



CERP

Computing Research Association
Evaluation

**2019 Data Buddies Department Report
University of Hawaii-Hilo**

REPORT INFORMATION

This report presents data collected via The Computing Research Association's (CRA) Data Buddies survey during the end of the Fall 2019 and the beginning of the Spring 2020 academic semesters. The Data Buddies surveys are designed to assess experiences of students engaged in the computing community. This includes students who are pursuing a computing degree, as well as students who are simply taking computing courses while pursuing other degrees.

Report structure

This report compares data collected from your students to data from students at similar institutions. In this report, **“similar institutions”** are those whose computing departments award Bachelor's degrees. Data are presented by student population (i.e. undergraduate and graduate). For each population, we present:

- An executive summary page containing key findings about students in your department
- Detailed comparative tables for:
 - Your students and students at similar institutions
 - Women and men at your institution and at similar institutions
 - Students from underrepresented racial/ethnic (URM) groups versus students who are from majority groups¹ at your institution and at other institutions.

If your institution did not have at least 5 respondents for a particular student group and/or does not have a particular student population (e.g., graduate students), there will be no content reported for that chapter.

Table layout

For each survey question, either a mean + standard deviation (SD) or a proportion (in percentage) is reported depending on the type of survey question. Sample sizes within each table are notated with '*n*' in the bottom row of each table; '*n*' indicates the number of students who responded to that specific chapter of the survey. Sample sizes may vary across tables because all survey questions were voluntary. Tables also present the results of inferential statistics assessing group differences (column labeled Sig.).

Statistical tests and reporting

Independent samples *t*-tests were used to assess group differences in means. A two-proportion *z*-test with unpooled variance was used to assess differences in proportions across groups.

For each statistical test, we indicate whether a comparison between two groups is “significant”. Significance is determined using a two-step process. First, we assessed whether group differences meet the conventional $p \leq .05$ threshold for inferential statistics. Then, if the $p \leq .05$ threshold was met, we observed the effect size for the two-group comparison using Cohen's *d* for the independent samples *t*-tests and Cohen's *h* for the two-proportion *z*-tests. In the current report, group comparisons are only deemed “significant” if they reach the $p \leq .05$ threshold and their effect size is $\geq .30$ (indicating an effect size of “medium” or greater). For an explanation of why we use this two-step process and more information on how to interpret inferential statistics, see the Appendix.

More CERP data

Past Data Buddies data are also displayed on a data visualization page on the CRA's Center for Evaluating the Research Pipeline's (CERP) website <http://cra.org/cerp/data-visualization>. CERP also publishes monthly infographics in the Computing Research Newsletter (<https://cra.org/crn/tag/cerp-infographics/>). Subscribe to CERP's newsletter at <https://cra.org/cerp/email-list>. For parties interested in working with CERP data, a data request application can be completed at <https://cra.org/cerp/cerp-data-request/>.

Thank you for contributing data to the CRA's Data Buddies Project! Your students' data help the computing community better understand correlates of persistence and success among computing students.

¹“URM” includes students who identify as African American/Black, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, Mexican American/Chicano/Puerto Rican/Other Latino, and students who identify with one or more of these groups. “Majority” includes racial/ethnic groups who are in the majority in computing, which are White/Caucasian; East Asian; Southeast Asian; South Asian, Other Asian.

Report Highlights: Undergraduate Students

May 21, 2020

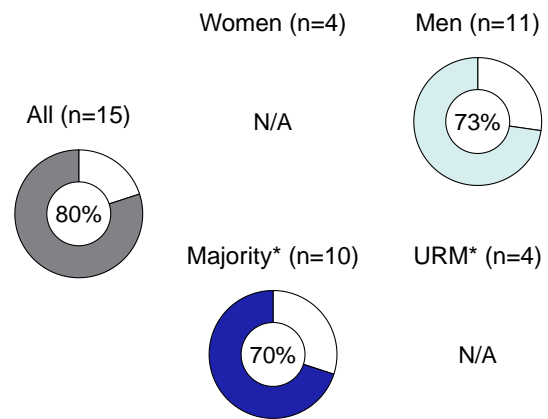
Reasons for selecting a computing major

At your institution, the following are the top five reasons why students selected, or are considering to select a computing major.

1. I like learning about computing
2. The job market for the computing field is promising
3. The courses required of the computing major are interesting
4. A computing major will allow me to make an impact on society
5. A computing major will enable me to make a lot of money

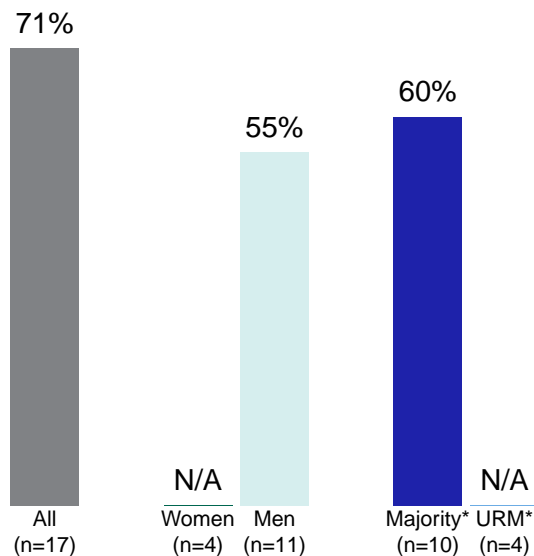
Satisfaction with the computing program

At your institution, the following are satisfied with the computing program:



Thoughts about leaving computing major

At your institution, the following thought about leaving their computing major:



Why did you consider leaving computing?

At your institution, the following are the top five reasons why students considered leaving their computing major.

1. I was having trouble passes my courses
2. I was interested in trying something new
3. The courses were difficult
4. I experienced health issues that inhibited my ability to feel/be successful
5. I did not like the course material

See full report for benchmarking on these topics and more!

* **URM**: "Underrepresented minority" in computing; students who identify as African American/Black; American Indian/Alaska Native; Mexican American/Chicano; Native Hawaiian/Pacific Islander; Puerto Rican, Other Latino. **Majority**: Students who identify with a racial/ethnic group in the majority in computing, including White/Caucasian and/or Asian.

N/A: $n < 5$ for the group for the specific question.

+ The calculations are independent for All Students, for Women/Men, and for Majority/URM.

Report Highlights: Graduate Students

May 21, 2020

This highlight page is not available for your department for the Fall 2019 Graduate Student Survey. Any of the following could be causing this:

- Your department did not participate in Data Buddies at the graduate level or does not have a graduate program.
- Your department had fewer than 5 usable responses from one or more of the following groups at the graduate level: women, men, racial/ethnic identities underrepresented in computing, majority racial/ethnic groups. Please see the section titled Report Information for description of these groups.

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Part I

Undergraduate Students

Chapter 1

Undergraduate Students: General Results

1.1 Student Background

Table 1.1.1 Which of the following experiences did you have prior to entering college?
Select all that apply

	Your Institution (%)	Similar Institutions (%)	Sig.
Took AP Computer Science A	5%	15%	
Took AP Computer Science Principles	5%	5%	
Took other AP courses	26%	32%	
Took dual enrollment courses	11%	11%	
Learned a computer programming language	37%	33%	
Engaged in software or hardware related projects	37%	21%	
Took part in student groups related to computing	16%	13%	
Completed an online course related to computing (e.g., MOOC)	11%	7%	
Attended a workshop or other training in computing (e.g., through your local library, community center, etc.)	16%	9%	
None of the above	53%	35%	
<i>n</i>	19	1797	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.1.2 Which of the following mathematics courses did you take prior to entering college?*Select all that apply*

	Your Institution (%)	Similar Institutions (%)	Sig.
Algebra I	79%	91%	
Algebra II	89%	86%	
Trigonometry	63%	70%	
Pre-calculus	53%	76%	*
Calculus	42%	59%	
Statistics	16%	34%	
None of the above	0%	2%	
<i>n</i>	19	1800	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met**Table 1.1.3 Which of the following applies to you?***Select all that apply*

	Your Institution (%)	Similar Institutions (%)	Sig.
I temporarily withdrew from my current institution	12%	2%	
I transferred from a 2-year institution to my current institution	35%	12%	*
I transferred from a 4-year institution to my current institution	24%	7%	*
I have taken courses for credit at a community college	41%	14%	*
I have completed a degree/certification at a community college	35%	6%	*
None of the above	18%	71%	*
<i>n</i>	17	1715	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met**Table 1.1.4 In what year do you expect to complete your current degree program?**

	Your Institution (%)	Similar Institutions (%)	Sig.
2019	6%	3%	
2020	24%	28%	
2021	29%	26%	
2022	35%	23%	
2023	0%	18%	
2024	0%	1%	
2025 or later	6%	0%	*
<i>n</i>	17	1725	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.1.5 Have you experienced any economic hardships during your program that made you consider, or led you to, a leave of absence?

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes	41%	18%	*
<i>n</i>	17	1707	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.1.6 Do you have any type of disability (e.g., physical, learning, mental, etc.)?

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes	25%	13%	
<i>n</i>	16	1303	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.2 Entering and Exiting the Field

Table 1.2.1 Why did you choose your degree program?

Choose up to 3 responses.

	Your Institution (%)	Similar Institutions (%)	Sig.
I like learning about this field	80%	78%	
My friends are enrolled in this program	0%	4%	
The courses required of this program are interesting	47%	37%	
Professors/faculty at my institution influenced my decision	13%	8%	
The program will allow me to make an impact on society	33%	30%	
This program will enable me to make a lot of money	27%	35%	
The job market for this field is promising	53%	62%	
My family influenced my decision	7%	11%	
I will be successful completing the coursework required of this program	13%	13%	
Another reason	13%	4%	
None of the above	0%	0%	
<i>n</i>	15	1180	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.2.2 During your studies at your current institution, how often have you considered leaving your degree program before completing it?

(1) Never - (5) All the time

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
During your studies at your current institution, how often have you considered leaving your degree program before completing it?	2.18 (1.07)	1.74 (0.97)	
<i>n</i>	17	1472	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.2.3 Why did you think about leaving computing?

Choose up to 3 responses.

	Your Institution (%)	Similar Institutions (%)	Sig.
The courses were difficult	25%	41%	
The math requirements were too hard	0%	13%	
I was interested in trying something new	33%	25%	
I did not like the course material	17%	18%	
I was having trouble passes my courses	42%	18%	
I did not have any friends in the major	8%	9%	
The professors were not supportive	0%	10%	
I felt isolated in my program	8%	20%	
The department did not make me feel welcome	0%	7%	
I experienced health issues that inhibited my ability to feel/be successful	25%	18%	
Another reason	50%	22%	
None of the above	0%	4%	
<i>n</i>	12	685	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.2.4 What helped you continue in your program when you were contemplating leaving?*Choose up to 3 responses.*

	Your Institution (%)	Similar Institutions (%)	Sig.
My family encouraged/supported me	25%	38%	
My friends encouraged/supported me	42%	29%	
Professors/faculty encouraged/supported me	42%	24%	
I had already invested too much time and resources	50%	62%	
I liked the field of study	58%	43%	
The job market is promising	42%	38%	
Another reason	17%	7%	
None of the above	0%	2%	
<i>n</i>	12	684	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.3 Perceptions of the Department

Table 1.3.1 Please indicate the extent to which you disagree or agree with the following statements.*(1) Strongly disagree - (5) Strongly agree*

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Overall, I am satisfied with the computing program at my institution	3.93 (1.16)	3.83 (1.02)	
I would recommend taking computing courses at my institution to a friend	3.56 (1.36)	3.99 (1.01)	
The number of students in my computing classes is too large	2.12 (1.15)	2.47 (1.22)	
I am satisfied with the technical content of the computing courses	3.69 (1.14)	3.75 (0.96)	
The computing courses at my institution are too difficult	2.62 (0.89)	2.65 (1.02)	
<i>n</i>	16	1457	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.3.2 How dissatisfied or satisfied are you with the following aspects of the computing program at your institution?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
The variety of computing courses offered	3.25 (1.18)	3.39 (1.07)	
Access to academic resources needed to do your work	4.06 (1.24)	3.88 (1.00)	
The availability of professors/instructors outside of class (e.g., office hours, answering questions via email, etc.)	4.19 (1.05)	4.18 (0.95)	
How well the program has prepared you for your future career	3.38 (1.09)	3.52 (0.98)	
The workload expected of you	3.44 (1.03)	3.51 (0.99)	
<i>n</i>	16	1456	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.3.3 Rate how you feel about the environment of the department of your computing program.

(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
I feel a sense of community in the computing department	3.75 (1.29)	3.58 (1.06)	
People in the department often attribute my success to special treatment or luck, rather than my competence	1.50 (0.82)	2.08 (1.14)	*
The environment in the computing department inspires me to do the best job that I can	3.94 (1.12)	3.63 (0.96)	
My ideas or opinions are minimized or ignored	2.00 (1.00)	2.12 (1.10)	
The department cares about its students	4.12 (0.96)	4.22 (0.91)	
The department is NOT very supportive of its students	1.75 (1.00)	1.84 (1.04)	
Computer science administrators (e.g., the department chair, dean, staff) and faculty care about diversity	4.31 (0.95)	3.79 (0.97)	*
<i>n</i>	16	1440	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.3.4 Do you have access to one or more academic advisor(s)?

Select all that apply

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes, I have an academic advisor(s) affiliated with the computing department	81%	65%	
Yes, I have an academic advisor(s) affiliated with another department	50%	45%	
No, I do not have an advisor yet	6%	6%	
<i>n</i>	16	1432	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.3.5 About how many times per semester/quarter do you interact with academic advisor(s) for the following reasons?

(1) Never - (5) Four or more times

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Course-related guidance	2.07 (0.96)	2.50 (0.77)	
Career advice	1.80 (0.94)	1.89 (0.92)	
Graduate school advice	1.60 (0.91)	1.62 (0.88)	
Another reason	2.20 (1.21)	2.01 (1.04)	
<i>n</i>	15	1264	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.3.6 How dissatisfied or satisfied are you with the following?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
How often you meet with your advisor(s)	3.60 (1.18)	3.75 (1.11)	
The academic guidance your advisor(s) provides	3.60 (1.35)	3.88 (1.10)	
The career advice your advisor(s) provides	3.67 (1.23)	3.64 (1.11)	
<i>n</i>	15	1325	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.4 Support Structures

Table 1.4.1 Approximately how often do you interact with the following individuals?

(1) Never - (5) More than 3 times per week

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Teaching assistants	1.56 (1.09)	2.19 (1.26)	*
An instructor/faculty member outside of lecture regarding a course	2.81 (1.33)	2.73 (1.09)	
An instructor/faculty member outside of lecture NOT regarding a course	2.50 (1.37)	2.13 (1.12)	
Classmates outside of lecture	4.06 (1.18)	3.81 (1.28)	
<i>n</i>	16	1383	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.4.2 How often to you receive the following from other students if you need it?*(1) Not at all - (5) Very much*

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Help and support	3.67 (1.29)	3.65 (1.10)	
Willingness to listen to issues you are having at school	3.56 (1.21)	3.52 (1.17)	
Feedback about your work	3.56 (1.26)	3.41 (1.16)	
<i>n</i>	16	1439	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met**Table 1.4.3 To what extent do you have a mentor who:***(1) Not at all - (5) Very much*

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
helps you improve your computing skills	2.81 (1.72)	2.61 (1.42)	
shows compassion for any issues you discussed with them	2.88 (1.78)	3.27 (1.42)	
shares personal experiences as an alternative perspective to your problem	2.75 (1.84)	3.00 (1.44)	
explores career options with you	2.50 (1.59)	2.84 (1.43)	
encourages you to do the best you can in your coursework	3.12 (1.71)	3.33 (1.46)	
supports your research ideas	2.50 (1.63)	2.79 (1.48)	
<i>n</i>	16	1386	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met**Table 1.4.4 Think about your relationships in computing. To what extent is each of the following available to you at this point?***(1) Not at all - (5) Very much*

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
People with whom you can discuss professional development questions	3.44 (1.31)	3.42 (1.13)	
People with whom you can discuss graduate school opportunities	3.06 (1.24)	3.31 (1.20)	
A strong network of peers to interact with at conferences	2.31 (1.08)	2.78 (1.25)	
A strong network of mentors to interact with at conferences	2.69 (1.30)	2.74 (1.26)	
People who would be excited to learn about your professional successes	3.19 (1.38)	3.33 (1.17)	
People with whom you can discuss issues you are having	3.31 (1.49)	3.42 (1.18)	
<i>n</i>	16	1500	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.5 Self-perceptions

Table 1.5.1 Please indicate the extent to which you disagree or agree with the following statements.

(1) Strongly Disagree - (5) Strongly Agree

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
I see myself as a computing person	4.06 (0.77)	3.69 (1.12)	
I feel like I belong in computing	3.56 (1.03)	3.45 (1.16)	
I feel like an outsider in computing	2.62 (1.15)	2.66 (1.22)	
Computing is a big part of who I am	3.56 (1.09)	2.97 (1.24)	*
I feel welcomed in computing	3.69 (1.14)	3.60 (1.00)	
I do not have much in common with the other students in my computing classes	2.38 (1.09)	2.77 (1.13)	
<i>n</i>	16	1523	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.5.2 In your opinion, to what extent are each of the following statements true of you?

(1) Not at all - (5) Very much

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
I can give the impression that I'm more competent than I really am	3.12 (1.63)	3.33 (1.23)	
When others praise me for something I have accomplished, I'm afraid I won't be able to live up to their expectations of me in the future	2.88 (1.54)	3.22 (1.35)	
At times, I feel my success has been due to some kind of luck	2.69 (1.74)	3.01 (1.38)	
I'm disappointed at times in my present accomplishments and think I should have accomplished much more by now	3.44 (1.41)	3.35 (1.37)	
<i>n</i>	16	1480	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.5.3 I am confident that I can:*(1) Strongly disagree - (5) Strongly agree*

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
pass my computing courses	4.44 (0.73)	4.43 (0.84)	
learn the foundations and concepts of computing	4.44 (0.73)	4.47 (0.74)	
do well in a computing-related contest (e.g., programming contest, robotics contest, hackathon)	3.44 (1.36)	3.32 (1.24)	
quickly learn a new programming language on my own	4.12 (0.89)	3.63 (1.20)	*
contribute to a research project in computing	4.25 (0.77)	3.56 (1.18)	*
clearly communicate technical problems and solutions to a range of audiences	3.44 (1.15)	3.76 (1.08)	
articulate thoughtful answers to theoretical questions about your work during a presentation	3.69 (1.25)	3.89 (1.02)	
introduce myself to new peers/colleagues at professional meetings	3.44 (1.50)	3.94 (1.04)	
be a capable researcher in computing	3.56 (1.09)	3.47 (1.13)	
find employment in an area of computing interest	3.81 (0.91)	3.81 (1.11)	
complete an undergraduate degree in computing	4.50 (0.73)	4.28 (1.13)	
get admitted to a graduate computing program	3.69 (1.14)	3.56 (1.19)	
be successful in a graduate computing program	4.00 (0.89)	3.58 (1.22)	
<i>n</i>	16	1481	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.5.4 In your opinion, to what extent would a career in computing allow you to do the following.*(1) Not at all - (5) Extremely*

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Serve humanity	3.88 (1.05)	3.49 (1.08)	
Be in a position of influence in society	3.59 (1.37)	3.49 (1.14)	
Spend at lot of time with family	3.18 (1.24)	3.25 (1.04)	
<i>n</i>	17	1583	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.6 Activities

Table 1.6.1 How often have you been involved in each of the following groups or activities?

(1) Never - (5) Four or more times

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Internships related to computing	1.94 (1.00)	1.51 (0.80)	
Jobs related to computing	1.81 (0.91)	1.36 (0.74)	
Career mentoring programs or workshops	1.44 (0.81)	1.50 (0.85)	
Outreach to K-12 students related to computing	1.44 (0.96)	1.35 (0.80)	
Computing-related student groups (e.g., technical organizations on campus, ACM student chapters, etc.)	1.69 (1.01)	1.66 (0.95)	
Other student groups (e.g., Greek Life, volunteer groups, academic merit societies, etc.)	1.62 (1.15)	2.16 (1.21)	
<i>n</i>	16	1328	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.6.2 How often have you been involved in each of the following groups or activities?

(1) Never - (5) Four or more times

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Submitted a poster proposal to a conference	1.25 (0.58)	1.22 (0.57)	
Submitted a paper proposal to a conference	1.12 (0.34)	1.18 (0.52)	
Submitted a paper for publication in a peer reviewed journal	1.38 (0.62)	1.15 (0.50)	
Presented a poster at a conference	1.12 (0.34)	1.21 (0.57)	
Given an oral presentation at a conference	1.31 (0.70)	1.24 (0.63)	
Had a paper accepted for publication in conference proceedings	1.00 (0.00)	1.14 (0.47)	
Had a paper accepted for publication in a peer reviewed journal	1.12 (0.50)	1.13 (0.49)	
<i>n</i>	16	1328	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.6.3 During your academic career to date, have you participated in any of the following conferences or programs?

Select all that apply

	Your Institution (%)	Similar Institutions (%)	Sig.
ACM Richard Tapia Celebration of Diversity in Computing	0%	2%	
Grace Hopper Celebration of Women in Computing	0%	5%	
Local events related to diversity in computing	17%	8%	
None of these	83%	87%	
<i>n</i>	12	1206	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.6.4 During your academic career to date, have you pursued any of the following resources at your institution?

Select all that apply

	Your Institution (%)	Similar Institutions (%)	Sig.
Peer tutoring	53%	42%	
Tutoring offered by your department/college	60%	39%	
Peer mentoring	20%	16%	
Career counseling	27%	28%	
Mental health counseling	13%	21%	
Does not apply to me	20%	32%	
<i>n</i>	15	1305	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.7 Future Plans and Interests

Table 1.7.1 For your future career, in which setting would you like to work the most?

	Your Institution (%)	Similar Institutions (%)	Sig.
Academia	18%	11%	
Industry	47%	51%	
Government	18%	12%	
Self-employment	12%	17%	
Something else	6%	8%	
<i>n</i>	17	1574	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.7.2 How interested are you in having a career:

(1) Not at all interested - (5) Extremely interested

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
doing computing-related work	4.41 (0.80)	3.72 (1.23)	*
in computing research	3.12 (1.45)	2.70 (1.25)	
<i>n</i>	17	1576	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.7.3 How interested are you in having the types of jobs listed below after you finish your highest degree?

(1) Very uninterested - (5) Very interested

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
College or university professor in computing field (teaching focused)	2.44 (1.26)	2.45 (1.37)	
College or university professor in computing field (research focused)	2.69 (1.62)	2.36 (1.31)	
K-12 computing teacher	2.19 (1.22)	2.05 (1.25)	
Computing researcher in industry	3.12 (1.41)	2.91 (1.33)	
Computing researcher in a government lab or agency	3.12 (1.41)	2.88 (1.34)	
A non-research computing position in industry (e.g., software engineer)	3.94 (1.29)	3.69 (1.30)	
A non-research computing position in government	3.31 (1.35)	3.13 (1.32)	
Entrepreneur (computing related; e.g., individual contractor, build a start-up)	3.56 (1.41)	3.38 (1.33)	
Non-computing career	2.13 (1.46)	3.00 (1.38)	*
<i>n</i>	15	1537	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.7.4 What is the highest degree you plan to attain?

	Your Institution (%)	Similar Institutions (%)	Sig.
Associate's degree	6%	1%	
Bachelor's degree	41%	36%	
Master's degree	29%	43%	
Doctoral degree	24%	20%	
None of the above	0%	0%	
<i>n</i>	17	1600	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.7.5 Do you intend to earn/ have your earned your highest degree in a computing-related field?

	Your Institution (%)	Similar Institutions (%)	Sig.
No	24%	34%	
Yes	76%	66%	
<i>n</i>	17	1554	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Chapter 2

Undergraduate Students: Results by Gender

Data for individuals who do not identify as either a woman or a man are not included in this report due to small samples sizes.

2.1 Student Background

Table 2.1.1 Which of the following experiences did you have prior to entering college?

Select all that apply

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Took AP Computer Science A	N/A	0%	N/A	16%	16%	
Took AP Computer Science Principles	N/A	0%	N/A	4%	6%	
Took other AP courses	N/A	18%	N/A	39%	28%	
Took dual enrollment courses	N/A	9%	N/A	13%	12%	
Learned a computer programming language	N/A	45%	N/A	29%	35%	
Engaged in software or hardware related projects	N/A	36%	N/A	16%	25%	
Took part in student groups related to computing	N/A	9%	N/A	12%	12%	
Completed an online course related to computing (e.g., MOOC)	N/A	18%	N/A	7%	8%	
Attended a workshop or other training in computing (e.g., through your local library, community center, etc.)	N/A	18%	N/A	11%	7%	
None of the above	N/A	55%	N/A	38%	34%	
<i>n</i>	4	11		520	760	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.2 Which of the following mathematics courses did you take prior to entering college?

Select all that apply

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Algebra I	N/A	73%	N/A	93%	91%	
Algebra II	N/A	91%	N/A	88%	86%	
Trigonometry	N/A	55%	N/A	70%	72%	
Pre-calculus	N/A	55%	N/A	82%	74%	
Calculus	N/A	36%	N/A	69%	56%	
Statistics	N/A	9%	N/A	38%	34%	
None of the above	N/A	0%	N/A	2%	1%	
<i>n</i>	4	11		520	761	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.3 Which of the following applies to you?

Select all that apply

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
I temporarily withdrew from my current institution	N/A	18%	N/A	2%	1%	
I transferred from a 2-year institution to my current institution	N/A	18%	N/A	8%	13%	
I transferred from a 4-year institution to my current institution	N/A	18%	N/A	5%	8%	
I have taken courses for credit at a community college	N/A	18%	N/A	12%	14%	
I have completed a degree/certification at a community college	N/A	27%	N/A	5%	5%	
None of the above	N/A	27%	N/A	76%	69%	
<i>n</i>	4	11		514	749	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.4 In what year do you expect to complete your current degree program?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
2019	N/A	0%	N/A	2%	4%	
2020	N/A	9%	N/A	28%	30%	
2021	N/A	36%	N/A	26%	26%	
2022	N/A	45%	N/A	24%	22%	
2023	N/A	0%	N/A	19%	17%	
2024	N/A	0%	N/A	0%	1%	
2025 or later	N/A	9%	N/A	0%	0%	N/A
<i>n</i>	4	11		517	755	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.5 Have you experienced any economic hardships during your program that made you consider, or led you to, a leave of absence?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes	N/A	27%	N/A	15%	18%	
<i>n</i>	4	11		516	752	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.6 Do you have any type of disability (e.g., physical, learning, mental, etc.)?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes	N/A	27%	N/A	15%	10%	
<i>n</i>	4	11		513	753	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.2 Entering and Exiting the Field

Table 2.2.1 Why did you choose your degree program?

Choose up to 3 responses.

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
I like learning about this field	N/A	80%	N/A	75%	79%	
My friends are enrolled in this program	N/A	0%	N/A	3%	4%	
The courses required of this program are interesting	N/A	50%	N/A	37%	37%	
Professors/faculty at my institution influenced my decision	N/A	10%	N/A	14%	5%	*
The program will allow me to make an impact on society	N/A	30%	N/A	35%	29%	
This program will enable me to make a lot of money	N/A	10%	N/A	32%	36%	
The job market for this field is promising	N/A	60%	N/A	59%	63%	
My family influenced my decision	N/A	10%	N/A	12%	10%	
I will be successful completing the coursework required of this program	N/A	10%	N/A	14%	13%	
Another reason	N/A	20%	N/A	5%	4%	
None of the above	N/A	0%	N/A	0%	0%	
<i>n</i>	3	10		330	571	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.2.2 During your studies at your current institution, how often have you considered leaving your degree program before completing it?

(1) Never - (5) All the time

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
During your studies at your current institution, how often have you considered leaving your degree program before completing it?	N/A	2.09 (1.30)	N/A	1.74 (0.97)	1.70 (0.93)	
<i>n</i>	4	11		443	666	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.2.3 Why did you think about leaving computing?*Choose up to 3 responses.*

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
The courses were difficult	N/A	0%	N/A	41%	39%	
The math requirements were too hard	N/A	0%	N/A	11%	15%	
I was interested in trying something new	N/A	50%	N/A	23%	27%	
I did not like the course material	N/A	33%	N/A	15%	21%	
I was having trouble passes my courses	N/A	33%	N/A	19%	17%	
I did not have any friends in the major	N/A	17%	N/A	11%	8%	
The professors were not supportive	N/A	0%	N/A	10%	10%	
I felt isolated in my program	N/A	17%	N/A	25%	17%	
The department did not make me feel welcome	N/A	0%	N/A	10%	6%	
I experienced health issues that inhibited my ability to feel/be successful	N/A	17%	N/A	22%	16%	
Another reason	N/A	50%	N/A	22%	24%	
None of the above	N/A	0%	N/A	4%	5%	
<i>n</i>	4	6		208	300	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.2.4 What helped you continue in your program when you were contemplating leaving?*Choose up to 3 responses.*

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
My family encouraged/supported me	N/A	17%	N/A	34%	39%	
My friends encouraged/supported me	N/A	33%	N/A	33%	25%	
Professors/faculty encouraged/supported me	N/A	50%	N/A	30%	19%	
I had already invested too much time and resources	N/A	33%	N/A	71%	61%	
I liked the field of study	N/A	50%	N/A	40%	48%	
The job market is promising	N/A	50%	N/A	38%	43%	
Another reason	N/A	33%	N/A	5%	10%	
None of the above	N/A	0%	N/A	1%	2%	
<i>n</i>	4	6		207	301	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.3 Perceptions of the Department

Table 2.3.1 Please indicate the extent to which you disagree or agree with the following statements.
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Overall, I am satisfied with the computing program at my institution	N/A	3.82 (1.33)	N/A	3.81 (1.00)	3.87 (1.02)	
I would recommend taking computing courses at my institution to a friend	N/A	3.36 (1.43)	N/A	3.98 (1.04)	4.01 (1.00)	
The number of students in my computing classes is too large	N/A	2.09 (1.22)	N/A	2.46 (1.22)	2.43 (1.21)	
I am satisfied with the technical content of the computing courses	N/A	3.73 (1.27)	N/A	3.74 (0.96)	3.78 (0.97)	
The computing courses at my institution are too difficult	N/A	2.55 (0.69)	N/A	2.73 (0.98)	2.58 (1.02)	
<i>n</i>	4	11		512	746	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.3.2 How dissatisfied or satisfied are you with the following aspects of the computing program at your institution?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
The variety of computing courses offered	N/A	3.45 (1.21)	N/A	3.26 (1.11)	3.48 (1.04)	
Access to academic resources needed to do your work	N/A	4.09 (1.45)	N/A	3.83 (1.04)	3.91 (0.98)	
The availability of professors/instructors outside of class (e.g., office hours, answering questions via email, etc.)	N/A	4.18 (1.25)	N/A	4.21 (0.97)	4.18 (0.94)	
How well the program has prepared you for your future career	N/A	3.45 (1.13)	N/A	3.45 (1.02)	3.55 (0.96)	
The workload expected of you	N/A	3.27 (1.19)	N/A	3.47 (1.03)	3.53 (0.99)	
<i>n</i>	4	11		512	746	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.3.3 Rate how you feel about the environment of the department of your computing program.

(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
I feel a sense of community in the computing department	N/A	3.73 (1.35)	N/A	3.55 (1.11)	3.60 (1.05)	
People in the department often attribute my success to special treatment or luck, rather than my competence	N/A	1.73 (0.90)	N/A	2.07 (1.13)	2.04 (1.13)	
The environment in the computing department inspires me to do the best job that I can	N/A	3.82 (1.33)	N/A	3.61 (1.00)	3.66 (0.94)	
My ideas or opinions are minimized or ignored	N/A	2.10 (1.10)	N/A	2.11 (1.07)	2.08 (1.10)	
The department cares about its students	N/A	4.09 (1.04)	N/A	4.23 (0.92)	4.24 (0.90)	
The department is NOT very supportive of its students	N/A	1.73 (1.10)	N/A	1.79 (1.01)	1.83 (1.04)	
Computer science administrators (e.g., the department chair, dean, staff) and faculty care about diversity	N/A	4.09 (1.04)	N/A	3.74 (1.00)	3.82 (0.95)	
<i>n</i>	4	11		510	747	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.3.4 Do you have access to one or more academic advisor(s)?

Select all that apply

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes, I have an academic advisor(s) affiliated with the computing department	N/A	82%	N/A	61%	66%	
Yes, I have an academic advisor(s) affiliated with another department	N/A	45%	N/A	53%	42%	
No, I do not have an advisor yet	N/A	9%	N/A	4%	6%	
<i>n</i>	4	11		509	749	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.3.5 About how many times per semester/quarter do you interact with academic advisor(s) for the following reasons?

(1) Never - (5) Four or more times

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Course-related guidance	N/A	1.80 (0.79)	N/A	2.48 (0.82)	2.50 (0.72)	
Career advice	N/A	1.60 (0.70)	N/A	1.86 (0.93)	1.88 (0.90)	
Graduate school advice	N/A	1.40 (0.52)	N/A	1.55 (0.86)	1.63 (0.87)	
Another reason	N/A	2.00 (1.25)	N/A	2.06 (1.09)	1.96 (1.02)	
<i>n</i>	4	10		463	667	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.3.6 How dissatisfied or satisfied are you with the following?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
How often you meet with your advisor(s)	N/A	3.40 (1.35)	N/A	3.74 (1.18)	3.77 (1.08)	
The academic guidance your advisor(s) provides	N/A	3.30 (1.49)	N/A	3.79 (1.19)	3.93 (1.06)	
The career advice your advisor(s) provides	N/A	3.40 (1.35)	N/A	3.61 (1.19)	3.65 (1.09)	
<i>n</i>	4	10		485	698	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.4 Support Structures

Table 2.4.1 Approximately how often do you interact with the following individuals?

(1) Never - (5) More than 3 times per week

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Teaching assistants	N/A	1.73 (1.27)	N/A	2.35 (1.34)	2.03 (1.19)	
An instructor/faculty member outside of lecture regarding a course	N/A	2.64 (1.29)	N/A	2.85 (1.07)	2.62 (1.08)	
An instructor/faculty member outside of lecture NOT regarding a course	N/A	2.27 (1.27)	N/A	2.16 (1.11)	2.08 (1.11)	
Classmates outside of lecture	N/A	4.00 (1.34)	N/A	3.99 (1.18)	3.74 (1.31)	
<i>n</i>	4	11		504	740	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.4.2 How often to you receive the following from other students if you need it?

(1) Not at all - (5) Very much

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Help and support	N/A	3.70 (1.34)	N/A	3.75 (1.09)	3.59 (1.09)	
Willingness to listen to issues you are having at school	N/A	3.45 (1.21)	N/A	3.58 (1.19)	3.49 (1.16)	
Feedback about your work	N/A	3.55 (1.21)	N/A	3.41 (1.21)	3.43 (1.14)	
<i>n</i>	4	11		510	746	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.4.3 To what extent do you have a mentor who:*(1) Not at all - (5) Very much*

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
helps you improve your computing skills	N/A	2.82 (1.83)	N/A	2.63 (1.41)	2.56 (1.45)	
shows compassion for any issues you discussed with them	N/A	2.73 (2.00)	N/A	3.46 (1.40)	3.14 (1.44)	
shares personal experiences as an alternative perspective to your problem	N/A	2.82 (2.09)	N/A	3.05 (1.47)	2.92 (1.44)	
explores career options with you	N/A	2.18 (1.54)	N/A	2.89 (1.48)	2.79 (1.41)	
encourages you to do the best you can in your coursework	N/A	2.82 (1.94)	N/A	3.47 (1.44)	3.22 (1.48)	
supports your research ideas	N/A	2.36 (1.80)	N/A	2.78 (1.52)	2.74 (1.46)	
<i>n</i>	4	11		503	745	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.4.4 Think about your relationships in computing. To what extent is each of the following available to you at this point?*(1) Not at all - (5) Very much*

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
People with whom you can discuss professional development questions	N/A	3.18 (1.25)	N/A	3.43 (1.14)	3.45 (1.12)	
People with whom you can discuss graduate school opportunities	N/A	2.91 (1.30)	N/A	3.37 (1.21)	3.27 (1.20)	
A strong network of peers to interact with at conferences	N/A	2.36 (1.03)	N/A	2.72 (1.26)	2.81 (1.24)	
A strong network of mentors to interact with at conferences	N/A	2.82 (1.33)	N/A	2.66 (1.29)	2.77 (1.23)	
People who would be excited to learn about your professional successes	N/A	2.82 (1.33)	N/A	3.36 (1.20)	3.31 (1.16)	
People with whom you can discuss issues you are having	N/A	2.91 (1.58)	N/A	3.45 (1.20)	3.41 (1.17)	
<i>n</i>	4	11		512	755	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.5 Self-perceptions

Table 2.5.1 Please indicate the extent to which you disagree or agree with the following statements.
(1) Strongly Disagree - (5) Strongly Agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
I see myself as a computing person	N/A	4.00 (0.89)	N/A	3.44 (1.19)	3.85 (1.08)	*
I feel like I belong in computing	N/A	3.73 (1.01)	N/A	3.15 (1.18)	3.67 (1.10)	*
I feel like an outsider in computing	N/A	2.45 (0.93)	N/A	2.98 (1.17)	2.41 (1.20)	*
Computing is a big part of who I am	N/A	3.27 (1.01)	N/A	2.69 (1.26)	3.12 (1.22)	*
I feel welcomed in computing	N/A	3.82 (1.17)	N/A	3.34 (1.04)	3.79 (0.92)	*
I do not have much in common with the other students in my computing classes	N/A	2.09 (0.94)	N/A	2.82 (1.10)	2.69 (1.14)	
<i>n</i>	4	11		512	750	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.5.2 In your opinion, to what extent are each of the following statements true of you?
(1) Not at all - (5) Very much

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
I can give the impression that I'm more competent than I really am	N/A	2.73 (1.74)	N/A	3.25 (1.28)	3.40 (1.21)	
When others praise me for something I have accomplished, I'm afraid I won't be able to live up to their expectations of me in the future	N/A	2.73 (1.56)	N/A	3.43 (1.37)	3.10 (1.36)	
At times, I feel my success has been due to some kind of luck	N/A	2.27 (1.68)	N/A	3.22 (1.42)	2.88 (1.35)	
I'm disappointed at times in my present accomplishments and think I should have accomplished much more by now	N/A	3.18 (1.54)	N/A	3.39 (1.37)	3.31 (1.40)	
<i>n</i>	4	11		513	755	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.5.3 I am confident that I can:
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
pass my computing courses	N/A	4.27 (0.79)	N/A	4.32 (0.86)	4.54 (0.80)	
learn the foundations and concepts of computing	N/A	4.36 (0.81)	N/A	4.39 (0.75)	4.57 (0.70)	
do well in a computing-related contest (e.g., programming contest, robotics contest, hackathon)	N/A	3.36 (1.36)	N/A	3.05 (1.27)	3.46 (1.21)	*
quickly learn a new programming language on my own	N/A	4.00 (0.89)	N/A	3.43 (1.25)	3.76 (1.16)	
contribute to a research project in computing	N/A	4.00 (0.77)	N/A	3.37 (1.27)	3.64 (1.12)	
clearly communicate technical problems and solutions to a range of audiences	N/A	3.45 (1.21)	N/A	3.59 (1.13)	3.86 (1.04)	
articulate thoughtful answers to theoretical questions about your work during a presentation	N/A	3.64 (1.29)	N/A	3.73 (1.09)	3.99 (0.97)	
introduce myself to new peers/colleagues at professional meetings	N/A	3.00 (1.61)	N/A	3.88 (1.12)	3.98 (1.01)	
be a capable researcher in computing	N/A	3.64 (1.12)	N/A	3.24 (1.20)	3.56 (1.09)	
find employment in an area of computing interest	N/A	3.55 (0.93)	N/A	3.57 (1.16)	3.94 (1.06)	*
complete an undergraduate degree in computing	N/A	4.45 (0.69)	N/A	4.04 (1.27)	4.42 (1.04)	*
get admitted to a graduate computing program	N/A	3.45 (1.13)	N/A	3.29 (1.25)	3.69 (1.15)	*
be successful in a graduate computing program	N/A	3.91 (0.83)	N/A	3.28 (1.28)	3.71 (1.17)	*
<i>n</i>	4	11		512	748	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.5.4 In your opinion, to what extent would a career in computing allow you to do the following.
 (1) Not at all - (5) Extremely

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Serve humanity	N/A	3.73 (1.19)	N/A	3.54 (1.04)	3.46 (1.09)	
Be in a position of influence in society	N/A	3.73 (1.27)	N/A	3.58 (1.09)	3.42 (1.16)	
Spend at lot of time with family	N/A	2.73 (1.19)	N/A	3.19 (1.06)	3.27 (1.04)	
<i>n</i>	4	11		516	758	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.6 Activities

Table 2.6.1 How often have you been involved in each of the following groups or activities?
 (1) Never - (5) Four or more times

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Internships related to computing	N/A	1.64 (0.81)	N/A	1.54 (0.82)	1.47 (0.77)	
Jobs related to computing	N/A	1.73 (0.90)	N/A	1.33 (0.70)	1.37 (0.74)	
Career mentoring programs or workshops	N/A	1.55 (0.93)	N/A	1.61 (0.91)	1.42 (0.79)	
Outreach to K-12 students related to computing	N/A	1.64 (1.12)	N/A	1.42 (0.87)	1.28 (0.74)	
Computing-related student groups (e.g., technical organizations on campus, ACM student chapters, etc.)	N/A	1.45 (1.04)	N/A	1.79 (1.00)	1.56 (0.90)	
Other student groups (e.g., Greek Life, volunteer groups, academic merit societies, etc.)	N/A	1.45 (1.04)	N/A	2.46 (1.25)	1.96 (1.15)	*
<i>n</i>	4	11		499	731	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.6.2 How often have you been involved in each of the following groups or activities?

(1) Never - (5) Four or more times

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Submitted a poster proposal to a conference	N/A	1.00 (0.00)	N/A	1.22 (0.54)	1.20 (0.56)	
Submitted a paper proposal to a conference	N/A	1.09 (0.30)	N/A	1.17 (0.48)	1.16 (0.52)	
Submitted a paper for publication in a peer reviewed journal	N/A	1.27 (0.65)	N/A	1.13 (0.45)	1.13 (0.48)	
Presented a poster at a conference	N/A	1.00 (0.00)	N/A	1.20 (0.53)	1.20 (0.56)	
Given an oral presentation at a conference	N/A	1.09 (0.30)	N/A	1.24 (0.63)	1.21 (0.59)	
Had a paper accepted for publication in conference proceedings	N/A	1.00 (0.00)	N/A	1.13 (0.44)	1.12 (0.43)	
Had a paper accepted for publication in a peer reviewed journal	N/A	1.18 (0.60)	N/A	1.11 (0.42)	1.13 (0.49)	
<i>n</i>	4	11		500	729	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.6.3 During your academic career to date, have you participated in any of the following conferences or programs?

Select all that apply

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
ACM Richard Tapia Celebration of Diversity in Computing	N/A	0%	N/A	3%	2%	
Grace Hopper Celebration of Women in Computing	N/A	0%	N/A	11%	0%	*
Local events related to diversity in computing	N/A	0%	N/A	10%	5%	
None of these	N/A	100%	N/A	78%	93%	*
<i>n</i>	3	8		456	661	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.6.4 During your academic career to date, have you pursued any of the following resources at your institution?

Select all that apply

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Peer tutoring	N/A	50%	N/A	51%	37%	
Tutoring offered by your department/college	N/A	40%	N/A	46%	34%	
Peer mentoring	N/A	20%	N/A	19%	15%	
Career counseling	N/A	20%	N/A	35%	23%	
Mental health counseling	N/A	10%	N/A	33%	14%	*
Does not apply to me	N/A	30%	N/A	21%	39%	*
<i>n</i>	4	10		497	710	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.7 Future Plans and Interests

Table 2.7.1 For your future career, in which setting would you like to work the most?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Academia	N/A	18%	N/A	15%	9%	
Industry	N/A	45%	N/A	50%	54%	
Government	N/A	18%	N/A	13%	11%	
Self-employment	N/A	9%	N/A	13%	19%	
Something else	N/A	9%	N/A	10%	7%	
<i>n</i>	4	11		514	755	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.7.2 How interested are you in having a career:*(1) Not at all interested - (5) Extremely interested*

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
doing computing-related work	N/A	4.18 (0.87)	N/A	3.52 (1.32)	3.82 (1.19)	
in computing research	N/A	3.09 (1.45)	N/A	2.47 (1.23)	2.77 (1.22)	
<i>n</i>	4	11		515	755	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.7.3 How interested are you in having the types of jobs listed below after you finish your highest degree?*(1) Very uninterested - (5) Very interested*

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
College or university professor in computing field (teaching focused)	N/A	2.09 (1.22)	N/A	2.47 (1.42)	2.42 (1.33)	
College or university professor in computing field (research focused)	N/A	2.64 (1.63)	N/A	2.26 (1.30)	2.37 (1.29)	
K-12 computing teacher	N/A	2.00 (1.10)	N/A	2.08 (1.32)	2.01 (1.21)	
Computing researcher in industry	N/A	3.09 (1.45)	N/A	2.66 (1.37)	3.03 (1.31)	
Computing researcher in a government lab or agency	N/A	3.00 (1.41)	N/A	2.64 (1.40)	2.98 (1.30)	
A non-research computing position in industry (e.g., software engineer)	N/A	3.82 (1.54)	N/A	3.50 (1.46)	3.82 (1.21)	
A non-research computing position in government	N/A	3.36 (1.43)	N/A	2.86 (1.38)	3.27 (1.27)	*
Entrepreneur (computing related; e.g., individual contractor, build a start-up)	N/A	3.18 (1.47)	N/A	3.08 (1.40)	3.55 (1.25)	*
Non-computing career	N/A	2.18 (1.33)	N/A	3.22 (1.38)	2.86 (1.39)	
<i>n</i>	3	11		511	747	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.7.4 What is the highest degree you plan to attain?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Associate's degree	N/A	9%	N/A	1%	1%	
Bachelor's degree	N/A	45%	N/A	26%	43%	*
Master's degree	N/A	27%	N/A	49%	40%	
Doctoral degree	N/A	18%	N/A	25%	16%	
None of the above	N/A	0%	N/A	0%	0%	
<i>n</i>	4	11		517	758	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.7.5 Do you intend to earn/ have your earned your highest degree in a computing-related field?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
No	N/A	27%	N/A	43%	29%	
Yes	N/A	73%	N/A	57%	71%	
<i>n</i>	4	11		508	740	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Chapter 3

Undergraduate Students: Results by Race/Ethnicity

3.1 Student Background

Table 3.1.1 Which of the following experiences did you have prior to entering college?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Took AP Computer Science A	0%	N/A	N/A	18%	10%	
Took AP Computer Science Principles	0%	N/A	N/A	5%	4%	
Took other AP courses	30%	N/A	N/A	32%	33%	
Took dual enrollment courses	10%	N/A	N/A	12%	13%	
Learned a computer programming language	40%	N/A	N/A	35%	25%	
Engaged in software or hardware related projects	30%	N/A	N/A	22%	22%	
Took part in student groups related to computing	0%	N/A	N/A	13%	11%	
Completed an online course related to computing (e.g., MOOC)	20%	N/A	N/A	7%	10%	
Attended a workshop or other training in computing (e.g., through your local library, community center, etc.)	10%	N/A	N/A	9%	7%	
None of the above	50%	N/A	N/A	35%	33%	
<i>n</i>	10	4		973	288	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.2 Which of the following mathematics courses did you take prior to entering college?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Algebra I	80%	N/A	N/A	92%	92%	
Algebra II	90%	N/A	N/A	88%	80%	
Trigonometry	60%	N/A	N/A	74%	62%	
Pre-calculus	50%	N/A	N/A	81%	67%	*
Calculus	60%	N/A	N/A	68%	42%	*
Statistics	10%	N/A	N/A	35%	34%	
None of the above	0%	N/A	N/A	1%	3%	
<i>n</i>	10	4		975	288	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.3 Which of the following applies to you?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
I temporarily withdrew from my current institution	20%	N/A	N/A	2%	3%	
I transferred from a 2-year institution to my current institution	20%	N/A	N/A	9%	16%	
I transferred from a 4-year institution to my current institution	20%	N/A	N/A	6%	7%	
I have taken courses for credit at a community college	40%	N/A	N/A	14%	13%	
I have completed a degree/certification at a community college	30%	N/A	N/A	4%	6%	
None of the above	20%	N/A	N/A	74%	67%	
<i>n</i>	10	4		963	281	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.4 In what year do you expect to complete your current degree program?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
2019	0%	N/A	N/A	3%	4%	
2020	10%	N/A	N/A	31%	25%	
2021	40%	N/A	N/A	24%	32%	
2022	40%	N/A	N/A	23%	19%	
2023	0%	N/A	N/A	17%	20%	
2024	0%	N/A	N/A	1%	1%	
2025 or later	10%	N/A	N/A	0%	0%	N/A
<i>n</i>	10	4		973	280	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.5 Have you experienced any economic hardships during your program that made you consider, or led you to, a leave of absence?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes	30%	N/A	N/A	12%	29%	*
<i>n</i>	10	4		967	282	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.6 Do you have any type of disability (e.g., physical, learning, mental, etc.)?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes	30%	N/A	N/A	15%	7%	
<i>n</i>	10	4		969	285	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.2 Entering and Exiting the Field

Table 3.2.1 Why did you choose your degree program?

Choose up to 3 responses.

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
I like learning about this field	75%	N/A	N/A	79%	72%	
My friends are enrolled in this program	0%	N/A	N/A	4%	4%	
The courses required of this program are interesting	50%	N/A	N/A	39%	31%	
Professors/faculty at my institution influenced my decision	12%	N/A	N/A	10%	4%	
The program will allow me to make an impact on society	38%	N/A	N/A	30%	32%	
This program will enable me to make a lot of money	0%	N/A	N/A	32%	43%	
The job market for this field is promising	50%	N/A	N/A	62%	63%	
My family influenced my decision	12%	N/A	N/A	10%	14%	
I will be successful completing the coursework required of this program	12%	N/A	N/A	14%	10%	
Another reason	25%	N/A	N/A	4%	6%	
None of the above	0%	N/A	N/A	0%	0%	
<i>n</i>	8	4		689	207	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.2.2 During your studies at your current institution, how often have you considered leaving your degree program before completing it?

(1) Never - (5) All the time

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
During your studies at your current institution, how often have you considered leaving your degree program before completing it?	2.20 (1.32)	N/A	N/A	1.66 (0.89)	1.91 (1.07)	
<i>n</i>	10	4		839	254	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.2.3 Why did you think about leaving computing?

Choose up to 3 responses.

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
The courses were difficult	17%	N/A	N/A	37%	49%	
The math requirements were too hard	0%	N/A	N/A	11%	15%	
I was interested in trying something new	50%	N/A	N/A	26%	25%	
I did not like the course material	17%	N/A	N/A	19%	16%	
I was having trouble passes my courses	0%	N/A	N/A	13%	31%	*
I did not have any friends in the major	17%	N/A	N/A	9%	9%	
The professors were not supportive	0%	N/A	N/A	9%	11%	
I felt isolated in my program	17%	N/A	N/A	20%	23%	
The department did not make me feel welcome	0%	N/A	N/A	7%	10%	
I experienced health issues that inhibited my ability to feel/be successful	17%	N/A	N/A	21%	16%	
Another reason	67%	N/A	N/A	23%	22%	
None of the above	0%	N/A	N/A	4%	2%	
<i>n</i>	6	3		368	138	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.2.4 What helped you continue in your program when you were contemplating leaving?

Choose up to 3 responses.

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
My family encouraged/supported me	33%	N/A	N/A	37%	38%	
My friends encouraged/supported me	17%	N/A	N/A	28%	31%	
Professors/faculty encouraged/supported me	50%	N/A	N/A	26%	21%	
I had already invested too much time and resources	33%	N/A	N/A	63%	69%	
I liked the field of study	67%	N/A	N/A	46%	39%	
The job market is promising	33%	N/A	N/A	40%	43%	
Another reason	17%	N/A	N/A	8%	9%	
None of the above	0%	N/A	N/A	1%	0%	
<i>n</i>	6	3		369	137	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.3 Perceptions of the Department

Table 3.3.1 Please indicate the extent to which you disagree or agree with the following statements.
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Overall, I am satisfied with the computing program at my institution	3.70 (1.34)	N/A	N/A	3.87 (0.99)	3.83 (1.07)	
I would recommend taking computing courses at my institution to a friend	3.40 (1.35)	N/A	N/A	4.05 (0.99)	3.91 (1.04)	
The number of students in my computing classes is too large	2.00 (1.25)	N/A	N/A	2.47 (1.24)	2.39 (1.17)	
I am satisfied with the technical content of the computing courses	3.60 (1.26)	N/A	N/A	3.78 (0.96)	3.74 (0.98)	
The computing courses at my institution are too difficult	2.60 (0.52)	N/A	N/A	2.61 (1.02)	2.64 (1.01)	
<i>n</i>	10	4		963	278	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.3.2 How dissatisfied or satisfied are you with the following aspects of the computing program at your institution?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
The variety of computing courses offered	3.30 (1.25)	N/A	N/A	3.38 (1.08)	3.44 (1.08)	
Access to academic resources needed to do your work	3.70 (1.42)	N/A	N/A	3.92 (1.01)	3.82 (1.00)	
The availability of professors/instructors outside of class (e.g., office hours, answering questions via email, etc.)	4.00 (1.25)	N/A	N/A	4.26 (0.94)	4.09 (0.91)	
How well the program has prepared you for your future career	3.20 (1.14)	N/A	N/A	3.51 (0.99)	3.53 (1.00)	
The workload expected of you	3.30 (1.06)	N/A	N/A	3.52 (0.99)	3.48 (1.02)	
<i>n</i>	10	4		963	278	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.3.3 Rate how you feel about the environment of the department of your computing program.

(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
I feel a sense of community in the computing department	3.50 (1.08)	N/A	N/A	3.60 (1.07)	3.51 (1.08)	
People in the department often attribute my success to special treatment or luck, rather than my competence	1.50 (0.85)	N/A	N/A	1.95 (1.10)	2.32 (1.17)	*
The environment in the computing department inspires me to do the best job that I can	3.70 (1.34)	N/A	N/A	3.66 (0.96)	3.55 (1.01)	
My ideas or opinions are minimized or ignored	1.89 (1.17)	N/A	N/A	2.03 (1.06)	2.23 (1.16)	
The department cares about its students	3.90 (1.10)	N/A	N/A	4.30 (0.88)	4.08 (0.97)	
The department is NOT very supportive of its students	1.80 (1.14)	N/A	N/A	1.76 (1.00)	1.96 (1.09)	
Computer science administrators (e.g., the department chair, dean, staff) and faculty care about diversity	4.30 (0.95)	N/A	N/A	3.84 (0.93)	3.67 (1.07)	
<i>n</i>	10	4		964	277	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.3.4 Do you have access to one or more academic advisor(s)?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes, I have an academic advisor(s) affiliated with the computing department	70%	N/A	N/A	64%	68%	
Yes, I have an academic advisor(s) affiliated with another department	70%	N/A	N/A	48%	42%	
No, I do not have an advisor yet	10%	N/A	N/A	5%	6%	
<i>n</i>	10	4		962	278	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.3.5 About how many times per semester/quarter do you interact with academic advisor(s) for the following reasons?

(1) Never - (5) Four or more times

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Course-related guidance	1.78 (0.83)	N/A	N/A	2.48 (0.75)	2.57 (0.77)	
Career advice	1.56 (0.73)	N/A	N/A	1.84 (0.91)	1.98 (0.95)	
Graduate school advice	1.33 (0.50)	N/A	N/A	1.57 (0.85)	1.70 (0.94)	
Another reason	2.22 (1.30)	N/A	N/A	2.00 (1.05)	2.08 (1.02)	
<i>n</i>	9	4		875	243	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.3.6 How dissatisfied or satisfied are you with the following?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
How often you meet with your advisor(s)	3.78 (1.09)	N/A	N/A	3.77 (1.11)	3.73 (1.12)	
The academic guidance your advisor(s) provides	3.78 (1.30)	N/A	N/A	3.88 (1.11)	3.87 (1.14)	
The career advice your advisor(s) provides	3.78 (1.09)	N/A	N/A	3.62 (1.13)	3.68 (1.15)	
<i>n</i>	9	4		912	259	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.4 Support Structures

Table 3.4.1 Approximately how often do you interact with the following individuals?

(1) Never - (5) More than 3 times per week

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Teaching assistants	1.70 (1.34)	N/A	N/A	2.17 (1.26)	2.16 (1.28)	
An instructor/faculty member outside of lecture regarding a course	2.90 (1.20)	N/A	N/A	2.76 (1.06)	2.60 (1.14)	
An instructor/faculty member outside of lecture NOT regarding a course	2.70 (1.49)	N/A	N/A	2.14 (1.10)	2.05 (1.18)	
Classmates outside of lecture	3.80 (1.32)	N/A	N/A	3.93 (1.21)	3.60 (1.38)	
<i>n</i>	10	4		953	278	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.4.2 How often to you receive the following from other students if you need it?

(1) Not at all - (5) Very much

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Help and support	3.30 (1.34)	N/A	N/A	3.69 (1.08)	3.64 (1.13)	
Willingness to listen to issues you are having at school	3.20 (1.23)	N/A	N/A	3.57 (1.15)	3.47 (1.21)	
Feedback about your work	3.20 (1.23)	N/A	N/A	3.44 (1.16)	3.42 (1.17)	
<i>n</i>	10	4		962	277	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.4.3 To what extent do you have a mentor who:*(1) Not at all - (5) Very much*

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
helps you improve your computing skills	2.50 (1.96)	N/A	N/A	2.65 (1.44)	2.46 (1.42)	
shows compassion for any issues you discussed with them	2.50 (1.96)	N/A	N/A	3.31 (1.43)	3.22 (1.41)	
shares personal experiences as an alternative perspective to your problem	2.30 (1.89)	N/A	N/A	3.00 (1.47)	2.99 (1.40)	
explores career options with you	2.10 (1.60)	N/A	N/A	2.86 (1.46)	2.75 (1.39)	
encourages you to do the best you can in your coursework	2.80 (1.99)	N/A	N/A	3.35 (1.48)	3.28 (1.46)	
supports your research ideas	2.10 (1.66)	N/A	N/A	2.78 (1.50)	2.73 (1.44)	
<i>n</i>	10	4		952	282	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.4.4 Think about your relationships in computing. To what extent is each of the following available to you at this point?*(1) Not at all - (5) Very much*

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
People with whom you can discuss professional development questions	3.10 (1.10)	N/A	N/A	3.48 (1.10)	3.36 (1.19)	
People with whom you can discuss graduate school opportunities	2.90 (1.20)	N/A	N/A	3.35 (1.19)	3.23 (1.24)	
A strong network of peers to interact with at conferences	2.20 (0.92)	N/A	N/A	2.73 (1.25)	2.88 (1.25)	
A strong network of mentors to interact with at conferences	2.60 (1.26)	N/A	N/A	2.71 (1.26)	2.76 (1.25)	
People who would be excited to learn about your professional successes	2.80 (1.23)	N/A	N/A	3.35 (1.16)	3.30 (1.19)	
People with whom you can discuss issues you are having	3.00 (1.49)	N/A	N/A	3.44 (1.18)	3.38 (1.18)	
<i>n</i>	10	4		965	288	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.5 Self-perceptions

Table 3.5.1 Please indicate the extent to which you disagree or agree with the following statements.
(1) Strongly Disagree - (5) Strongly Agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
I see myself as a computing person	3.90 (0.74)	N/A	N/A	3.68 (1.15)	3.73 (1.11)	
I feel like I belong in computing	3.50 (1.08)	N/A	N/A	3.45 (1.17)	3.52 (1.16)	
I feel like an outsider in computing	2.70 (0.95)	N/A	N/A	2.63 (1.23)	2.64 (1.18)	
Computing is a big part of who I am	3.60 (0.84)	N/A	N/A	2.89 (1.26)	3.17 (1.21)	
I feel welcomed in computing	3.80 (1.03)	N/A	N/A	3.63 (0.98)	3.57 (1.07)	
I do not have much in common with the other students in my computing classes	2.60 (0.97)	N/A	N/A	2.73 (1.13)	2.80 (1.14)	
<i>n</i>	10	4		965	281	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.5.2 In your opinion, to what extent are each of the following statements true of you?
(1) Not at all - (5) Very much

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
I can give the impression that I'm more competent than I really am	2.70 (1.70)	N/A	N/A	3.35 (1.23)	3.34 (1.27)	
When others praise me for something I have accomplished, I'm afraid I won't be able to live up to their expectations of me in the future	2.90 (1.52)	N/A	N/A	3.26 (1.34)	3.17 (1.46)	
At times, I feel my success has been due to some kind of luck	2.80 (1.81)	N/A	N/A	3.04 (1.36)	2.96 (1.45)	
I'm disappointed at times in my present accomplishments and think I should have accomplished much more by now	3.30 (1.34)	N/A	N/A	3.31 (1.37)	3.43 (1.45)	
<i>n</i>	10	4		965	287	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.5.3 I am confident that I can:
 (1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
pass my computing courses	4.40 (0.84)	N/A	N/A	4.49 (0.78)	4.34 (0.94)	
learn the foundations and concepts of computing	4.20 (0.79)	N/A	N/A	4.53 (0.68)	4.40 (0.82)	
do well in a computing-related contest (e.g., programming contest, robotics contest, hackathon)	3.70 (1.16)	N/A	N/A	3.25 (1.27)	3.46 (1.17)	
quickly learn a new programming language on my own	3.90 (0.99)	N/A	N/A	3.61 (1.22)	3.71 (1.15)	
contribute to a research project in computing	4.10 (0.74)	N/A	N/A	3.51 (1.20)	3.68 (1.10)	
clearly communicate technical problems and solutions to a range of audiences	3.40 (1.07)	N/A	N/A	3.76 (1.10)	3.80 (1.01)	
articulate thoughtful answers to theoretical questions about your work during a presentation	3.90 (1.20)	N/A	N/A	3.89 (1.04)	3.94 (0.94)	
introduce myself to new peers/colleagues at professional meetings	3.70 (1.49)	N/A	N/A	3.90 (1.07)	4.07 (1.01)	
be a capable researcher in computing	3.70 (0.67)	N/A	N/A	3.40 (1.16)	3.61 (1.09)	
find employment in an area of computing interest	3.60 (0.84)	N/A	N/A	3.75 (1.14)	3.97 (1.00)	
complete an undergraduate degree in computing	4.40 (0.84)	N/A	N/A	4.26 (1.16)	4.33 (1.09)	
get admitted to a graduate computing program	3.90 (0.88)	N/A	N/A	3.49 (1.21)	3.69 (1.18)	
be successful in a graduate computing program	4.00 (0.82)	N/A	N/A	3.50 (1.25)	3.69 (1.18)	
<i>n</i>	10	4		963	280	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.5.4 In your opinion, to what extent would a career in computing allow you to do the following.
 (1) Not at all - (5) Extremely

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Serve humanity	3.80 (1.14)	N/A	N/A	3.44 (1.05)	3.70 (1.06)	
Be in a position of influence in society	3.60 (1.26)	N/A	N/A	3.44 (1.12)	3.66 (1.16)	
Spend at lot of time with family	3.20 (1.32)	N/A	N/A	3.20 (1.03)	3.34 (1.10)	
<i>n</i>	10	4		969	287	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.6 Activities

Table 3.6.1 How often have you been involved in each of the following groups or activities?
 (1) Never - (5) Four or more times

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Internships related to computing	1.60 (0.70)	N/A	N/A	1.50 (0.79)	1.47 (0.76)	
Jobs related to computing	1.60 (0.70)	N/A	N/A	1.31 (0.67)	1.43 (0.82)	
Career mentoring programs or workshops	1.60 (0.97)	N/A	N/A	1.47 (0.84)	1.54 (0.84)	
Outreach to K-12 students related to computing	1.50 (1.08)	N/A	N/A	1.35 (0.82)	1.32 (0.73)	
Computing-related student groups (e.g., technical organizations on campus, ACM student chapters, etc.)	1.60 (1.07)	N/A	N/A	1.65 (0.96)	1.67 (0.94)	
Other student groups (e.g., Greek Life, volunteer groups, academic merit societies, etc.)	1.50 (1.08)	N/A	N/A	2.25 (1.23)	1.91 (1.12)	
<i>n</i>	10	4		949	267	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.6.2 How often have you been involved in each of the following groups or activities?

(1) Never - (5) Four or more times

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Submitted a poster proposal to a conference	1.30 (0.67)	N/A	N/A	1.20 (0.53)	1.24 (0.57)	
Submitted a paper proposal to a conference	1.20 (0.42)	N/A	N/A	1.15 (0.47)	1.18 (0.52)	
Submitted a paper for publication in a peer reviewed journal	1.40 (0.70)	N/A	N/A	1.11 (0.41)	1.18 (0.58)	
Presented a poster at a conference	1.10 (0.32)	N/A	N/A	1.19 (0.53)	1.21 (0.54)	
Given an oral presentation at a conference	1.30 (0.67)	N/A	N/A	1.19 (0.55)	1.27 (0.68)	
Had a paper accepted for publication in conference proceedings	1.00 (0.00)	N/A	N/A	1.11 (0.41)	1.13 (0.43)	
Had a paper accepted for publication in a peer reviewed journal	1.20 (0.63)	N/A	N/A	1.10 (0.40)	1.16 (0.56)	
<i>n</i>	10	4		947	268	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.6.3 During your academic career to date, have you participated in any of the following conferences or programs?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
ACM Richard Tapia Celebration of Diversity in Computing	0%	N/A	N/A	2%	4%	
Grace Hopper Celebration of Women in Computing	0%	N/A	N/A	5%	2%	
Local events related to diversity in computing	0%	N/A	N/A	7%	10%	
None of these	100%	N/A	N/A	88%	84%	
<i>n</i>	6	4		848	260	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.6.4 During your academic career to date, have you pursued any of the following resources at your institution?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Peer tutoring	56%	N/A	N/A	45%	38%	
Tutoring offered by your department/college	56%	N/A	N/A	40%	36%	
Peer mentoring	22%	N/A	N/A	16%	18%	
Career counseling	22%	N/A	N/A	31%	22%	
Mental health counseling	22%	N/A	N/A	23%	19%	
Does not apply to me	11%	N/A	N/A	29%	36%	
<i>n</i>	9	4		926	266	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.7 Future Plans and Interests

Table 3.7.1 For your future career, in which setting would you like to work the most?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Academia	20%	N/A	N/A	14%	8%	
Industry	40%	N/A	N/A	55%	44%	
Government	10%	N/A	N/A	11%	15%	
Self-employment	20%	N/A	N/A	14%	22%	
Something else	10%	N/A	N/A	7%	10%	
<i>n</i>	10	4		971	280	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.7.2 How interested are you in having a career:*(1) Not at all interested - (5) Extremely interested*

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
doing computing-related work	4.10 (0.88)	N/A	N/A	3.69 (1.25)	3.82 (1.22)	
in computing research	3.00 (1.49)	N/A	N/A	2.63 (1.22)	2.83 (1.26)	
<i>n</i>	10	4		970	281	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.7.3 How interested are you in having the types of jobs listed below after you finish your highest degree?*(1) Very uninterested - (5) Very interested*

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
College or university professor in computing field (teaching focused)	2.70 (1.34)	N/A	N/A	2.49 (1.38)	2.41 (1.36)	
College or university professor in computing field (research focused)	3.00 (1.63)	N/A	N/A	2.34 (1.30)	2.40 (1.31)	
K-12 computing teacher	2.50 (1.27)	N/A	N/A	2.04 (1.25)	2.12 (1.31)	
Computing researcher in industry	3.00 (1.49)	N/A	N/A	2.91 (1.34)	2.87 (1.35)	
Computing researcher in a government lab or agency	3.00 (1.49)	N/A	N/A	2.84 (1.34)	2.92 (1.37)	
A non-research computing position in industry (e.g., software engineer)	3.60 (1.51)	N/A	N/A	3.69 (1.33)	3.76 (1.23)	
A non-research computing position in government	3.20 (1.32)	N/A	N/A	3.07 (1.34)	3.28 (1.30)	
Entrepreneur (computing related; e.g., individual contractor, build a start-up)	3.00 (1.49)	N/A	N/A	3.32 (1.33)	3.50 (1.31)	
Non-computing career	2.70 (1.49)	N/A	N/A	3.06 (1.39)	2.81 (1.38)	
<i>n</i>	10	3		962	279	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.7.4 What is the highest degree you plan to attain?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Associate's degree	10%	N/A	N/A	1%	1%	
Bachelor's degree	30%	N/A	N/A	35%	40%	
Master's degree	40%	N/A	N/A	44%	38%	
Doctoral degree	20%	N/A	N/A	20%	20%	
None of the above	0%	N/A	N/A	0%	1%	
<i>n</i>	10	4		969	288	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.7.5 Do you intend to earn/ have your earned your highest degree in a computing-related field?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
No	40%	N/A	N/A	35%	30%	
Yes	60%	N/A	N/A	65%	70%	
<i>n</i>	10	4		949	283	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Part II

Graduate Students

Chapter 4

Graduate Students: General Results

This section is not available for your department for the Fall 2019 Graduate Student Survey. Any of the following could be causing this:

- Your department did not participate in Data Buddies at the graduate level or does not have an graduate program.
- Your department had fewer than 5 graduate student responses.

Chapter 5

Graduate Students: Results by Gender

This section is not available for your department for the Fall 2019 Graduate Student Survey. Any of the following could be causing this:

- Your department did not participate in Data Buddies at the graduate level or does not have a graduate program.
- Your department had fewer than 5 graduate student responses from one or more of the groups compared in this chapter.

Chapter 6

Graduate Students: Results by Race/Ethnicity

This section is not available for your department for the Fall 2019 Graduate Student Survey. Any of the following could be causing this:

- Your department did not participate in Data Buddies at the graduate level or does not have a graduate program.
- Your department had fewer than 5 graduate student responses from one or more of the groups compared in this chapter.

APPENDIX

Statistical significance

For each statistical test in this report, statistical significance is determined using a two-step process. First, we assessed whether group differences meet the conventional $p \leq .05$ threshold for inferential statistics. Then, if the $p \leq .05$ threshold was met, we observed the effect size for the two-group comparison using Cohen's d for the independent samples t tests and Cohen's h for the two-proportion z tests. According to Cohen (1988)¹, the magnitude of effect sizes indicate the following: .10 - .29 is a small effect, .30 - .49 is a medium effect, and .50 or greater is a large effect; values less than .10 are considered inconsequential. In the current report, group comparisons are only deemed "significant" if they reach the $p \leq .05$ threshold, and their effect size is $\geq .30$ (indicating an effects size of "medium" or greater).

We opted to use a two-step method to test for significant effects so that we could control for unequal sample sizes (i.e., a relatively small "Your Institution" sample, compared to a relatively large "Similar Institutions" sample). This is because large sample sizes tend to yield group differences that easily meet the $p \leq .05$ threshold, but have small effect sizes. On the other hand, it is relatively more difficult to detect a significant effect when sample sizes are small. Thus, our two-step strategy required that a group comparison meet the $p \leq .05$ threshold, and for that effect to be at least medium in size.

Statistical tests were not run if sample size was too small, $n < 5$.

¹Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.



CERP

Computing Research Association
Evaluation

**2018 Data Buddies Department Report
University of Hawaii-Hilo**

REPORT INFORMATION

This report presents data collected via The Computing Research Association's (CRA) Data Buddies survey during the end of the fall 2018 and the beginning of the spring 2019 academic semesters. The Data Buddies surveys are designed to assess experiences of students engaged in the computing community. This includes students who are pursuing a computing degree, as well as students who are simply taking computing courses while pursuing other degrees.

Report structure

This report compares data collected from your students to data from students at similar institutions. In this report, **“similar institutions”** are those whose computing departments award Bachelor's degrees. Data are presented by student population (i.e. undergraduate and graduate). For each population, we present:

- An executive summary page containing key findings about students in your department
- Detailed comparative tables for:
 - Your students and students at similar institutions
 - Women and men at your institution and at similar institutions
 - Students from underrepresented racial/ethnic (URM) groups versus students who are from majority groups¹ at your institution and at other institutions.

If your institution did not have at least 5 respondents for a particular student group and/or does not have a particular student population (e.g., graduate students), there will be no content reported for that chapter.

Table layout

For each survey question, either a mean + standard deviation (SD) or a proportion (in percentage) is reported depending on the type of survey question. Sample sizes within each table are notated with 'n' in the bottom row of each table; 'n' indicates the number of students who responded to that specific chapter of the survey. Sample sizes may vary across tables because all survey questions were voluntary. Tables also present the results of inferential statistics assessing group differences (column labeled Sig.).

Statistical tests and reporting

Independent samples *t*-tests were used to assess group differences in means. A two-proportion *z*-test with unpooled variance was used to assess differences in proportions across groups.

For each statistical test, we indicate whether a comparison between two groups is “significant”. Significance is determined using a two-step process. First, we assessed whether group differences meet the conventional $p \leq .05$ threshold for inferential statistics. Then, if the $p \leq .05$ threshold was met, we observed the effect size for the two-group comparison using Cohen's *d* for the independent samples *t*-tests and Cohen's *h* for the two-proportion *z*-tests. In the current report, group comparisons are only deemed “significant” if they reach the $p \leq .05$ threshold and their effect size is $\geq .30$ (indicating an effect size of “medium” or greater). For an explanation of why we use this two-step process and more information on how to interpret inferential statistics, see the Appendix.

More CERP data

Past Data Buddies data are also displayed on a data visualization page on the CRA's Center for Evaluating the Research Pipeline's (CERP) website <http://cra.org/cerp/data-visualization>. CERP also publishes monthly infographics in the Computing Research Newsletter (<https://cra.org/crn/tag/cerp-infographics/>). Subscribe to CERP's newsletter at <https://cra.org/cerp/email-list>. For parties interested in working with CERP data, a data request application can be completed at <https://cra.org/cerp/cerp-data-request/>.

Thank you for contributing data to the CRA's Data Buddies Project! Your students' data help the computing community better understand correlates of persistence and success among computing students.

¹“URM” includes students who identify as African American/Black, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, Mexican American/Chicano/Puerto Rican/Other Latino, and students who identify with one or more of these groups. “Majority” includes racial/ethnic groups who are in the majority in computing, which are White/Caucasian; East Asian; Southeast Asian; South Asian, Other Asian.

Report Highlights: Undergraduate Students

June 19, 2019

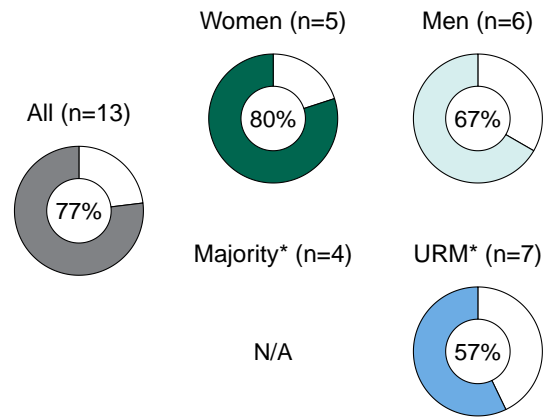
Reasons for selecting a computing major

At your institution, the following are the top five reasons why students selected, or are considering to select a computing major.

1. I like learning about computing
2. The job market for the computing field is promising
3. A computing major will allow me to make an impact on society
4. A computing major will enable me to make a lot of money
5. The courses required of the computing major are interesting

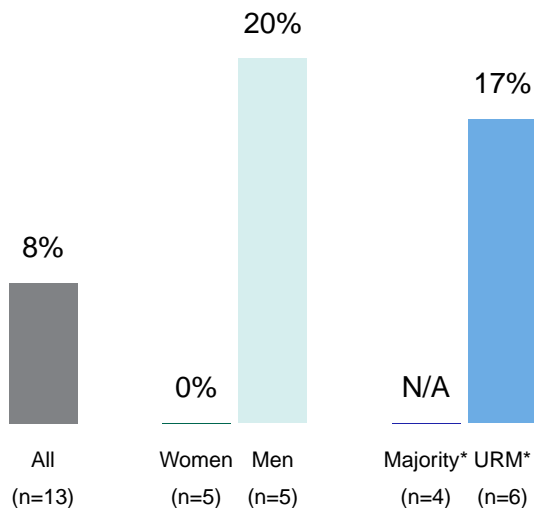
Satisfaction with the computing program

At your institution, the following are satisfied with the computing program:



Thoughts about leaving computing major

At your institution, the following thought about leaving their computing major:



Why did you consider leaving computing?

At your institution, the following are the top five reasons why students considered leaving their computing major.

1. I did not like the course material
2. The courses were difficult
3. The math requirements were too hard
4. I was having trouble passes my courses
5. I did not have any friends in the major

See full report for benchmarking on these topics and more!

* **URM**: "Underrepresented minority" in computing; students who identify as African American/Black; American Indian/Alaska Native; Mexican American/Chicano; Native Hawaiian/Pacific Islander; Puerto Rican, Other Latino. **Majority**: Students who identify with a racial/ethnic group in the majority in computing, including White/Caucasian and/or Asian.

N/A: $n < 5$ for the group for the specific question.

+ The calculations are independent for All Students, for Women/Men, and for Majority/URM.

Report Highlights: Graduate Students

June 19, 2019

This highlight page is not available for your department for the fall 2018 Graduate Student Survey. Any of the following could be causing this:

- Your department did not participate in Data Buddies at the graduate level or does not have a graduate program.
- Your department had fewer than 5 usable responses from one or more of the following groups at the graduate level: women, men, racial/ethnic identities underrepresented in computing, majority racial/ethnic groups. Please see the section titled Report Information for description of these groups.

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Part I

Undergraduate Students

Chapter 1

Undergraduate Students: General Results

1.1 Student Background

Table 1.1.1 Does your major (or one of your majors, if you are a double major) have a computing component?

	Your Institution (%)	Similar Institutions (%)	Sig.
No	13%	18%	N/A
Yes	80%	63%	N/A
Have not declared a major	7%	18%	N/A
<i>n</i>	15	1101	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.1.2 In what year do you expect to complete your current degree program?

	Your Institution (%)	Similar Institutions (%)	Sig.
2018	0%	2%	N/A
2019	14%	26%	N/A
2020	50%	29%	
2021	21%	26%	N/A
2022	14%	17%	N/A
2023 or later	0%	0%	N/A
<i>n</i>	14	1109	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.1.3 During your college career so far, have you participated in any formal research experiences?

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes	27%	32%	N/A
<i>n</i>	11	943	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.1.4 How are you paying for your education?*Select all that apply*

	Your Institution (%)	Similar Institutions (%)	Sig.
Federal student loans	33%	41%	
Private student loans	7%	15%	N/A
Personal savings	40%	36%	
Scholarship, fellowship, grant, or aid	73%	65%	N/A
Full-time work	7%	3%	N/A
Part-time work	53%	42%	
Family support	20%	70%	N/A
Credit	0%	6%	N/A
Research Assistantship	0%	3%	N/A
Teaching Assistantship	7%	2%	N/A
Employer support	0%	2%	N/A
Military/Veterans benefits/assistance	13%	1%	N/A
Other	0%	1%	N/A
<i>n</i>	15	1098	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.1.5 Which of the following experiences did you have prior to entering college?*Select all that apply*

	Your Institution (%)	Similar Institutions (%)	Sig.
Took AP Computer Science A	0%	25%	N/A
Took AP Computer Science Principles	0%	5%	N/A
Took other AP courses	45%	47%	
Took dual enrollment courses	27%	12%	N/A
Learned a computer programming language	64%	48%	N/A
Engaged in software or hardware related projects	36%	31%	N/A
Took part in student groups related to computing	18%	21%	N/A
Completed an online course related to computing (e.g., MOOC)	18%	12%	N/A
Attended a workshop or other training in computing (e.g., through your local library, community center, etc.)	36%	16%	N/A
<i>n</i>	11	901	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.1.6 Which of the following mathematics courses did you take prior to entering college?*Select all that apply*

	Your Institution (%)	Similar Institutions (%)	Sig.
Algebra I	80%	93%	N/A
Algebra II	80%	90%	N/A
Trigonometry	73%	75%	N/A
Pre-calculus	67%	85%	
Calculus	20%	69%	N/A
Statistics	20%	37%	N/A
<i>n</i>	15	1161	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met**Table 1.1.7 Which of the following applies to you?***Select all that apply*

	Your Institution (%)	Similar Institutions (%)	Sig.
I temporarily withdrew from my current institution.	0%	13%	N/A
I transferred from a 2-year institution to my current institution.	57%	28%	N/A
I transferred from a 4-year institution to my current institution.	14%	20%	N/A
I have taken courses for credit at a community college.	71%	53%	N/A
I have completed a degree/certification at a community college.	43%	19%	N/A
<i>n</i>	7	257	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.2 Entering and Exiting the Field

Table 1.2.1 Why did/would you choose a computing major?*Choose up to 3 responses.*

	Your Institution (%)	Similar Institutions (%)	Sig.
I like learning about this field	67%	77%	N/A
The courses required of this major are interesting	25%	33%	N/A
The major will allow me to make an impact on society	42%	37%	
The job market for this field is promising	58%	62%	
This major will enable me to make a lot of money	33%	34%	N/A
I will be successful completing the courses required of this major	8%	14%	N/A
My friends are majors in this field	8%	4%	N/A
Professors/faculty at my institution influenced my decision	25%	9%	N/A
My family influenced my decision	8%	11%	N/A
<i>n</i>	12	864	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.2.2 For computing majors: Over the past year, have you seriously considered changing to a non-computing major?

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes	8%	20%	N/A
<i>n</i>	13	874	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.2.3 Why did you think about leaving computing?

Choose up to 3 responses.

	Your Institution (%)	Similar Institutions (%)	Sig.
The courses were difficult	N/A	31%	N/A
The math requirements were too hard	N/A	9%	N/A
I did not like the course material	N/A	32%	N/A
I was having trouble passes my courses	N/A	19%	N/A
I did not have any friends in the major	N/A	8%	N/A
The professors were not supportive	N/A	15%	N/A
I felt isolated in my program	N/A	20%	N/A
The department did not make me feel welcome	N/A	10%	N/A
I experienced health issues that inhibited my ability to feel/be successful	N/A	13%	N/A
<i>n</i>	1	173	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.3 Confidence

Table 1.3.1 I am confident that I can...

(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
pass my computing classes	4.23 (1.01)	4.45 (0.81)	
clearly communicate technical problems and solutions to a range of audiences	4.00 (1.00)	3.83 (1.04)	
complete my undergraduate degree in computing	4.38 (0.87)	4.40 (0.98)	
get admitted to a graduate computing program	3.69 (1.18)	3.65 (1.20)	
find employment in my area of computing interest	3.92 (0.95)	4.06 (1.04)	
become a capable researcher in computing.	3.54 (1.51)	3.54 (1.13)	
<i>n</i>	13	1033	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.4 Perceptions of the Professional Environment

Table 1.4.1 Please indicate the extent to which you disagree or agree with the following statement:

(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Overall, I am satisfied with the computing program at my institution.	3.85 (0.80)	3.76 (1.09)	
<i>n</i>	13	1011	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.4.2 How do you feel about the computing courses you have taken at your current institution?

(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
I would recommend taking computing courses at my institution to a friend.	4.15 (0.90)	4.00 (1.06)	
The number of students in my computing classes is too large.	1.31 (0.63)	2.36 (1.22)	*
I am satisfied with the technical content of the computing courses.	3.85 (0.69)	3.77 (1.04)	
The computing courses at my institution are too difficult.	2.54 (1.05)	2.54 (1.04)	
<i>n</i>	13	1013	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.4.3 How dissatisfied or satisfied are you with the following aspects of the computing program at your institution?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
The variety of computing courses offered	3.69 (0.95)	3.21 (1.17)	
Access to academic resources needed to do your work	4.00 (0.91)	3.93 (1.04)	
The availability of professors outside of class (e.g., office hours, answering questions via email, etc.)	4.38 (0.65)	4.24 (0.97)	
How well the program has prepared you for your future career	3.62 (0.65)	3.50 (1.05)	
The workload expected of you	3.62 (0.96)	3.55 (1.01)	
How often you meet with your advisor(s)	4.00 (0.89)	3.78 (1.10)	
The academic guidance your advisor(s) provides	4.18 (0.98)	3.88 (1.16)	
The career advice your advisor(s) provides	3.91 (1.04)	3.58 (1.18)	
<i>n</i>	11	945	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.4.4 Rate how you feel about the environment of the department of your computing program.*(1) Strongly disagree - (5) Strongly agree*

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
I feel a sense of community in my department.	4.64 (0.50)	3.68 (1.12)	*
My department cares about its students.	4.45 (0.93)	4.19 (0.94)	
People in the department often attribute my success to special treatment or luck, rather than my competence.	1.80 (1.03)	2.09 (1.16)	
The environment in my department inspires me to do the best job that I can.	3.91 (0.83)	3.70 (1.01)	
The department is NOT very supportive of its students	1.27 (0.47)	1.81 (1.05)	*
My ideas or opinions are minimized or ignored.	2.00 (0.77)	1.98 (1.05)	
Computer science administrators and faculty care about diversity	3.91 (0.70)	3.88 (0.97)	
<i>n</i>	11	1003	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.5 Support Structures

Table 1.5.1 To what extent do you have a mentor who...*(1) Not at all - (5) Very much*

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
helps you improve your computing skills?	3.55 (1.13)	2.71 (1.42)	*
shows compassion for any issues you discussed with them?	3.91 (1.22)	3.35 (1.39)	
shares personal experiences as an alternative perspective to your problem?	3.82 (1.40)	3.11 (1.45)	
explores career options with you?	3.27 (1.62)	2.90 (1.43)	
encourages you to do the best you can in your coursework?	4.09 (1.14)	3.40 (1.44)	
<i>n</i>	11	974	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.6 Career Interests

Table 1.6.1 How interested are you in having the types of jobs listed below after you finish your highest degree?

(1) Very uninterested - (5) Very interested

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
College or university professor in computing field (teaching focused)	2.54 (1.05)	2.59 (1.36)	
College or university professor in computing field (research focused)	2.62 (1.19)	2.46 (1.29)	
K-12 computing teacher	2.38 (0.96)	2.18 (1.28)	
Computing researcher in industry	3.23 (1.24)	3.05 (1.27)	
Computing researcher in a government lab or agency	3.23 (1.01)	2.94 (1.32)	
A non-research computing position in industry (e.g., software engineer)	3.69 (0.85)	3.84 (1.23)	
Entrepreneur (computing related; e.g., individual contractor, build a start-up)	3.62 (1.12)	3.37 (1.34)	
Non-computing career	2.69 (1.44)	3.04 (1.34)	
<i>n</i>	13	1018	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.7 Degree Plans

Table 1.7.1 What is the highest degree you plan to attain?

	Your Institution (%)	Similar Institutions (%)	Sig.
Associate's degree	0%	0%	N/A
Bachelor's degree	50%	31%	
Master's degree	36%	43%	
Doctoral degree	14%	27%	N/A
<i>n</i>	14	1051	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Table 1.7.2 Do you intend to earn/ have you earned your highest degree in a computing-related field?

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes	79%	67%	N/A
<i>n</i>	14	1014	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Chapter 2

Undergraduate Students: Results by Gender

Data for individuals who do not identify as either a woman or a man are not included in this report due to small samples sizes.

2.1 Student Background

Table 2.1.1 Does your major (or one of your majors, if you are a double major) have a computing component?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
No	20%	0%	N/A	20%	15%	
Yes	80%	83%	N/A	59%	69%	
Have not declared a major	0%	17%	N/A	22%	16%	
<i>n</i>	5	6		469	443	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.2 In what year do you expect to complete your current degree program?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
2018	0%	0%	N/A	1%	3%	N/A
2019	40%	0%	N/A	29%	26%	
2020	60%	80%	N/A	27%	28%	
2021	0%	20%	N/A	26%	26%	
2022	0%	0%	N/A	17%	17%	
2023 or later	0%	0%	N/A	0%	0%	N/A
<i>n</i>	5	5		467	442	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.3 During your college career so far, have you participated in any formal research experiences?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes	60%	0%	N/A	35%	28%	
<i>n</i>	5	6		461	428	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.4 How are you paying for your education?

Select all that apply

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Federal student loans	40%	33%	N/A	41%	39%	
Private student loans	0%	17%	N/A	15%	15%	
Personal savings	60%	50%	N/A	37%	36%	
Scholarship, fellowship, grant, or aid	100%	50%	N/A	73%	60%	
Full-time work	20%	0%	N/A	3%	5%	
Part-time work	60%	67%	N/A	45%	39%	
Family support	0%	33%	N/A	76%	66%	
Credit	0%	0%	N/A	5%	7%	
Research Assistantship	0%	0%	N/A	3%	2%	
Teaching Assistantship	0%	17%	N/A	2%	1%	
Employer support	0%	0%	N/A	2%	2%	
Military/Veterans benefits/assistance	0%	17%	N/A	1%	1%	
Other	0%	0%	N/A	0%	2%	N/A
<i>n</i>	5	6		468	442	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.5 Which of the following experiences did you have prior to entering college?*Select all that apply*

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Took AP Computer Science A	N/A	N/A	N/A	26%	22%	
Took AP Computer Science Principles	N/A	N/A	N/A	3%	6%	
Took other AP courses	N/A	N/A	N/A	56%	42%	
Took dual enrollment courses	N/A	N/A	N/A	13%	11%	
Learned a computer programming language	N/A	N/A	N/A	42%	51%	
Engaged in software or hardware related projects	N/A	N/A	N/A	25%	36%	
Took part in student groups related to computing	N/A	N/A	N/A	19%	21%	
Completed an online course related to computing (e.g., MOOC)	N/A	N/A	N/A	10%	13%	
Attended a workshop or other training in computing (e.g., through your local library, community center, etc.)	N/A	N/A	N/A	17%	14%	
<i>n</i>	4	4		358	360	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.6 Which of the following mathematics courses did you take prior to entering college?*Select all that apply*

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Algebra I	80%	100%	N/A	95%	93%	
Algebra II	100%	83%	N/A	93%	88%	
Trigonometry	80%	83%	N/A	74%	78%	
Pre-calculus	80%	67%	N/A	88%	83%	
Calculus	20%	17%	N/A	76%	66%	
Statistics	0%	17%	N/A	40%	34%	
<i>n</i>	5	6		470	441	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.1.7 Which of the following applies to you?

Select all that apply

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
I temporarily withdrew from my current institution.	N/A	N/A	N/A	13%	14%	
I transferred from a 2-year institution to my current institution.	N/A	N/A	N/A	19%	32%	*
I transferred from a 4-year institution to my current institution.	N/A	N/A	N/A	16%	23%	
I have taken courses for credit at a community college.	N/A	N/A	N/A	63%	50%	
I have completed a degree/certification at a community college.	N/A	N/A	N/A	15%	21%	
<i>n</i>	1	4		89	117	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.2 Entering and Exiting the Field

Table 2.2.1 Why did/would you choose a computing major?

Choose up to 3 responses.

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
I like learning about this field	N/A	50%	N/A	76%	79%	
The courses required of this major are interesting	N/A	0%	N/A	31%	33%	
The major will allow me to make an impact on society	N/A	50%	N/A	40%	37%	
The job market for this field is promising	N/A	67%	N/A	63%	62%	
This major will enable me to make a lot of money	N/A	67%	N/A	34%	32%	
I will be successful completing the courses required of this major	N/A	17%	N/A	15%	13%	
My friends are majors in this field	N/A	17%	N/A	4%	5%	
Professors/faculty at my institution influenced my decision	N/A	0%	N/A	11%	7%	
My family influenced my decision	N/A	17%	N/A	12%	10%	
<i>n</i>	4	6		357	365	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.2.2 For computing majors: Over the past year, have you seriously considered changing to a non-computing major?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes	0%	20%	N/A	22%	19%	
<i>n</i>	5	5		365	371	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.2.3 Why did you think about leaving computing?

Choose up to 3 responses.

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
The courses were difficult	N/A	N/A	N/A	33%	33%	
The math requirements were too hard	N/A	N/A	N/A	6%	11%	
I did not like the course material	N/A	N/A	N/A	33%	35%	
I was having trouble passes my courses	N/A	N/A	N/A	18%	21%	
I did not have any friends in the major	N/A	N/A	N/A	9%	8%	
The professors were not supportive	N/A	N/A	N/A	14%	12%	
I felt isolated in my program	N/A	N/A	N/A	24%	20%	
The department did not make me feel welcome	N/A	N/A	N/A	13%	6%	N/A
I experienced health issues that inhibited my ability to feel/be successful	N/A	N/A	N/A	15%	8%	
<i>n</i>	0	1		79	66	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.3 Confidence

Table 2.3.1 I am confident that I can...
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
pass my computing classes	4.00 (1.22)	4.17 (0.98)		4.34 (0.85)	4.58 (0.73)	*
clearly communicate technical problems and solutions to a range of audiences	4.20 (1.30)	3.83 (0.75)		3.69 (1.10)	3.96 (0.98)	
complete my undergraduate degree in computing	4.20 (1.30)	4.33 (0.52)		4.25 (1.11)	4.58 (0.79)	*
get admitted to a graduate computing program	3.40 (1.67)	3.83 (0.75)		3.44 (1.24)	3.87 (1.14)	*
find employment in my area of computing interest	4.00 (1.22)	3.83 (0.75)		3.94 (1.10)	4.23 (0.90)	
become a capable researcher in computing.	3.80 (1.64)	3.00 (1.55)		3.38 (1.15)	3.71 (1.06)	*
<i>n</i>	5	6		462	438	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.4 Perceptions of the Professional Environment

Table 2.4.1 Please indicate the extent to which you disagree or agree with the following statement:
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Overall, I am satisfied with the computing program at my institution.	3.60 (0.89)	4.00 (0.89)		3.75 (1.05)	3.84 (1.11)	
<i>n</i>	5	6		463	431	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.4.2 How do you feel about the computing courses you have taken at your current institution?

(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
I would recommend taking computing courses at my institution to a friend.	4.40 (0.55)	3.83 (1.17)		4.02 (1.03)	4.07 (1.05)	
The number of students in my computing classes is too large.	1.00 (0.00)	1.33 (0.52)		2.39 (1.24)	2.32 (1.20)	
I am satisfied with the technical content of the computing courses.	4.00 (0.00)	3.50 (0.84)		3.78 (1.02)	3.82 (1.02)	
The computing courses at my institution are too difficult.	2.20 (1.30)	2.67 (0.82)		2.61 (1.00)	2.52 (1.05)	
<i>n</i>	5	6		463	433	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.4.3 How dissatisfied or satisfied are you with the following aspects of the computing program at your institution?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
The variety of computing courses offered	3.80 (1.10)	3.33 (0.82)		3.14 (1.17)	3.38 (1.14)	
Access to academic resources needed to do your work	3.40 (0.89)	4.33 (0.82)		3.92 (1.03)	3.99 (1.03)	
The availability of professors outside of class (e.g., office hours, answering questions via email, etc.)	4.40 (0.55)	4.50 (0.55)		4.27 (0.94)	4.27 (0.98)	
How well the program has prepared you for your future career	3.80 (0.45)	3.67 (0.82)		3.50 (1.03)	3.54 (1.04)	
The workload expected of you	3.60 (1.14)	3.50 (0.84)		3.53 (0.99)	3.60 (1.01)	
How often you meet with your advisor(s)	4.60 (0.55)	3.50 (0.84)	*	3.72 (1.14)	3.86 (1.02)	
The academic guidance your advisor(s) provides	4.80 (0.45)	3.67 (1.03)	*	3.81 (1.20)	3.97 (1.10)	
The career advice your advisor(s) provides	4.60 (0.55)	3.33 (1.03)	*	3.51 (1.21)	3.67 (1.14)	
<i>n</i>	5	6		443	416	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.4.4 Rate how you feel about the environment of the department of your computing program.
 (1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
I feel a sense of community in my department.	4.80 (0.45)	4.50 (0.55)		3.66 (1.17)	3.80 (1.00)	
My department cares about its students.	4.60 (0.55)	4.33 (1.21)		4.21 (0.96)	4.23 (0.89)	
People in the department often attribute my success to special treatment or luck, rather than my competence.	N/A	1.67 (0.82)	N/A	2.06 (1.13)	2.13 (1.18)	
The environment in my department inspires me to do the best job that I can.	3.80 (1.10)	4.00 (0.63)		3.73 (0.99)	3.71 (1.01)	
The department is NOT very supportive of its students	1.20 (0.45)	1.33 (0.52)		1.75 (0.98)	1.81 (1.06)	
My ideas or opinions are minimized or ignored.	2.00 (1.00)	2.00 (0.63)		1.94 (1.01)	1.98 (1.08)	
Computer science administrators and faculty care about diversity	4.20 (0.45)	3.67 (0.82)		3.89 (0.97)	3.95 (0.94)	
<i>n</i>	5	6		462	433	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.5 Support Structures

Table 2.5.1 To what extent do you have a mentor who...
 (1) Not at all - (5) Very much

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
helps you improve your computing skills?	3.80 (1.30)	3.33 (1.03)		2.66 (1.41)	2.79 (1.44)	
shows compassion for any issues you discussed with them?	4.40 (0.89)	3.50 (1.38)		3.48 (1.35)	3.26 (1.41)	
shares personal experiences as an alternative perspective to your problem?	4.20 (1.30)	3.50 (1.52)		3.18 (1.42)	3.06 (1.47)	
explores career options with you?	3.60 (1.95)	3.00 (1.41)		3.00 (1.41)	2.82 (1.44)	
encourages you to do the best you can in your coursework?	4.20 (1.30)	4.00 (1.10)		3.52 (1.40)	3.32 (1.48)	
<i>n</i>	5	6		458	431	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.6 Career Interests

Table 2.6.1 How interested are you in having the types of jobs listed below after you finish your highest degree?

(1) Very uninterested - (5) Very interested

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
College or university professor in computing field (teaching focused)	2.20 (1.10)	2.50 (1.05)		2.53 (1.36)	2.63 (1.34)	
College or university professor in computing field (research focused)	2.60 (1.34)	2.33 (1.21)		2.34 (1.27)	2.59 (1.29)	
K-12 computing teacher	1.40 (0.55)	2.83 (0.41)	*	2.20 (1.27)	2.20 (1.29)	
Computing researcher in industry	3.40 (1.52)	3.00 (1.26)		2.93 (1.32)	3.21 (1.21)	
Computing researcher in a government lab or agency	3.20 (1.30)	3.17 (0.98)		2.79 (1.35)	3.15 (1.26)	
A non-research computing position in industry (e.g., software engineer)	3.20 (1.10)	4.00 (0.63)		3.75 (1.29)	3.95 (1.18)	
Entrepreneur (computing related; e.g., individual contractor, build a start-up)	3.20 (1.30)	4.00 (1.10)		3.09 (1.37)	3.69 (1.23)	*
Non-computing career	2.80 (1.64)	2.50 (1.64)		3.28 (1.33)	2.83 (1.31)	*
<i>n</i>	5	6		460	435	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.7 Degree Plans

Table 2.7.1 What is the highest degree you plan to attain?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Associate's degree	0%	0%	N/A	0%	0%	N/A
Bachelor's degree	20%	83%	N/A	24%	37%	
Master's degree	40%	17%	N/A	48%	38%	
Doctoral degree	40%	0%	N/A	28%	25%	
<i>n</i>	5	6		452	437	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 2.7.2 Do you intend to earn/ have your earned your highest degree in a computing-related field?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes	80%	83%	N/A	62%	74%	
<i>n</i>	5	6		437	425	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Chapter 3

Undergraduate Students: Results by Race/Ethnicity

3.1 Student Background

Table 3.1.1 Does your major (or one of your majors, if you are a double major) have a computing component?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
No	N/A	0%	N/A	18%	14%	
Yes	N/A	150%	N/A	61%	74%	
Have not declared a major	N/A	25%	N/A	21%	11%	
<i>n</i>	4	7		751	183	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.2 In what year do you expect to complete your current degree program?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
2018	N/A	0%	N/A	2%	3%	
2019	N/A	50%	N/A	27%	30%	
2020	N/A	75%	N/A	28%	25%	
2021	N/A	25%	N/A	26%	26%	
2022	N/A	0%	N/A	17%	16%	
2023 or later	N/A	0%	N/A	0%	0%	N/A
<i>n</i>	4	6		750	181	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.3 During your college career so far, have you participated in any formal research experiences?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes	N/A	29%	N/A	33%	26%	
<i>n</i>	4	7		738	174	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.4 How are you paying for your education?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Federal student loans	N/A	43%	N/A	37%	55%	*
Private student loans	N/A	14%	N/A	13%	20%	
Personal savings	N/A	57%	N/A	37%	34%	
Scholarship, fellowship, grant, or aid	N/A	71%	N/A	65%	73%	
Full-time work	N/A	14%	N/A	3%	5%	
Part-time work	N/A	71%	N/A	41%	49%	
Family support	N/A	29%	N/A	77%	48%	*
Credit	N/A	0%	N/A	5%	9%	
Research Assistantship	N/A	0%	N/A	3%	2%	N/A
Teaching Assistantship	N/A	14%	N/A	2%	2%	N/A
Employer support	N/A	0%	N/A	2%	2%	N/A
Military/Veterans benefits/assistance	N/A	0%	N/A	1%	3%	
Other	N/A	0%	N/A	1%	1%	N/A
<i>n</i>	4	7		749	183	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.5 Which of the following experiences did you have prior to entering college?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Took AP Computer Science A	N/A	0%	N/A	26%	17%	
Took AP Computer Science Principles	N/A	0%	N/A	4%	5%	
Took other AP courses	N/A	40%	N/A	50%	44%	
Took dual enrollment courses	N/A	40%	N/A	12%	10%	
Learned a computer programming language	N/A	80%	N/A	49%	40%	
Engaged in software or hardware related projects	N/A	40%	N/A	30%	33%	
Took part in student groups related to computing	N/A	20%	N/A	21%	20%	
Completed an online course related to computing (e.g., MOOC)	N/A	0%	N/A	11%	15%	
Attended a workshop or other training in computing (e.g., through your local library, community center, etc.)	N/A	40%	N/A	14%	25%	
<i>n</i>	3	5		585	153	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.6 Which of the following mathematics courses did you take prior to entering college?

Select all that apply

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Algebra I	N/A	86%	N/A	95%	92%	
Algebra II	N/A	86%	N/A	92%	86%	
Trigonometry	N/A	71%	N/A	76%	73%	
Pre-calculus	N/A	57%	N/A	88%	75%	*
Calculus	N/A	14%	N/A	75%	54%	*
Statistics	N/A	14%	N/A	37%	35%	
<i>n</i>	4	7		752	181	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.1.7 Which of the following applies to you?*Select all that apply*

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
I temporarily withdrew from my current institution.	N/A	N/A	N/A	13%	14%	
I transferred from a 2-year institution to my current institution.	N/A	N/A	N/A	24%	34%	
I transferred from a 4-year institution to my current institution.	N/A	N/A	N/A	23%	10%	
I have taken courses for credit at a community college.	N/A	N/A	N/A	58%	52%	
I have completed a degree/certification at a community college.	N/A	N/A	N/A	21%	14%	
<i>n</i>	1	4		155	58	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.2 Entering and Exiting the Field

Table 3.2.1 Why did/would you choose a computing major?*Choose up to 3 responses.*

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
I like learning about this field	N/A	71%	N/A	78%	73%	
The courses required of this major are interesting	N/A	0%	N/A	31%	34%	
The major will allow me to make an impact on society	N/A	43%	N/A	39%	36%	
The job market for this field is promising	N/A	71%	N/A	63%	61%	
This major will enable me to make a lot of money	N/A	43%	N/A	32%	38%	
I will be successful completing the courses required of this major	N/A	14%	N/A	15%	11%	
My friends are majors in this field	N/A	14%	N/A	5%	4%	
Professors/faculty at my institution influenced my decision	N/A	14%	N/A	9%	10%	
My family influenced my decision	N/A	14%	N/A	11%	10%	
<i>n</i>	3	7		584	157	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.2.2 For computing majors: Over the past year, have you seriously considered changing to a non-computing major?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes	N/A	17%	N/A	20%	21%	
<i>n</i>	4	6		593	160	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.2.3 Why did you think about leaving computing?

Choose up to 3 responses.

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
The courses were difficult	N/A	N/A	N/A	30%	38%	
The math requirements were too hard	N/A	N/A	N/A	9%	12%	N/A
I did not like the course material	N/A	N/A	N/A	35%	26%	
I was having trouble passes my courses	N/A	N/A	N/A	16%	29%	
I did not have any friends in the major	N/A	N/A	N/A	9%	6%	N/A
The professors were not supportive	N/A	N/A	N/A	13%	18%	
I felt isolated in my program	N/A	N/A	N/A	16%	38%	*
The department did not make me feel welcome	N/A	N/A	N/A	8%	18%	
I experienced health issues that inhibited my ability to feel/be successful	N/A	N/A	N/A	10%	21%	
<i>n</i>	0	1		116	34	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.3 Confidence

Table 3.3.1 I am confident that I can...
 (1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
pass my computing classes	N/A	4.14 (0.90)	N/A	4.49 (0.76)	4.27 (0.98)	
clearly communicate technical problems and solutions to a range of audiences	N/A	4.00 (0.82)	N/A	3.81 (1.06)	3.80 (1.02)	
complete my undergraduate degree in computing	N/A	4.29 (0.49)	N/A	4.39 (1.00)	4.43 (0.95)	
get admitted to a graduate computing program	N/A	3.71 (0.76)	N/A	3.60 (1.20)	3.69 (1.26)	
find employment in my area of computing interest	N/A	3.86 (0.69)	N/A	4.02 (1.05)	4.18 (0.97)	
become a capable researcher in computing.	N/A	3.14 (1.46)	N/A	3.47 (1.13)	3.74 (1.05)	
<i>n</i>	4	7		745	176	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.4 Perceptions of the Professional Environment

Table 3.4.1 Please indicate the extent to which you disagree or agree with the following statement:
 (1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Overall, I am satisfied with the computing program at my institution.	N/A	3.57 (0.98)	N/A	3.80 (1.06)	3.73 (1.21)	
<i>n</i>	4	7		740	175	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.4.2 How do you feel about the computing courses you have taken at your current institution?

(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
I would recommend taking computing courses at my institution to a friend.	N/A	3.86 (1.07)	N/A	4.04 (1.03)	3.97 (1.10)	
The number of students in my computing classes is too large.	N/A	1.29 (0.49)	N/A	2.36 (1.21)	2.32 (1.25)	
I am satisfied with the technical content of the computing courses.	N/A	3.86 (0.38)	N/A	3.81 (0.99)	3.72 (1.16)	
The computing courses at my institution are too difficult.	N/A	2.57 (0.79)	N/A	2.53 (1.01)	2.69 (1.09)	
<i>n</i>	4	7		741	176	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.4.3 How dissatisfied or satisfied are you with the following aspects of the computing program at your institution?

(1) Very dissatisfied - (5) Very satisfied

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
The variety of computing courses offered	N/A	3.14 (0.90)	N/A	3.21 (1.13)	3.35 (1.27)	
Access to academic resources needed to do your work	N/A	4.14 (0.69)	N/A	3.99 (0.98)	3.85 (1.18)	
The availability of professors outside of class (e.g., office hours, answering questions via email, etc.)	N/A	4.29 (0.49)	N/A	4.29 (0.93)	4.12 (1.09)	
How well the program has prepared you for your future career	N/A	3.57 (0.53)	N/A	3.49 (1.01)	3.53 (1.16)	
The workload expected of you	N/A	3.29 (0.49)	N/A	3.56 (0.97)	3.48 (1.12)	
How often you meet with your advisor(s)	N/A	3.57 (0.79)	N/A	3.79 (1.09)	3.77 (1.10)	
The academic guidance your advisor(s) provides	N/A	3.86 (1.07)	N/A	3.89 (1.16)	3.87 (1.17)	
The career advice your advisor(s) provides	N/A	3.43 (0.98)	N/A	3.56 (1.18)	3.63 (1.16)	
<i>n</i>	4	7		708	169	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.4.4 Rate how you feel about the environment of the department of your computing program.
 (1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
I feel a sense of community in my department.	N/A	4.71 (0.49)	N/A	3.73 (1.07)	3.58 (1.23)	
My department cares about its students.	N/A	4.29 (1.11)	N/A	4.22 (0.91)	4.16 (0.99)	
People in the department often attribute my success to special treatment or luck, rather than my competence.	N/A	1.71 (0.76)	N/A	2.00 (1.10)	2.40 (1.27)	*
The environment in my department inspires me to do the best job that I can.	N/A	3.57 (0.79)	N/A	3.72 (0.96)	3.66 (1.12)	
The department is NOT very supportive of its students	N/A	1.29 (0.49)	N/A	1.75 (0.98)	1.99 (1.19)	
My ideas or opinions are minimized or ignored.	N/A	2.29 (0.49)	N/A	1.91 (0.97)	2.22 (1.30)	
Computer science administrators and faculty care about diversity	N/A	3.57 (0.53)	N/A	3.91 (0.96)	3.90 (0.98)	
<i>n</i>	4	7		741	176	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.5 Support Structures

Table 3.5.1 To what extent do you have a mentor who...
 (1) Not at all - (5) Very much

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
helps you improve your computing skills?	N/A	3.43 (0.98)	N/A	2.72 (1.42)	2.61 (1.43)	
shows compassion for any issues you discussed with them?	N/A	3.71 (1.38)	N/A	3.37 (1.39)	3.29 (1.41)	
shares personal experiences as an alternative perspective to your problem?	N/A	3.71 (1.50)	N/A	3.10 (1.45)	3.13 (1.45)	
explores career options with you?	N/A	3.29 (1.50)	N/A	2.86 (1.43)	3.03 (1.43)	
encourages you to do the best you can in your coursework?	N/A	4.00 (1.00)	N/A	3.40 (1.43)	3.41 (1.51)	
<i>n</i>	4	7		735	174	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.6 Career Interests

Table 3.6.1 How interested are you in having the types of jobs listed below after you finish your highest degree?

(1) Very uninterested - (5) Very interested

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
College or university professor in computing field (teaching focused)	N/A	2.71 (1.11)	N/A	2.61 (1.35)	2.58 (1.40)	
College or university professor in computing field (research focused)	N/A	2.43 (1.40)	N/A	2.44 (1.30)	2.55 (1.27)	
K-12 computing teacher	N/A	2.57 (0.79)	N/A	2.14 (1.26)	2.43 (1.33)	
Computing researcher in industry	N/A	3.14 (1.21)	N/A	3.00 (1.26)	3.28 (1.24)	
Computing researcher in a government lab or agency	N/A	3.29 (0.95)	N/A	2.90 (1.30)	3.10 (1.36)	
A non-research computing position in industry (e.g., software engineer)	N/A	3.86 (0.38)	N/A	3.78 (1.27)	4.01 (1.14)	
Entrepreneur (computing related; e.g., individual contractor, build a start-up)	N/A	4.14 (0.69)	N/A	3.28 (1.35)	3.62 (1.32)	
Non-computing career	N/A	2.57 (1.40)	N/A	3.13 (1.33)	2.87 (1.34)	
<i>n</i>	4	7		741	175	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.7 Degree Plans

Table 3.7.1 What is the highest degree you plan to attain?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Associate's degree	N/A	0%	N/A	0%	0%	N/A
Bachelor's degree	N/A	125%	N/A	30%	31%	
Master's degree	N/A	25%	N/A	43%	45%	
Doctoral degree	N/A	25%	N/A	27%	24%	
<i>n</i>	4	7		734	175	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Table 3.7.2 Do you intend to earn/ have your earned your highest degree in a computing-related field?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes	N/A	86%	N/A	66%	73%	
<i>n</i>	4	7		712	169	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Part II

Graduate Students

Chapter 4

Graduate Students: General Results

This section is not available for your department for the fall 2018 Graduate Student Survey. Any of the following could be causing this:

- Your department did not participate in Data Buddies at the graduate level or does not have an graduate program.
- Your department had fewer than 5 graduate student responses.

Chapter 5

Graduate Students: Results by Gender

This section is not available for your department for the fall 2018 Graduate Student Survey. Any of the following could be causing this:

- Your department did not participate in Data Buddies at the graduate level or does not have a graduate program.
- Your department had fewer than 5 graduate student responses from one or more of the groups compared in this chapter.

Chapter 6

Graduate Students: Results by Race/Ethnicity

This section is not available for your department for the fall 2018 Graduate Student Survey. Any of the following could be causing this:

- Your department did not participate in Data Buddies at the graduate level or does not have a graduate program.
- Your department had fewer than 5 graduate student responses from one or more of the groups compared in this chapter.

APPENDIX

Statistical significance

For each statistical test in this report, statistical significance is determined using a two-step process. First, we assessed whether group differences meet the conventional $p \leq .05$ threshold for inferential statistics. Then, if the $p \leq .05$ threshold was met, we observed the effect size for the two-group comparison using Cohen's d for the independent samples t tests and Cohen's h for the two-proportion z tests. According to Cohen (1988)¹, the magnitude of effect sizes indicate the following: .10 - .29 is a small effect, .30 - .49 is a medium effect, and .50 or greater is a large effect; values less than .10 are considered inconsequential. In the current report, group comparisons are only deemed "significant" if they reach the $p \leq .05$ threshold, and their effect size is $\geq .30$ (indicating an effects size of "medium" or greater).

We opted to use a two-step method to test for significant effects so that we could control for unequal sample sizes (i.e., a relatively small "Your Institution" sample, compared to a relatively large "Similar Institutions" sample). This is because large sample sizes tend to yield group differences that easily meet the $p \leq .05$ threshold, but have small effect sizes. On the other hand, it is relatively more difficult to detect a significant effect when sample sizes are small. Thus, our two-step strategy required that a group comparison meet the $p \leq .05$ threshold, and for that effect to be at least medium in size.

Test criteria

Statistical tests were not run if:

- Sample size was too small, $n < 5$.
- For the two-proportion z -tests: The number of students in each group who selected a response option was less than five. (e.g., out of 65 students at your institution, 3 selected that they are planning to get their highest degree in a non-computing related field.)

¹Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.



CERP

Computing Research Association
Evaluation

**2017 Data Buddies Department Report
University of Hawaii-Hilo**

REPORT INFORMATION

This report presents data collected via The Computing Research Association's (CRA) Data Buddies survey during the end of the Fall 2017 and the beginning of the Spring 2018 academic semesters. The Data Buddies surveys are designed to assess experiences of students engaged in the computing community. This includes students who are pursuing a computing degree, as well as students who are simply taking computing courses while pursuing other degrees.

Report structure

This report compares data collected from your students to data from students at similar institutions. In this report, **“similar institutions”** are those whose computing departments award Bachelor's degrees. Data are presented by student population (i.e. undergraduate and graduate). For each population, we present:

- An executive summary page containing key findings about students in your department
- Detailed comparative tables for:
 - Your students and students at similar institutions
 - Women and men at your institution and at similar institutions
 - Students from underrepresented racial/ethnic (URM) groups versus students who are from majority groups¹ at your institution and at other institutions.

If your institution did not have at least 5 respondents for a particular student group and/or does not have a particular student population (e.g., graduate students), there will be no content reported for that chapter.

Table layout

For each survey question, either a mean + standard deviation (SD) or a proportion (in percentage) is reported, depending on the type of survey question. Sample sizes within each table are notated with '*n*' in the bottom row of each table; '*n*' indicates the number of students who responded to that specific chapter of the survey. Sample sizes may vary across tables because all survey questions were voluntary. Tables also present the results of inferential statistics assessing group differences (column labeled Sig.).

Statistical tests and reporting

Independent samples *t*-tests were used to assess group differences in means. A two-proportion *z*-test with unpooled variance was used to assess differences in proportions across groups.

For each statistical test, we indicate whether a comparison between two groups is “significant”. Significance is determined using a two-step process. First, we assessed whether group differences meet the conventional $p \leq .05$ threshold for inferential statistics. Then, if the $p \leq .05$ threshold was met, we observed the effect size for the two-group comparison using Cohen's *d* for the independent samples *t*-tests and Cohen's *h* for the two-proportion *z*-tests. In the current report, group comparisons are only deemed “significant” if they reach the $p \leq .05$ threshold and their effect size is $\geq .30$ (indicating an effect size of “medium” or greater). For an explanation of why we use this two-step process and more information on how to interpret inferential statistics, see the Appendix.

More CERP data

Past Data Buddies data are also displayed on a data visualization page on the CRA's Center for Evaluating the Research Pipeline's (CERP) website <http://cra.org/cerp/data-visualization>.

Thank you for contributing data to the CRA's Data Buddies Project! Your students' data help the computing community better understand correlates of persistence and success among computing students.

¹“URM” includes students who identify as African American/Black, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, Arab/Middle Eastern/Persian, Mexican American/Chicano/Puerto Rican/Other Latino, and students who identify with one or more of these groups. “Majority” includes racial/ethnic groups who are in the majority in computing, which are White/Caucasian; East Asian; Southeast Asian; South Asian, Other Asian.

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Part I

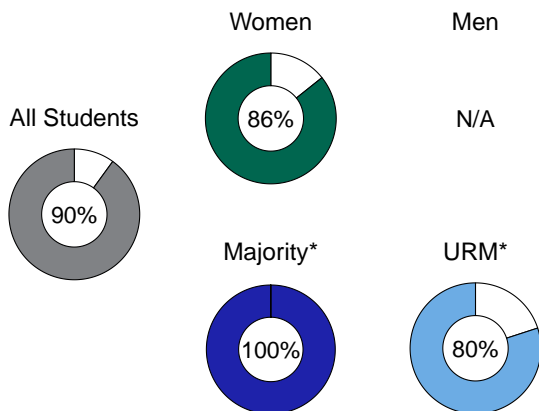
Undergraduate Students

Your Institution at a Glance: Undergraduate Students

April 14, 2018

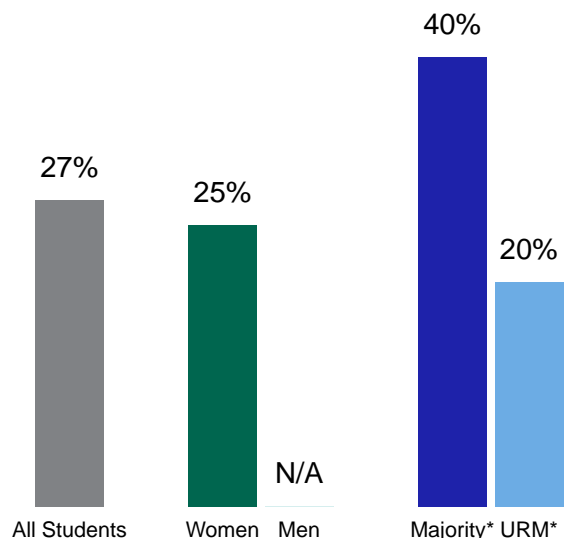
Satisfaction with the computing program

At your institution, the following are satisfied with the computing program**:



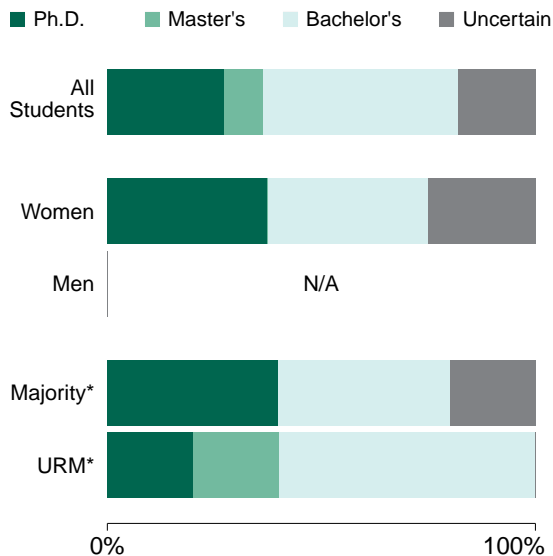
Thought about leaving computing major

At your institution, the following thought about leaving their computing major**:



Highest degree plans of your students

Your students' highest intended degree**:



Career interests of your students

Top 5 career paths reported by your students:

1. A non-research position
2. Entrepreneurship (computing related)
3. Applied research, computing
4. Applied research, non-computing
5. Computing researcher

See full report for benchmarking on these topics and more!

* **URM**: "Underrepresented minority" in computing; students who identify as African American/Black; American Indian/Alaska Native; Arab, Middle Eastern, or Persian; Mexican American/Chicano; Native Hawaiian/Pacific Islander; Puerto Rican, Other Latino. **Majority**: Students who identify with a racial/ethnic group in the majority in computing, including White/Caucasian and/or Asian.

N/A: $n < 5$ for the group for the specific question.

+ The calculations are independent for All Students, for Women/Men, and for Majority/URM.

Chapter 1

Undergraduate Students: General Results

1.1 Student Background

Does your major (or one of your majors, if you are a double major) have a computing component?

	Your Institution (%)	Similar Institutions (%)	Sig.
No	0%	12%	N/A
Yes	100%	78%	N/A
Have not declared a major	0%	10%	N/A
<i>n</i>	11	1017	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

In what year do you expect to complete your current undergraduate degree?

	Your Institution (%)	Similar Institutions (%)	Sig.
2017	0%	2%	N/A
2018	27%	28%	N/A
2019	27%	26%	N/A
2020	45%	43%	
2021	0%	0%	N/A
2022 or later	0%	0%	N/A
<i>n</i>	11	1017	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

During your college career so far, have you participated in any formal research experiences?

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes	18%	32%	N/A
<i>n</i>	11	956	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Have you ever attended community college?

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes	45%	12%	*
<i>n</i>	11	933	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

How are you paying for your education? Select all that apply.

	Your Institution (%)	Similar Institutions (%)	Sig.
Federal student loans	27%	39%	N/A
Private student loans	0%	16%	N/A
Personal savings	55%	33%	
Scholarship, fellowship, grant, or aid	82%	58%	N/A
Full-time work	0%	3%	N/A
Part-time work	64%	37%	N/A
Family support	27%	64%	N/A
Credit	0%	4%	N/A
Research Assistantship	0%	2%	N/A
Teaching Assistantship	0%	2%	N/A
Employer support	0%	1%	N/A
Military/Veterans benefits/assistance	9%	1%	N/A
Other	9%	2%	N/A
<i>n</i>	11	1017	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.2 Confidence

I am confident that I can:
(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
find employment in my area of computing interest	3.91 (1.30)	4.01 (1.04)	
become a leader in the field of computing	3.09 (1.22)	3.31 (1.12)	
win a computing-related contest (e.g., programming contest, robotics contest, hackathon)	3.64 (0.81)	3.93 (1.28)	
get admitted to a graduate computing program	3.09 (1.45)	2.90 (1.20)	
complete my undergraduate degree in computing	3.82 (1.25)	3.23 (1.29)	
quickly learn a new programming language on my own	3.73 (0.90)	3.75 (1.15)	
clearly communicate technical problems and solutions to a range of audiences	3.91 (1.04)	3.76 (1.07)	
<i>n</i>	11	1006	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.3 Perceptions of the Professional Environment

How do you feel about the computing courses you have taken at your current institution?
(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
I would recommend taking computing courses at my institution to a friend.	4.40 (0.70)	4.15 (1.00)	
Overall, I am satisfied with the computing program at my institution	4.20 (1.23)	3.96 (1.02)	
I am glad that I chose to study computing	4.60 (0.52)	4.38 (0.85)	
<i>n</i>	10	975	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Rate how you feel about the environment of the department of your computing program.
(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
The department is not very supportive of its students	2.60 (1.35)	3.31 (1.32)	
I feel a sense of community in my department.	4.40 (0.70)	4.14 (0.93)	
My department cares about its students.	4.10 (1.20)	3.99 (0.97)	
The environment in my department inspires me to do the best job that I can.	3.40 (1.58)	2.46 (1.32)	
<i>n</i>	10	975	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

**Within your computing department and/or classes, how often do you feel that:
(1) Never - (5) Always**

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
People tend to attribute your success to special treatment or luck rather than to your competence.	1.27 (0.47)	1.62 (0.95)	*
You are talked down to by classmates, instructors, or advisors.	1.64 (0.92)	1.66 (0.97)	
Your ideas or opinions are minimized or ignored.	1.64 (1.03)	1.60 (0.92)	
<i>n</i>	11	976	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.4 Support Structures

**To what extent do you have a mentor who:
(1) Not at all - (5) Very much**

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
helps you improve your computing skills.	3.00 (1.41)	2.90 (1.36)	
shows compassion for concerns and feelings you discussed with them.	4.00 (1.10)	3.38 (1.33)	
shares personal experiences as an alternative perspective to your problems.	3.55 (1.29)	3.13 (1.38)	
explores career options with you.	3.09 (1.30)	2.99 (1.38)	
<i>n</i>	11	956	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

**To what extent is each of the following kinds of support available to you from other computing students if
you need it?
(1) Not at all - (5) Very much**

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
Someone to hang out with.	3.73 (1.27)	3.52 (1.24)	
Someone to confide in or talk to about your problems.	3.64 (1.29)	3.17 (1.32)	
Someone to get class assignments for you if you were sick.	4.09 (0.83)	3.82 (1.16)	
Someone to help you understand difficult homework problems.	3.82 (1.17)	3.80 (1.13)	
<i>n</i>	11	955	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.5 Career Interests

How interested are you in having the types of jobs listed below after you finish your highest degree?
(1) Very uninterested - (5) Very interested

	Your Institution Mean (SD)	Similar Institutions Mean (SD)	Sig.
College/University professor in computing field	3.00 (1.10)	2.58 (1.32)	
Computing researcher in industry or government lab	3.27 (1.19)	3.08 (1.32)	
High school computing teacher	2.45 (1.21)	2.03 (1.19)	
A non-research position in the computing industry	4.00 (1.18)	3.68 (1.21)	
Position applying computing research to another area (e.g. digital media, support of research in medicine or other sciences)	3.73 (0.90)	3.74 (1.13)	
Non-research position applying your computing knowledge in another area (e.g. business applications, government)	3.73 (1.10)	3.54 (1.21)	
Entrepreneur (computing related)	3.82 (0.98)	3.25 (1.35)	
Non-computing career	2.64 (1.36)	2.82 (1.33)	
<i>n</i>	11	1000	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

1.6 Degree Plans

What is the highest degree you plan to attain?

	Your Institution (%)	Similar Institutions (%)	Sig.
Associate's degree	0%	0%	N/A
Bachelor's degree	45%	28%	
Master's degree	9%	24%	N/A
Doctoral degree	18%	21%	N/A
Professional degree (MD, JD, Ed.D, etc)	9%	5%	N/A
Uncertain	18%	21%	N/A
Other	0%	0%	N/A
<i>n</i>	11	953	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

In which field do you plan to attain your highest degree? Please select all that apply.

	Your Institution (%)	Similar Institutions (%)	Sig.
Computing related field	82%	68%	N/A
Non-computing field	36%	45%	N/A
<i>n</i>	11	1017	

(*) $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

For computing majors: Over the past year, have you seriously considered changing to a non-computing major?

	Your Institution (%)	Similar Institutions (%)	Sig.
Yes	27%	8%	N/A
<i>n</i>	11	798	

(* $p \leq .05$ and Cohen's d or $h \geq .30$; (N/A) $n < 5$ or test criteria were not met

Chapter 2

Undergraduate Students: Results by Gender

Data for individuals who do not identify as either a woman or a man are not included in this report due to small samples sizes

2.1 Student Background

Does your major (or one of your majors, if you are a double major) have a computing component?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
No	0%	N/A	N/A	16%	9%	
Yes	100%	N/A	N/A	75%	82%	
Have not declared a major	0%	N/A	N/A	9%	10%	
<i>n</i>	8	3		442	470	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

In what year do you expect to complete your current undergraduate degree?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
2017	0%	N/A	N/A	2%	3%	
2018	25%	N/A	N/A	33%	26%	
2019	25%	N/A	N/A	28%	23%	
2020	50%	N/A	N/A	38%	48%	
2021	0%	N/A	N/A	0%	0%	N/A
2022 or later	0%	N/A	N/A	0%	0%	N/A
<i>n</i>	8	3		442	470	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

During your college career so far, have you participated in any formal research experiences?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes	12%	N/A	N/A	39%	24%	*
<i>n</i>	8	3		436	467	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Have you ever attended community college?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes	38%	N/A	N/A	10%	13%	
<i>n</i>	8	3		433	460	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

How are you paying for your education? Select all that apply.

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Federal student loans	38%	N/A	N/A	39%	43%	
Private student loans	0%	N/A	N/A	15%	20%	
Personal savings	62%	N/A	N/A	30%	39%	
Scholarship, fellowship, grant, or aid	75%	N/A	N/A	62%	61%	
Full-time work	0%	N/A	N/A	2%	5%	
Part-time work	75%	N/A	N/A	40%	38%	
Family support	25%	N/A	N/A	72%	65%	
Credit	0%	N/A	N/A	3%	6%	
Research Assistantship	0%	N/A	N/A	2%	1%	
Teaching Assistantship	0%	N/A	N/A	2%	1%	
Employer support	0%	N/A	N/A	1%	2%	N/A
Military/Veterans benefits/assistance	12%	N/A	N/A	1%	0%	N/A
Other	12%	N/A	N/A	2%	2%	
<i>n</i>	8	3		442	470	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.2 Confidence

I am confident that I can:
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
find employment in my area of computing interest	3.50 (1.31)	N/A	N/A	3.88 (1.12)	4.16 (0.93)	
become a leader in the field of computing	2.88 (1.36)	N/A	N/A	3.12 (1.13)	3.54 (1.06)	*
win a computing-related contest (e.g., programming contest, robotics contest, hackathon)	3.62 (0.92)	N/A	N/A	3.62 (1.40)	4.22 (1.09)	*
get admitted to a graduate computing program	2.75 (1.28)	N/A	N/A	2.74 (1.22)	3.07 (1.15)	
complete my undergraduate degree in computing	3.38 (1.19)	N/A	N/A	3.05 (1.38)	3.40 (1.18)	
quickly learn a new programming language on my own	3.62 (1.06)	N/A	N/A	3.60 (1.18)	3.89 (1.10)	
clearly communicate technical problems and solutions to a range of audiences	3.75 (1.16)	N/A	N/A	3.63 (1.11)	3.90 (1.01)	
<i>n</i>	8	3		440	470	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.3 Perceptions of the Professional Environment

How do you feel about the computing courses you have taken at your current institution?
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
I would recommend taking computing courses at my institution to a friend.	4.43 (0.79)	N/A	N/A	4.15 (1.05)	4.18 (0.91)	
Overall, I am satisfied with the computing program at my institution	4.00 (1.41)	N/A	N/A	3.98 (1.01)	3.99 (1.02)	
I am glad that I chose to study computing	4.57 (0.53)	N/A	N/A	4.34 (0.91)	4.45 (0.80)	
<i>n</i>	7	3		435	467	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

**Rate how you feel about the environment of the department of your computing program.
(1) Strongly disagree - (5) Strongly agree**

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
The department is not very supportive of its students	2.71 (1.38)	N/A	N/A	3.24 (1.40)	3.40 (1.24)	
I feel a sense of community in my department.	4.43 (0.79)	N/A	N/A	4.13 (0.98)	4.15 (0.90)	
My department cares about its students.	4.00 (1.41)	N/A	N/A	4.06 (1.02)	3.94 (0.95)	
The environment in my department inspires me to do the best job that I can.	2.86 (1.57)	N/A	N/A	2.55 (1.39)	2.33 (1.26)	
<i>n</i>	7	3		437	466	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

**Within your computing department and/or classes, how often do you feel that:
(1) Never - (5) Always**

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
People tend to attribute your success to special treatment or luck rather than to your competence.	1.25 (0.46)	N/A	N/A	1.66 (0.93)	1.57 (0.96)	
You are talked down to by classmates, instructors, or advisors.	1.75 (1.04)	N/A	N/A	1.78 (1.00)	1.53 (0.93)	
Your ideas or opinions are minimized or ignored.	1.62 (1.06)	N/A	N/A	1.69 (0.95)	1.49 (0.88)	
<i>n</i>	8	3		436	469	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.4 Support Structures

**To what extent do you have a mentor who:
(1) Not at all - (5) Very much**

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
helps you improve your computing skills.	3.25 (1.49)	N/A	N/A	2.95 (1.38)	2.87 (1.35)	
shows compassion for concerns and feelings you discussed with them.	4.38 (1.06)	N/A	N/A	3.54 (1.33)	3.23 (1.33)	
shares personal experiences as an alternative perspective to your problems.	3.88 (1.36)	N/A	N/A	3.25 (1.39)	3.02 (1.37)	
explores career options with you.	3.25 (1.49)	N/A	N/A	3.05 (1.40)	2.95 (1.36)	
<i>n</i>	8	3		436	466	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

**To what extent is each of the following kinds of support available to you from other computing students if you need it?
(1) Not at all - (5) Very much**

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
Someone to hang out with.	3.50 (1.31)	N/A	N/A	3.55 (1.28)	3.48 (1.21)	
Someone to confide in or talk to about your problems.	3.38 (1.41)	N/A	N/A	3.36 (1.34)	3.01 (1.29)	
Someone to get class assignments for you if you were sick.	4.00 (0.93)	N/A	N/A	3.94 (1.15)	3.72 (1.16)	
Someone to help you understand difficult homework problems.	3.50 (1.20)	N/A	N/A	3.89 (1.14)	3.74 (1.08)	
<i>n</i>	8	3		435	465	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.5 Career Interests

How interested are you in having the types of jobs listed below after you finish your highest degree?
(1) Very uninterested - (5) Very interested

	Your Institution			Similar Institutions		
	Women Mean (SD)	Men Mean (SD)	Sig.	Women Mean (SD)	Men Mean (SD)	Sig.
College/University professor in computing field	3.00 (1.20)	N/A	N/A	2.45 (1.31)	2.69 (1.30)	
Computing researcher in industry or government lab	3.12 (1.13)	N/A	N/A	2.89 (1.36)	3.29 (1.22)	*
High school computing teacher	2.50 (1.31)	N/A	N/A	1.96 (1.18)	2.07 (1.17)	
A non-research position in the computing industry	3.75 (1.28)	N/A	N/A	3.60 (1.29)	3.76 (1.13)	
Position applying computing research to another area (e.g. digital media, support of research in medicine or other sciences)	3.62 (1.06)	N/A	N/A	3.78 (1.18)	3.68 (1.08)	
Non-research position applying your computing knowledge in another area (e.g. business applications, government)	3.62 (1.19)	N/A	N/A	3.50 (1.28)	3.63 (1.13)	
Entrepreneur (computing related)	3.62 (1.06)	N/A	N/A	3.03 (1.39)	3.52 (1.25)	*
Non-computing career	2.50 (1.51)	N/A	N/A	2.95 (1.37)	2.69 (1.25)	
<i>n</i>	8	3		438	466	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

2.6 Degree Plans

What is the highest degree you plan to attain?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Associate's degree	0%	N/A	N/A	0%	0%	N/A
Bachelor's degree	38%	N/A	N/A	21%	35%	*
Master's degree	0%	N/A	N/A	27%	24%	
Doctoral degree	25%	N/A	N/A	22%	20%	
Professional degree (MD, JD, Ed.D, etc)	12%	N/A	N/A	6%	3%	
Uncertain	25%	N/A	N/A	24%	18%	
Other	0%	N/A	N/A	1%	0%	N/A
<i>n</i>	8	3		436	467	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

In which field do you plan to attain your highest degree? Please select all that apply.

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Computing related field	75%	N/A	N/A	68%	76%	
Non-computing field	38%	N/A	N/A	55%	42%	
<i>n</i>	8	3		442	470	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

For computing majors: Over the past year, have you seriously considered changing to a non-computing major?

	Your Institution			Similar Institutions		
	Women (%)	Men (%)	Sig.	Women (%)	Men (%)	Sig.
Yes	25%	N/A	N/A	10%	6%	
<i>n</i>	8	3		333	384	

Data are compared between women and men at your institution, and women and men at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Chapter 3

Undergraduate Students: Results by Race/Ethnicity

3.1 Student Background

Does your major (or one of your majors, if you are a double major) have a computing component?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
No	0%	0%	N/A	11%	12%	
Yes	100%	100%	N/A	79%	81%	
Have not declared a major	0%	0%	N/A	10%	7%	
<i>n</i>	5	5		743	180	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

In what year do you expect to complete your current undergraduate degree?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
2017	0%	0%	N/A	2%	3%	
2018	20%	20%	N/A	30%	28%	
2019	20%	40%	N/A	25%	28%	
2020	60%	40%	N/A	43%	41%	
2021	0%	0%	N/A	0%	0%	N/A
2022 or later	0%	0%	N/A	0%	0%	N/A
<i>n</i>	5	5		743	180	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

During your college career so far, have you participated in any formal research experiences?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes	20%	20%	N/A	31%	34%	
<i>n</i>	5	5		735	179	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Have you ever attended community college?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes	20%	60%	N/A	10%	17%	
<i>n</i>	5	5		729	175	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

How are you paying for your education? Select all that apply.

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Federal student loans	60%	0%	N/A	39%	49%	
Private student loans	0%	0%	N/A	17%	16%	
Personal savings	60%	60%	N/A	38%	22%	*
Scholarship, fellowship, grant, or aid	60%	100%	N/A	59%	72%	
Full-time work	0%	0%	N/A	3%	4%	
Part-time work	60%	60%	N/A	39%	36%	
Family support	20%	40%	N/A	73%	51%	*
Credit	0%	0%	N/A	4%	4%	
Research Assistantship	0%	0%	N/A	2%	2%	N/A
Teaching Assistantship	0%	0%	N/A	2%	1%	N/A
Employer support	0%	0%	N/A	1%	0%	N/A
Military/Veterans benefits/assistance	0%	20%	N/A	0%	2%	N/A
Other	20%	0%	N/A	2%	3%	
<i>n</i>	5	5		743	180	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.2 Confidence

I am confident that I can:
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
find employment in my area of computing interest	3.60 (0.89)	4.20 (1.79)		4.01 (1.03)	4.07 (1.08)	
become a leader in the field of computing	3.00 (1.41)	3.20 (1.30)		3.25 (1.10)	3.58 (1.14)	*
win a computing-related contest (e.g., programming contest, robotics contest, hackathon)	3.40 (1.14)	3.80 (0.45)		3.94 (1.28)	3.92 (1.31)	
get admitted to a graduate computing program	2.60 (0.89)	3.60 (1.95)		2.88 (1.19)	2.99 (1.21)	
complete my undergraduate degree in computing	3.60 (0.89)	3.80 (1.64)		3.17 (1.29)	3.49 (1.28)	
quickly learn a new programming language on my own	3.40 (0.89)	4.20 (0.84)		3.73 (1.15)	3.83 (1.12)	
clearly communicate technical problems and solutions to a range of audiences	3.00 (0.71)	4.60 (0.55)	*	3.76 (1.05)	3.81 (1.08)	
<i>n</i>	5	5		742	178	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.3 Perceptions of the Professional Environment

How do you feel about the computing courses you have taken at your current institution?
(1) Strongly disagree - (5) Strongly agree

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
I would recommend taking computing courses at my institution to a friend.	4.60 (0.55)	4.20 (0.84)		4.16 (0.98)	4.16 (1.00)	
Overall, I am satisfied with the computing program at my institution	4.80 (0.45)	3.60 (1.52)		3.97 (1.02)	4.02 (1.00)	
I am glad that I chose to study computing	4.80 (0.45)	4.40 (0.55)		4.40 (0.83)	4.38 (0.89)	
<i>n</i>	5	5		736	176	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

**Rate how you feel about the environment of the department of your computing program.
(1) Strongly disagree - (5) Strongly agree**

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
The department is not very supportive of its students	2.40 (1.52)	2.80 (1.30)		3.33 (1.31)	3.20 (1.40)	
I feel a sense of community in my department.	4.80 (0.45)	4.00 (0.71)		4.14 (0.93)	4.12 (0.97)	
My department cares about its students.	4.40 (0.55)	3.80 (1.64)		3.98 (0.97)	4.05 (1.00)	
The environment in my department inspires me to do the best job that I can.	3.40 (1.82)	3.40 (1.52)		2.45 (1.32)	2.50 (1.38)	
<i>n</i>	5	5		737	176	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

**Within your computing department and/or classes, how often do you feel that:
(1) Never - (5) Always**

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
People tend to attribute your success to special treatment or luck rather than to your competence.	1.00 (0.00)	1.60 (0.55)		1.61 (0.93)	1.71 (1.04)	
You are talked down to by classmates, instructors, or advisors.	1.20 (0.45)	2.00 (1.22)		1.67 (0.97)	1.56 (0.91)	
Your ideas or opinions are minimized or ignored.	1.40 (0.89)	2.00 (1.22)		1.59 (0.91)	1.60 (0.96)	
<i>n</i>	5	5		736	179	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.4 Support Structures

**To what extent do you have a mentor who:
(1) Not at all - (5) Very much**

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
helps you improve your computing skills.	3.40 (1.14)	2.20 (1.30)		2.94 (1.34)	2.74 (1.42)	
shows compassion for concerns and feelings you discussed with them.	4.20 (0.84)	3.60 (1.34)		3.36 (1.32)	3.48 (1.38)	
shares personal experiences as an alternative perspective to your problems.	3.80 (0.84)	3.00 (1.58)		3.09 (1.36)	3.29 (1.48)	
explores career options with you.	3.20 (1.30)	3.20 (1.48)		3.00 (1.34)	2.90 (1.54)	
<i>n</i>	5	5		735	178	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

**To what extent is each of the following kinds of support available to you from other computing students if you need it?
(1) Not at all - (5) Very much**

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
Someone to hang out with.	3.60 (1.14)	3.60 (1.52)		3.53 (1.25)	3.51 (1.26)	
Someone to confide in or talk to about your problems.	3.80 (0.84)	3.20 (1.64)		3.17 (1.32)	3.26 (1.34)	
Someone to get class assignments for you if you were sick.	4.20 (0.84)	3.80 (0.84)		3.85 (1.14)	3.79 (1.25)	
Someone to help you understand difficult homework problems.	4.20 (0.84)	3.20 (1.30)		3.81 (1.10)	3.83 (1.20)	
<i>n</i>	5	5		734	178	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.5 Career Interests

How interested are you in having the types of jobs listed below after you finish your highest degree?
 (1) Very uninterested - (5) Very interested

	Your Institution			Similar Institutions		
	Majority Mean (SD)	URM Mean (SD)	Sig.	Majority Mean (SD)	URM Mean (SD)	Sig.
College/University professor in computing field	2.40 (0.55)	3.40 (1.34)		2.58 (1.33)	2.58 (1.30)	
Computing researcher in industry or government lab	3.60 (0.55)	2.80 (1.64)		3.05 (1.31)	3.22 (1.34)	
High school computing teacher	2.40 (0.89)	2.80 (1.48)		1.99 (1.15)	2.16 (1.28)	
A non-research position in the computing industry	4.00 (0.71)	3.80 (1.64)		3.67 (1.19)	3.69 (1.24)	
Position applying computing research to another area (e.g. digital media, support of research in medicine or other sciences)	3.20 (0.84)	4.40 (0.55)	*	3.72 (1.12)	3.79 (1.14)	
Non-research position applying your computing knowledge in another area (e.g. business applications, government)	4.00 (0.00)	3.60 (1.67)		3.54 (1.19)	3.58 (1.26)	
Entrepreneur (computing related)	3.80 (0.84)	3.60 (1.14)		3.20 (1.33)	3.45 (1.36)	
Non-computing career	3.00 (0.71)	2.60 (1.82)		2.83 (1.31)	2.65 (1.36)	
<i>n</i>	5	5		737	177	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

3.6 Degree Plans

What is the highest degree you plan to attain?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Associate's degree	0%	0%	N/A	0%	0%	N/A
Bachelor's degree	40%	60%	N/A	29%	25%	
Master's degree	0%	20%	N/A	24%	25%	
Doctoral degree	20%	20%	N/A	20%	27%	
Professional degree (MD, JD, Ed.D, etc)	20%	0%	N/A	4%	6%	
Uncertain	20%	0%	N/A	22%	17%	
Other	0%	0%	N/A	1%	0%	N/A
<i>n</i>	5	5		735	179	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

In which field do you plan to attain your highest degree? Please select all that apply.

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Computing related field	80%	80%	N/A	71%	76%	
Non-computing field	20%	60%	N/A	48%	46%	
<i>n</i>	5	5		743	180	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

For computing majors: Over the past year, have you seriously considered changing to a non-computing major?

	Your Institution			Similar Institutions		
	Majority (%)	URM (%)	Sig.	Majority (%)	URM (%)	Sig.
Yes	40%	20%	N/A	7%	11%	
<i>n</i>	5	5		588	146	

Data are compared between majority students and URM students at your institution, and majority students and URM students at other institutions.

(*) $p \leq .05$ and Cohen's d or $h \geq .30$, (N/A) $n < 5$ or test criteria were not met

Part II

Graduate Students

Chapter 4

Graduate Students: General Results

Your department had fewer than 5 respondents for the Fall 2017 Graduate Student Survey, did not participate in Data Buddies in Fall 2017 at the graduate level, or does not have an graduate program.

Chapter 5

Graduate Students: Results by Gender

Data for individuals who do not identify as either a woman or a man are not included in this report due to small samples sizes. Your department had fewer than 5 respondents for the Fall 2017 Graduate Student Survey, did not participate in Data Buddies in Fall 2017 at the graduate level, or does not have an graduate program.

Chapter 6

Graduate Students: Results by Race/Ethnicity

Your department had fewer than 5 respondents for the Fall 2017 Graduate Student Survey, did not participate in Data Buddies in Fall 2017 at the graduate level, or does not have an graduate program.

APPENDIX

Statistical significance

For each statistical test in this report, statistical significance is determined using a two-step process. First, we assessed whether group differences meet the conventional $p \leq .05$ threshold for inferential statistics. Then, if the $p \leq .05$ threshold was met, we observed the effect size for the two-group comparison using Cohen's d for the independent samples t tests and Cohen's h for the two-proportion z tests. According to Cohen (1988)¹, the magnitude of effect sizes indicate the following: .10 - .29 is a small effect, .30 - .49 is a medium effect, and .50 or greater is a large effect; values less than .10 are considered inconsequential. In the current report, group comparisons are only deemed "significant" if they reach the $p \leq .05$ threshold, and their effect size is $\geq .30$ (indicating an effects size of "medium" or greater).

We opted to use a two-step method to test for significant effects so that we could control for unequal sample sizes (i.e., a relatively small "Your Institution" sample, compared to a relatively large "Similar Institutions" sample). This is because large sample sizes tend to yield group differences that easily meet the $p \leq .05$ threshold, but have small effect sizes. On the other hand, it is relatively more difficult to detect a significant effect when sample sizes are small. Thus, our two-step strategy required that a group comparison meet the $p \leq .05$ threshold, and for that effect to be at least medium in size.

Test criteria

Statistical tests were not run if:

- Sample size was too small, $n < 5$.
- For the two-proportion z -tests: The number of students in each group who selected a response option was less than five. (e.g., out of 65 students at your institution, 3 selected that they are planning to get their highest degree in a non-computing related field.)

¹Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.



CERP

Computing Research Association
Evaluation

2016 Data Buddies Department Report University of Hawaii-Hilo

The Computing Research Association's (CRA) Data Buddies surveys are designed to assess experiences of students engaged in the computing community. This includes students who are pursuing a computing degree, as well as students who are simply taking computing courses while pursuing other degrees.

The current report presents data collected at two points in time. First, data collected during the Fall 2015 academic semester are presented; this survey was distributed to students at all levels of their degree program, and assessed students' experiences in the computing community. Second, data collected during the Spring 2014 and 2015 academic semesters are presented; these surveys were sent to students who were graduating from their degree program during the academic year of the survey, and measured plans for the future. Data from Spring 2014 and Spring 2015 were aggregated in order to increase sample sizes in this report.

Data are presented by semester of survey, and student population (i.e. undergraduate and graduate). If your institution did not have more than 4 respondents, did not distribute a particular survey to its students, or does not have a particular student population (e.g., graduate students), there will be no content reported for that section.

The tables in this report include aggregated data for your students compared to data for students at institutions that are similar to your own institution. **YOUR COMPARISON GROUP IS STUDENTS FROM OTHER INSTITUTIONS WHOSE COMPUTING DEPARTMENTS ONLY AWARD BACHELOR'S DEGREES.** For each survey question, either a mean + standard deviation (SD) or a proportion (in percentage) is reported for each student group. Sample sizes within each table are notated with 'n', and indicate the number of students who responded to that specific section of the survey; sample sizes may vary across tables, given that all survey questions were voluntary.

Tables also include inferential statistics assessing differences between your students' responses vs. a comparison group's responses. The reader should exercise caution when interpreting inferential statistics pertaining to one or more groups with a small sample size (e.g., $n < 10$). Small sample sizes tend to yield a high degree of error variance (i.e., unreliable estimate of the population), relative to moderate (e.g., $n = 10 - 30$) or large sample sizes (e.g., $n > 30$).

Independent samples t tests were used to assess group differences in means (For more information on this type of test see http://en.wikipedia.org/wiki/Student's_t-test). A two-proportion z test with unpooled variance was used to assess differences in proportions across groups (see http://en.wikipedia.org/wiki/Statistical_hypothesis_testing for more information on this type of test); if the product of either group's sample size and its respective proportion was less than five, then the assumptions for the two-proportion z test were not met, and a test was not conducted.

The following notation is used to indicate statistically significant group differences:

- (*) groups are significantly different at the $p \leq .05$ level.
- A blank cell indicates that the difference between groups is not significantly different.
- (-) fewer than 5 students completed a given question OR the criteria to calculate a two-proportion z test (see above) were not met.

Past Data Buddies data are also displayed on a data visualization page on the CRA's Center for Evaluating the Research Pipeline's (CERP) website (<http://cra.org/cerp/data-visualization>). Thank you for contributing data to the CRA's Data Buddies Project. Your students' data help the computing community better understand correlates of persistence and success among a diverse set of student populations.

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Part I

Fall 2015 Semester: Continuing Students

Chapter 1

Undergraduate Students

1.1 Background

What is your current class standing?

	Your Institution (%)	Comparison Group (%)	Sig.
First year	20%	17%	
Second year	13%	22%	
Third year	27%	28%	
Fourth year	20%	27%	
Fifth year	7%	4%	
Sixth year or more	7%	1%	
Other	7%	1%	
n	15	500	

Are you a computing major?

Note: we define "computing major" as computer science, computer engineering, computing information systems, or any other major with a strong computing component

	Your Institution (%)	Comparison Group (%)	Sig.
No	0%	19%	
Yes	100%	78%	
Have not declared a major	0%	3%	
n	15	498	

For computing majors: Over the past year, have you seriously considered changing to a non-computing major?

	Your Institution (%)	Comparison Group (%)	Sig.
Yes	13%	15%	
n	15	387	

Have you ever attended community college?

	Your Institution (%)	Comparison Group (%)	Sig.
Yes	54%	21%	*
n	13	392	

How are you paying for your education? Select all that apply.

	Your Institution (%)	Comparison Group (%)	Sig.
Federal student loans	47%	51%	
Private student loans	7%	20%	
Personal savings	33%	35%	
Scholarship/fellowship you applied for	73%	49%	
Full-time work	7%	6%	
Part-time work	67%	39%	
Spouse or partner support	0%	2%	
Parent or other family support	33%	65%	*
Other	13%	6%	
n	15	481	

Have you experienced any economic hardships during your college education that led to a leave of absence?

	Your Institution (%)	Comparison Group (%)	Sig.
Yes	20%	4%	*
n	15	475	

1.2 Computing Identity

How much do you agree or disagree with the following?
 (1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
I see myself as a computing person	4.13 (0.74)	3.91 (1.12)	
I feel like I belong in computing	3.73 (1.10)	3.73 (1.16)	
I feel like an outsider in the computing community	2.47 (1.25)	2.50 (1.23)	
I am interested in learning more about what I can do with computing	4.71 (0.83)	4.32 (0.86)	
Computing is a big part of who I am	4.07 (0.88)	3.69 (1.14)	
I feel welcomed in the computing community	3.47 (1.30)	3.69 (1.01)	
Using computers to solve problems is interesting	4.67 (0.72)	4.53 (0.79)	
I do not have much in common with the other students in my computing classes	2.87 (1.19)	2.66 (1.15)	
I care about doing well in computing	4.57 (0.51)	4.40 (0.87)	
n	14	497	

1.3 Confidence

I am confident that I can:
(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
find employment in my area of computing interest	4.07 (1.03)	4.18 (1.00)	
become a leader in the field of computing	3.00 (1.31)	3.07 (1.15)	
win a computing-related contest (e.g., programming contest, robotics contest, hackathon)	2.87 (1.19)	2.89 (1.20)	
get admitted to a graduate computing program	3.20 (1.32)	3.54 (1.11)	
complete my undergraduate degree in computing	4.53 (0.83)	4.41 (1.01)	
quickly learn a new programming language on your own	3.73 (0.88)	3.77 (1.12)	
clearly communicate technical problems and solutions to a range of audiences	3.67 (0.98)	3.82 (1.02)	
n	15	496	

1.4 Perceptions of the Professional Environment

To what extent do you disagree or agree with the following: I believe:
(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
People have a certain amount of computing ability that really can't be changed.	2.13 (1.06)	2.39 (1.09)	
People can't really change how good they are in computing.	1.80 (0.94)	1.90 (0.93)	
People can learn new things, but they can't change their basic ability to do computing.	1.87 (0.83)	2.13 (1.04)	
n	15	495	

What are your perceptions of people in computing?
(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
Although some women might be good at computing, women in general tend to be better at other things	2.07 (1.21)	2.01 (1.10)	
Computing fits men's personalities better than women's	1.67 (1.05)	1.95 (1.09)	
Computing seems to come more naturally to women than men	2.20 (0.94)	2.18 (0.95)	
n	15	494	

How do you feel about the computing courses you have taken at your current institution?
(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
I would recommend taking computing courses at my institution to a friend.	4.07 (1.16)	4.12 (0.93)	
Overall, I am satisfied with the computing program at my institution	3.67 (1.35)	3.99 (1.00)	
I am glad that I chose to study computing	4.27 (1.16)	4.37 (0.94)	
n	15	492	

1.5 Support Structures

Rate how you feel about the environment of the department of your computing program.

(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
The department is not very supportive of its students	1.93 (1.28)	1.93 (1.05)	
I feel a sense of community in my department.	3.87 (1.13)	3.80 (1.03)	
My department cares about its students.	4.33 (0.90)	4.25 (0.84)	
The environment in my department inspires me to do the best job that I can.	3.73 (1.39)	3.85 (0.99)	
n	15	496	

Within your computing department and/or classes, how often do you feel that:
(1) Never - (5) Always

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
People tend to attribute your success to special treatment or luck rather than to your competence.	1.67 (0.82)	1.70 (1.06)	
You are talked down to by classmates, instructors, or advisors.	2.20 (1.08)	1.63 (1.00)	
Your ideas or opinions are minimized or ignored.	2.00 (1.31)	1.61 (0.96)	
n	15	497	

Who do you consider to be a mentor? Select all that apply.

	Your Institution (%)	Comparison Group (%)	Sig.
A professor within my department	67%	64%	
A professor at my college/university who is outside of my department	33%	30%	
An individual I met through a formal mentoring program sponsored by an outside organization	7%	13%	
No one	20%	22%	
Someone else	33%	19%	
n	15	492	

**To what extent do you have a mentor who:
(1) Not at all - (5) Very much**

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
helps you improve your computing skills.	3.13 (1.60)	2.90 (1.50)	
shows compassion for concerns and feelings you discussed with them.	3.00 (1.65)	3.43 (1.48)	
shares personal experiences as an alternative perspective to your problems.	3.07 (1.71)	3.18 (1.46)	
explores career options with you.	2.67 (1.50)	3.04 (1.46)	
n	15	489	

**To what extent is each of the following kinds of support available to you from other computing students if you need it?
(1) Not at all - (5) Very much**

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
Someone to hang out with.	3.00 (1.65)	3.54 (1.23)	
Someone to confide in or talk to about your problems.	2.93 (1.71)	3.13 (1.37)	
Someone to get class assignments for you if you were sick.	3.47 (1.36)	3.77 (1.22)	
Someone to help you understand difficult homework problems.	3.27 (1.53)	3.81 (1.23)	
n	15	490	

**Think about the type of support you receive from your family and rate the degree to which each of the following is true.
(1) Strongly disagree - (5) Strongly agree**

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
My family encourages me to pursue my computing degree.	3.64 (1.50)	4.13 (1.10)	
My family questions why I am pursuing a computing degree.	1.80 (1.08)	1.98 (1.12)	
My family wonders why I invest so much time and effort into earning a computing degree.	2.00 (1.36)	2.00 (1.12)	
My family emphasizes the value of earning a computing degree.	3.29 (1.38)	3.62 (1.12)	
n	14	459	

1.6 Career Values

How important to you is it that your future career allows you to do the following?
 (1) Not at all important - (5) Very important

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
Make a lot of money	3.73 (1.03)	3.65 (0.97)	
Give back to my community	3.80 (0.86)	3.57 (1.12)	
Bring honor to my family	3.53 (1.19)	3.02 (1.43)	
Be in charge	2.67 (1.11)	2.90 (1.18)	
Work collaboratively with others	3.53 (1.13)	3.57 (1.11)	
Spend a lot of time with my family	3.47 (1.06)	3.55 (1.12)	
Have a social impact	3.73 (1.16)	3.55 (1.17)	
Decide for myself what I will work on	3.53 (1.13)	3.53 (1.06)	
Serve humanity	3.60 (1.30)	3.39 (1.21)	
Take time off work to care for my family	3.53 (1.25)	3.60 (1.15)	
Make important decisions at work	3.40 (0.91)	3.60 (1.05)	
Be a role model for people in my community	3.60 (1.40)	3.52 (1.24)	
Become well-known in my field	3.27 (1.28)	3.18 (1.33)	
Help others	4.20 (1.08)	3.89 (1.05)	
Have a lot of responsibility at work	3.13 (1.13)	3.43 (1.01)	
n	15	497	

In your opinion, to what extent would a career in computing allow you to do the following?
 (1) Not at all - (5) Very much

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
Serve humanity	3.67 (1.05)	3.56 (1.01)	
Be in a position of influence in society	3.13 (1.46)	3.61 (1.06)	
Spend time with family	3.00 (1.13)	3.39 (0.99)	
n	15	494	

1.7 Career Interests

How interested are you in having the types of jobs listed below after you finish your highest degree?
 (1) Very disinterested - (5) Very interested

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
College/University professor in computing field	2.47 (1.41)	2.60 (1.32)	
Computing researcher in industry or government lab	3.80 (1.32)	3.03 (1.33)	*
High school computing teacher	2.20 (1.37)	2.08 (1.20)	
A non-research position in the computing industry	4.14 (0.95)	3.73 (1.21)	
Position applying computing research to another area (e.g. digital media, support of research in medicine or other sciences)	4.00 (0.76)	3.61 (1.21)	
Non-research position applying your computing knowledge in another area (e.g. business applica- tions, government)	3.73 (0.88)	3.59 (1.23)	
Entrepreneur (computing related)	3.40 (1.40)	3.32 (1.34)	
Non-computing career	2.47 (1.25)	2.67 (1.37)	
n	15	494	

1.8 Highest Degree Plans

What is the highest degree you plan to attain?

	Your Institution (%)	Comparison Group (%)	Sig.
Associate's degree	0%	1%	
Bachelor's degree	33%	36%	
Master's degree	47%	26%	
Doctoral degree	7%	15%	
Professional degree (MD, JD, DDS, Ed.D, etc)	0%	2%	
Uncertain	13%	20%	
Other	0%	1%	
n	15	492	

In which field do you plan to attain your highest degree? Please select all that apply.

	Your Institution (%)	Comparison Group (%)	Sig.
Computing related field	93%	77%	
Non-computing field	27%	40%	
n	15	487	

1.9 Activities

During the past year, were you involved in any of the following groups or activities?
Select all that apply.

	Your Institution (%)	Comparison Group (%)	Sig.
Visiting lectures in your department related to computing	60%	64%	
Computing-related student groups	67%	55%	
Computing-related contests (hacking, robotics competitions, etc.)	47%	39%	
Computing-related online social networking (listservs, etc.)	53%	40%	
Professional societies related to computing	40%	24%	
Technical conferences related to computing	33%	21%	
Outreach to K-12 students related to computing	33%	19%	
Trainings or workshops in computing (other than conferences)	7%	22%	
Summer institutes or short courses (other than summer research programs)	27%	16%	
Study support in computing (e.g. Supplemental Instruction (SI), pair programming)	7%	19%	
n	15	494	

During your undergrad career to date, have you participated in any of the following conferences? Select all that apply.

	Your Institution (%)	Comparison Group (%)	Sig.
Grace Hopper Celebration of Women in Computing	20%	8%	
Regional 'Hoppers' or Celebrations of Women in Computing	7%	2%	
Richard Tapia Conference	7%	2%	
n	15	492	

Since September 2014, have you participated in any of the following research activities? Select all that apply.

	Your Institution (%)	Comparison Group (%)	Sig.
formal undergraduate research at my home institution	20%	17%	
formal undergraduate research at another institution	0%	7%	
a research internship in an industry or government lab	0%	4%	
None of the above	80%	77%	
n	15	487	

1.10 Introductory Courses

Are you currently enrolled in an introductory computer science course?

	Your Institution (%)	Comparison Group (%)	Sig.
Yes, I am enrolled in an introductory computing course	54%	33%	
I was enrolled in an introductory computing course, but I dropped it	0%	1%	
No I am not enrolled in an introductory computing course	46%	67%	
n	13	394	

Students who dropped their introductory computing course: Why did you drop your introductory computing course? Select all that apply.

	Your Institution (%)	Comparison Group (%)	Sig.
It did not meet my expectations	-	-	-
It was too challenging	-	-	-
It was not challenging enough	-	-	-
I am no longer interested in computer science	-	-	-
It was no longer a requirement for my degree	-	-	-
I did not enjoy the professor's teaching style	-	-	-
I had a scheduling conflict	-	-	-
Other	-	-	-
n	0	2	

Why did you enroll in an introductory computing class? Select all that apply.

	Your Institution (%)	Comparison Group (%)	Sig.
It was required for my major/minor	100%	84%	
Curiosity or interest in computers	14%	55%	
My parents encouraged me to	14%	7%	
A teacher or other mentor encouraged me to	14%	14%	
n	7	126	

**How frequently do your introductory course instructors use the following?
(1) Never - (5) Always**

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
Class discussion	3.71 (1.11)	3.40 (1.15)	
Group work	2.86 (0.90)	2.91 (1.33)	
Lecturing	4.86 (0.38)	4.40 (0.79)	*
Paired programming	2.29 (1.38)	2.64 (1.39)	
Use of real world problems involving relevant social issues	3.57 (1.40)	2.89 (1.27)	
Use of examples involving women	2.43 (1.51)	2.16 (1.22)	
Use of examples involving people of color	2.00 (1.00)	2.07 (1.20)	
Student presentations	2.29 (0.49)	1.67 (1.07)	*
Grading on a curve	1.57 (0.79)	2.02 (1.15)	
Discussions addressing misconceptions about the field of computer science	3.14 (1.35)	2.60 (1.18)	
Grouping students by level of computer science experience	1.43 (0.53)	1.55 (0.92)	
Peer instruction	2.86 (0.69)	2.46 (1.29)	
Working through examples or problems as a class	3.71 (1.50)	3.90 (1.08)	
Student choice in activities and assignments	2.29 (0.76)	2.10 (1.22)	
Interdisciplinary connections to computer science (e.g., biology and computer science)	2.57 (1.13)	2.36 (1.23)	
Rubric-based assessment of your work	3.71 (1.70)	3.35 (1.39)	
n	7	126	

On average, how frequently do you communicate with introductory course faculty in the following ways?

(1) Never (2) Less than once per month (3) 1-3 times per month (4) 1-3 times per week (5) More than 3 times a week

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
In class	4.29 (0.49)	3.65 (1.19)	*
At office hours	2.29 (0.76)	2.25 (1.13)	
By email	3.00 (0.58)	2.67 (1.04)	
By phone call	1.00 (0.00)	1.17 (0.66)	*
By text messages	1.00 (0.00)	1.18 (0.67)	*
Via course website (e.g., Blackboard)	1.14 (0.38)	2.02 (1.27)	*
In informal meetings (e.g., coffee with a professor)	1.86 (0.90)	1.27 (0.78)	
n	7	126	

Experiences with faculty and administrators in computer science
(1) Strongly disagree - (5) Strongly agree

	Your Institution Mean (SD)	Comparison Group Mean (SD)	Sig.
Introductory course faculty are inclusive and supportive of women	4.29 (0.95)	4.16 (0.91)	
Introductory course faculty are inclusive and supportive of students of color	5.00 (0.00)	4.20 (0.80)	*
Introductory course faculty are interested in helping me when I come to them with questions	4.86 (0.38)	4.36 (0.83)	*
Introductory course faculty are responsive to questions in class	4.86 (0.38)	4.38 (0.77)	*
Introductory course faculty are responsive to email communication	4.86 (0.38)	4.24 (0.83)	*
Computer science administrators (e.g., the department chair) care about diversity	4.57 (0.53)	3.98 (0.92)	*
n	7	125	

Chapter 2

Graduate Students

Your department had fewer than 5 respondents for the Fall 2015 Graduate Student Survey, did not participate in Data Buddies in Fall 2015 at the graduate level, or does not have a graduate program.

Part II

Spring 2014 and 2015 Semesters: Graduating Students

Chapter 3

Undergraduate Students

Your department had fewer than 5 respondents for the Spring 2014 and 2015 Undergraduate Student Survey, did not participate in Data Buddies in Spring 2014 and 2015 at the undergraduate level, or does not have an undergraduate program.

Chapter 4

Graduate Students

Your department had fewer than 5 respondents for the Spring 2014 and 2015 Graduate Student Survey, did not participate in Data Buddies in Spring 2014 and 2015 at the graduate level, or does not have a graduate program.