Understanding Participants' Feedback from Workshop Promoting Diversity and Inclusion in Computational Science and Engineering

by

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ABSTRACT

Collecting conference feedback survey is intended to gauge the participants' thoughts and insights regarding the conference. It is also intended to help organizers improve the content and execution of future conferences. For this project we are statistically analyzing the results of pre- and post-surveys data collected at a workshop organized to promote diversity and inclusion in computational science and engineering. The data was collected using Survey Monkey, one of the most popular survey platforms. Survey Monkey exports data that is not necessarily ready for analysis right out of the box, so additional preprocessing is needed before the final analysis. Finally, we need to present the surveys information in a comfortable and digestible way to communicate, highlight and visualize critical areas using statistics and plots.

Acknowledgements

I would first like to thank my thesis advisor Dr. Alina Lazar of the Department of Computer Science and Information Systems at Youngstown State University. The door to Prof. Lazar's office was always open whenever I ran into a trouble spot or had a question about my research or writing. She consistently allowed this thesis to be my own work but steered me in the right direction whenever she thought I needed it.

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1 Introduction

Researchers across fields and industries conduct surveys to collect data to answer important questions. Surveys are considered a valuable research method in many fields [1]. The main goal is to ask a set of questions to a sub-population, in order to construct explanatory models [2] or to validate knowledge [3]. Surveys are often employed when you need to gather feedback and summarize both quantitative and qualitative data. A survey isn't simply the instrument for collecting information, it is an extensive program for collecting information to refer to, evaluate and explain behavior, attitudes, and knowledge.

Designing, administrating and analyzing a survey is not a simple task. One must assure the quality, unbiased and significance of the questions included in the survey. After collecting the responses, one challenges is to identify the invalid responses. One way to do that is to calculate the time each participant spent to ask the questions. The recruitment and selection of participants' is also very important. To collect a sufficient number of valid responses to analyze [4], the drop-out rates and the invalid answer rates have to be considered.

The two main facets of a survey are the questions and the participants. The questions included in a survey vary and cover diverse range of topics, depending on who is developing and running the survey. Demographic questions are usually included so that it can be assessed how the participants' set statistically resembles the population. The second set of questions are intended to collect information to answer the research study hypothesis and the their content depends on the main goal of the survey.

The respondents or the participants', include an optimum set of people selected

to answer the survey. It's usually impractical to survey every person in the population, so most of the time a small sample is chosen instead. There are many different ways to sample a population in order to end up with a set that is representative of the population under study. In the end, the researchers need to make sure that the summaries from the survey questions can be extrapolated to the entire population.

Surveys could be both supervised or not [5], based on the goals and also the resources offered. In case supervised, we are able to designate one survey researcher to each respondent, to make sure that the respondent understands each question and offers a response. Telephone interviews tend to be of this particular kind, in which a questioner works one-on-one with a respondent to elicit answers. A survey could also be administered to a team, with a survey researcher readily available to clarify as well as elaborate on the directions in the survey instrument. A number of surveys are actually semi-supervised, in which a researcher describes the goals as well as format, possibly working through a number of sample questions, then again leaves the respondents to provide info themselves.

To ensure quality standards when conducting and reporting survey-based research, checklist [6] have been developed and became important instruments to support researchers. Checklists are very helpful regarding the definition of the population and sampling strategies.

The topic of this thesis is mainly the survey analysis using Excel plots. As survey analysis [7, 8, 9] continues to serve as a core component in the research of many social science related disciplines and not only, researchers are increasingly relying upon data gathered from complex surveys to carry out traditional analyses. Effective data visualizations of large datasets contributes to the interpretation and communication

of data analysis. A statistical plot or data graphic should balance functionality, interpretability, and complexity. Today, there are many tools available to produce visualizations, such as Excel, Python's Matplotlib [10], R's ggplot [11] and many others.

1.1 Types of Survey Questions

1.1.1 Open-ended Questions

Open-ended survey questions enable respondents to reply in the very own words of theirs. Open-ended issues likewise let the researcher to check out thoughts that would not generally be aired as well as are in fact helpful where added insights are in fact sought. They are additionally helpful the place that the researcher is less knowledgeable about the subject area and cannot offer certain effect choices. Open-ended issues call for greater concept as well as contemplation on the part of the respondent, consequently, and therefore are, extra time intensive to reply to. The results received from open ended questions are generally a lot harder to evaluate. Finally, it is harder to determine an individual course of activity coming from the number of responses that are received opening ended questions.

1.1.2 Multiple Choice Questions:

In comparison, closed ended issues need the respondent to select from with a certain set of responses. Closed-ended issues with purchased options need the respondent to look at each potential effect independent of the additional alternatives. The alternatives create a continuum of 2 - 7 responses, such as for instance those supplied by Numerical ranges as well as Likert scales. These kinds of questions

are actually easiest for respondents to answer and for researchers to evaluate the information [12].

The next kind of closed ended issue is the closed ended query with unordered alternatives. These questions ask the respondent to evaluate feasible reactions and choose one. Other choice questions are an illustration of this particular kind. The researcher should make sure that the respondent is provided an extensive choice of responses. Closed-ended issues with unordered options are helpful for ranking things in order of preference.

The third kind of closed ended issue will be the partial closed ended question in which the respondent is actually asked to evaluate feasible reactions and choose one or even create in "other". We observed that the majority of respondents choose one of the specified responses if this question type is actually presented. Closed-ended issues might additionally be classified as: (a) thoughts that explain as well as assess events, places, and people; (b) questions which evaluate responses to suggestions, analyses, and proposals; and (c) questions that evaluate understanding.

1.2 Survey Monkey

Survey Monkey is an online web site that allows researchers to design and administer surveys. The questionnaire could be set up with an assortment of responses like yes/no responses, choosing one or even more people out of a list as well as drop down menu responses. We are able to draft a survey questionnaire and protect the draft for more editing. Logic alternatives could be incorporated to ensure that a No solution moves the respondent to the following essential question. Likewise, a No reaction to the consent request in the introductory part might move the ques-

tionnaire to the conclusion page where a thank you note as well as exit button may be placed. A Yes reaction to the consent would lead to the very first of the survey sections/questions. When the questionnaire is actually in place and working based on the logic needed it may be used. A URL could be copied as well as pasted directly into a contact to a survey public or maybe the URL may be positioned in a certain web page that the survey public is actually directed to Survey Monkey has a survey completion develop bar so that the total number of survey questionnaires finished could be very easily read. Responses may be inputted for each returned questionnaire adding to the responses received through the web.

1.3 Survey Data

The following part clarify the steps involved in utilizing Google Forms for web-based survey. Each level beginning from designing and building web-based survey equipment to conclusion of the survey as well as analysis of the information is talked about.

Step-1: Design and building web-based Questionnaire the Google Forms offers an easy-to-use web interface for designing as well as developing web-based survey questionnaires. It offers different choices for capturing the information from the many answers. For instance, one might have several choice options, text, grid, scale, check boxes, etc. The designer (researcher) is able to set up the actual number of inquiries needed to be collected. The template choice offers pre-made guides for providing a search for the questionnaire.

Step-2: Web based questionnaire for information collection hosted on the internet. Once the questionnaire is actually prepared, it has to be hosted on the internet.

One may produce instant web URL for the questionnaire and send out the link to the planned participants of the survey. Generally, internet forums, social network websites, for instance, email contacts are utilized for sending net questionnaire.

Step-3: Graphical representation and data analysis, once the internet questionnaire is actually loaded on the internet, instantly the information will likely be captured in Google spreadsheet in an analyzable format and permit for graphical representation and tabulation of information.

1.4 Statistical Tests

Finding a data set and exploring the data set plays an important role in articulating the phase of data. There are a lot of methods used to portray the behavior of data using statistical tools like bench marking, regression analysis, aka Students T-test, ANOVA, cluster, conjoint, cross tab analysis etc. Researchers across different fields and industries conduct surveys to collect data to answer important questions which are considered as a valuable technique in many fields. Survey research is often employed when you need to gather feedback and draw conclusions based on both quantitative and qualitative data. Scientists have explored various challenges during the process of research and the most basic challenges are the representation of questions to avoid biased results like identification of invalid responses. Survey is categorized into two dimensions: The questions, which may vary with range of topics and its state. Its not possible to match every opinion but can be pictured diagrammatically through statistical data.

1.5 Visualizations

Visualizing survey information efficiently means by using various kinds of charts for various types of survey results (i.e., market outcomes, binary, rating scale, multiple choice or maybe individual option). Information visualization is actually the graphical representation of information as well as info. By utilizing visual components as maps, graphs, and charts, data visualization tools present an accessible way to find out as well as understand patterns, outliers, and trends in information. In the world of Big Data, information visualization tools as well as technologies are actually vital to evaluate substantial quantities of info and make data driven choices. Information visualization is yet another type of visual art which grabs the interest of ours and also keeps the eyes of ours on the email. Whenever we see a chart, we easily notice outliers as well as trends. If perhaps we are able to see something, we internalize it easily. It is storytelling with a goal. If perhaps you have previously stared at a large spreadsheet of information and could not see a trend, you understand how a lot more successful a visualization may be.

1.5.1 Bar Plots

We used bar plots to evaluate conditions between organizations that are various for those multiple-choice issues. A bar plot shows comparisons among discrete types. One axis of the chart shows the particular groups being compared, as well as the other axis belongs to a calculated printer. Bar plots enjoy a discrete URL of categories and are often scaled so that all of the information is able to fit on the chart. When there's no organic buying of the groups being compared, bars on the chart might be set up in any order. In a grouped bar plot, for every categorical team you will find two or

even more plots. These plots are color coded to stand for a specific grouping.

1.5.2 100% Stacked Bar

In a rating scale question, survey takers are actually provided a number of possible answers and are actually requested to choose a solution along that spectrum. This particular question type is usually found on pupil satisfaction surveys, used to get an understanding of pupil sentiment regarding a service. It is also well known for post occasion surveys, to gage exactly how a great deal of folks enjoyed taking part in the event. Most often it is available in one of 2 forms: the Likert scale ("Strongly Disagree," "Disagree," "Neutral," "Agree" as well as "Strongly Agree") or maybe the Net Promoter Score (NPS, which range from zero to ten). The NPS is utilized to determine the willingness of a buyer to suggest a product or maybe service to others. The 100% stacked bar chart is actually the easiest choice for visualizing survey information from rating scale concerns. It is fast to create as well as provides the proportion of responses of each group rather obviously.

1.6 Finding Correlations

Every system has a phase to follow, and it depends up on the various factors that it can go through. Random prediction became a part of all the system analysis, but the main idea of correlation comes with data. Data varying at regular intervals shows a trend and we can obtain the standard data points from the data path which are the major factors in building the structure of a system. Statistical data and visualization plots help to extract the data points which are the building blocks of structure.

1.7 Sentiment Analysis for Analyzing Text Questions

Sentiment Analysis instantly categorizes your text responses to disclose the emotion behind what individuals are actually thinking. The pupil feedback collected from survey is actually an input data. i.e. instruction information using which the method is actually taught. On obtaining test samples, the skilled structure classifies the sentence as bad, neutral, as well as optimistic sessions by using machine learning algorithms. This particular end result is represented to a table.

The sentiment examination is actually carried through using Azure machine learning. This particular method mostly focuses on a question that's connected to exact same subject and it doesn't exhibit the actual sentiment of the pupils. To be able to understand the actual sentiment of the student's textual feedback strategy is utilized. In this textual form, pupils are provided with set of questions and they have to reply to it in sentences. It's beneficial to both the academic administration as well as the teacher to conquer the problems related to the business of theirs. With this paper, the pupil feedback with mixed viewpoint is actually collected in our survey using google styles.

Sentimental examination is actually a way of determining the sentiment expressed in texts. The demand of Sentiment Analysis of text has acquired much more value in today's situations experienced by the individuals of the planet. In general, you will find 3 methods in sentimental analysis. They're lexicon based, machine learning as well as hybrid strategy. In machine learning method, it utilizes unsupervised learning or even supervised learning. Classification issue could be completed using a number of algorithms as assistance vector machine, naive Bayes, arbitrary forest. For lexicon based procedure sentiment polarity of the textual written content

is actually recognized utilizing sentiment lexicon. A lexicon is a summary of words with connected sentiment polarity. Hybrid strategy is a mix of lexicon based and machine learning strategies. The teaching information set is actually labelled utilizing sentiment lexicon and thiss utilized to for the machine learning model. Then testing information is evaluated making use of this model.

2 Tools

2.1 Survey Monkey

There are several number of survey tools which are readily available in the market which serve the purpose accordingly. Survey Monkey, Type form, Google form, Client heartbeat, Zoho survey are commercially available survey tools featuring an unlimited surveys, unlimited respondents, questionnaires and personalized data benchmarking. Every tool mentioned above has its own importance serving the needs of an organization in-turn contributes to improve the performance. Survey Monkey has been employed in this research paper to work out the participants academic characteristics, career values, self-efficacy and belonging and identification, research and academic skills and mentor support. Survey Monkey has been chosen because of the following reasons:

1. It is simple and easy to use.
2. Standard Survey Templates.
3. Availability of question banks.
4. Functional Reporting.
5. Quick turn around.

6. Its Economic.

2.2 Word Cloud

Data visualizations (like charts, graphs, infographics, and more) give companies an invaluable approach to communicate information that is important at a glance, but what if the raw data of yours information is text based? When you would like an incredible visualization format to highlight important textual data points, making use of a word cloud is able to create flat details sizzle and quickly convey info that is essential . For example, you may question respondents what they want or even do not love about a brand new service or product. Or maybe you can ask them to offer ideas about how the business of yours might greatly improve. They can also have the opportunity to elaborate on any pain points they are experiencing. With these, you are able to still quantify the text based insights of yours into measurable analytics. The sole difference? You will not develop a chart or even graph as you'd with a set of numbers. Rather, you will develop a word cloud generator to change by far the most crucial info right into a word cloud. The bigger the term in the visual the more prevalent the term was in the document(s). This particular kind of visualization is able to help evaluators with exploratory textual analysis by identifying words which often show up in a set of interviews, documents, or maybe some other text. It is able to likewise be used for communicating probably the most salient points or maybe themes of the reporting stage. A number of word cloud generators are readily offered on the procedure as well as the internet for producing them is simple. Evaluators can just import text (for instance, a set of interviews) right into a text box as well as the device creates a graphical representation of the text. Many word cloud generators

have characteristics that permit people to change exclude, font, and colors similar or common words.

3 Pre-Survey

Surveys may be one of probably the quickest and most reliable methods to get info that is helpful about options, at each step of the participant journey. As soon as you have collected the survey data of yours, although, you will have to evaluate the results. The kind of questions you ask as well as the amount of responses you get will shape the strategy you conduct survey evaluation. Ask close ended questions and you will be completely ready to assess the information of yours with daily instruments such as Excel. Ask open ended questions, and you will need much more complex data analysis aids that are built with AI. Close-ended issues provide quantitative data, likewise referred to as structured information. You would conduct statistical analysis on this particular survey information since it is quantifiable. The responses to close ended issues are generally multiple choice, rated on a number scale, or maybe one word answers, including Yes/No.

How you can Analyze Quantitative Survey Data in Excel

To get by far the most out of the survey responses of yours, you have to determine what you are searching for. What exactly are the goals of yours? What exactly are the insights you wish to collect? Begin with the end lead to brain. Analyzing quantitative survey information in Excel could be a snap with pre-made formulas, tables, and charts.

1. Filter survey information by various criteria

2. Calculate minimum, maximum, and mean : The columns, rows, and cells in Excel have pre-made formulas. With this situation, just highlight the whole column (or maybe team of columns) and select the appropriate formula of Excel. Type =average, =max, or =min to the corresponding discipline and Excel will compute the statistics for you.

3. Perform cross tabulation with a pivot table: A pivot table is actually a brand new (pivoted) table which summarizes the information of a far more extensive table. Additionally referred to as cross tabulation, it is able to offer a fast comparison of just how various groups of respondents answered the survey questions of yours. To produce a pivot table, choose the cells you wish to use, click Insert from the menu bar, select Pivot-Table, then select the place for the pivot table of yours. Drag the fields you wish to use into the Pivot Table Fields pane that pops up.

4. Create graphs and charts to imagine data: Simply pick the chart or maybe graph you would want using through the Insert menu, and Excel will walk you through selecting the areas of yours. The graph shows the percentage worth for every class.

3.1 Demographics

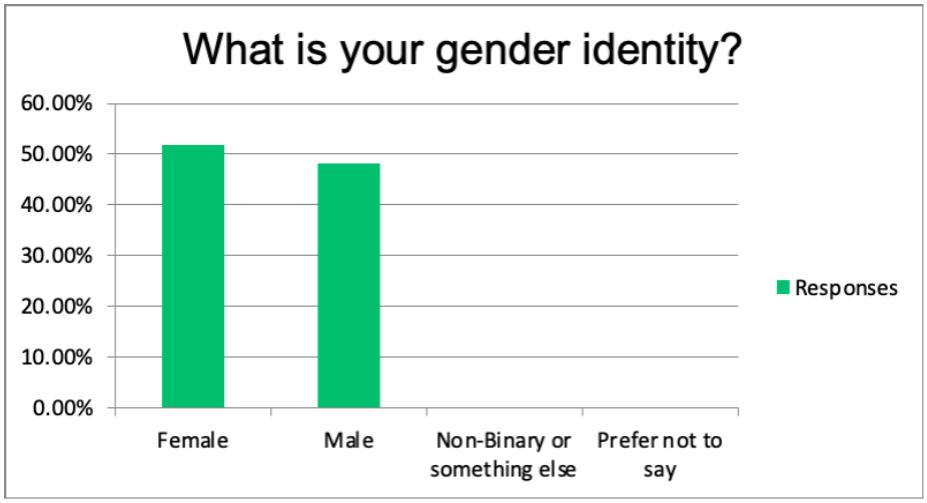

Figure 1: Gender Identity

Answer Choices	Responses	
Female	51.76%	44
Male	48.24%	41
Non-Binary or something else	0.00%	0
Prefer not to say	0.00%	0
	Answered	85
	Skipped	6

For this article, we draw our insights from the results of a survey that we conducted. As part of this survey, we included demographic questions regarding participants gender identities, these questions are the focus of our work in this article. The bar chart on figure 1 depicts the gender distribution of respondents. It is shown that 51.76% were female and the other 48.24% are male.

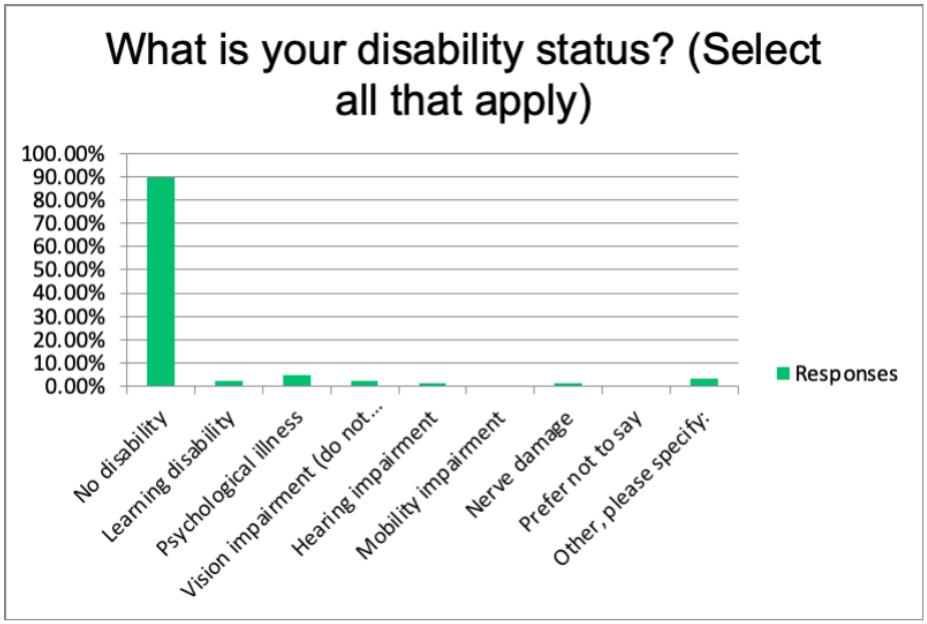

Figure 2: Disability Status

Answer Choices	Responses	
No disability	89.41%	76
Learning disability	2.35%	2
Psychological illness	4.71%	4
Vision impairment	2.35%	2
Hearing impairment	1.18%	1
Mobility impairment	0.00%	0
Nerve damage	1.18%	1
Prefer not to say	0.00%	0
Other, please specify:	3.53%	3
	Answered	85
	Skipped	6

Figure 2 shows ninety percent of our respondents identified as no disability

and remaining ten percent of our respondents identified as having learning disability, psychological illness, vision impairment, hearing impairment, nerve damage.

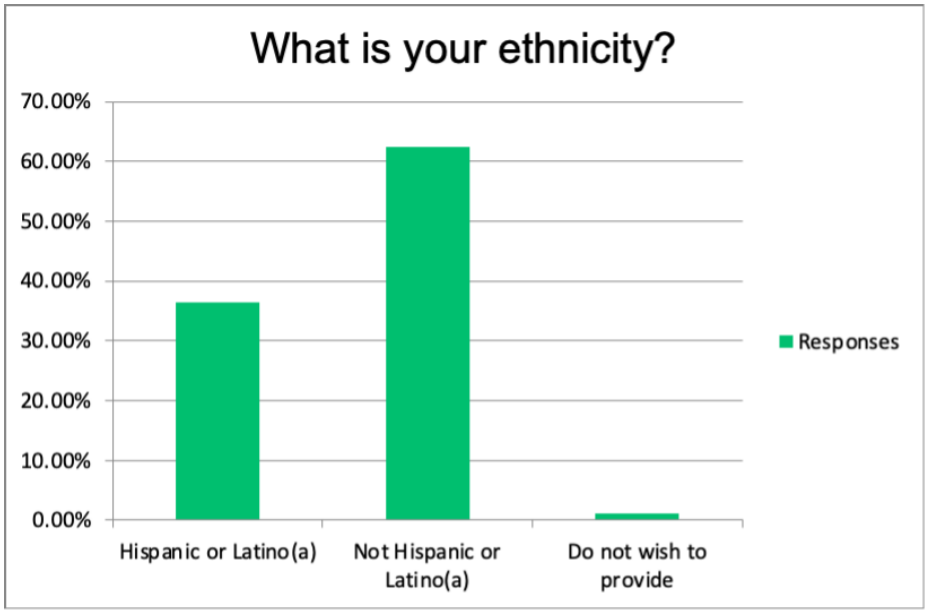

Figure 3: Ethnicity

Answer Choices	Responses	
Hispanic or Latino(a)	36.47%	31
Not Hispanic or Latino(a)	62.35%	53
Do not wish to provide	1.18%	1
	Answered	85
	Skipped	6

Figure 3 shows the percent rate based on the respondents response to a survey question that asked about ethnicity. Not Hispanic or Latino(a) had the largest percentage. While percentage of Hispanic or Latino(a) is more than a half of students of Not Hispanic. And a few responded to do not wish to provide.

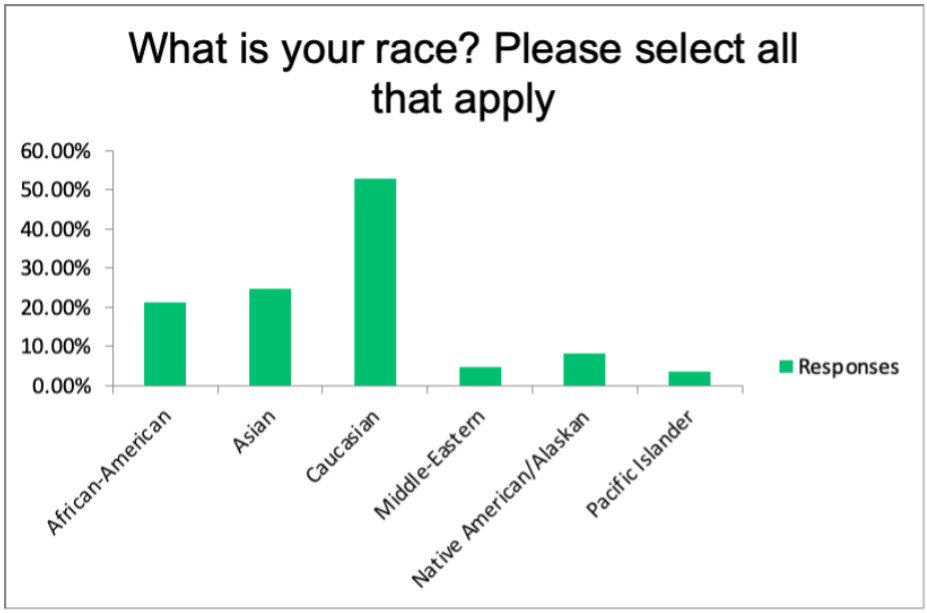

Figure 4: Race

Answer Choices	Responses	
African-American	21.18%	18
Asian	24.71%	21
Caucasian	52.94%	45
Middle-Eastern	4.71%	4
Native American/Alaskan	8.24%	7
Pacific Islander	3.53%	3
Other, please specify:		11
	Answered	85
	Skipped	6

Figure 4 shows, there are huge variations in the racial group. About 50% said Caucasian, 23% Asian, 20% African American, 5% Middle Eastern, 9% Native American/Alaskan and only 3% remained in the pacific Islander.

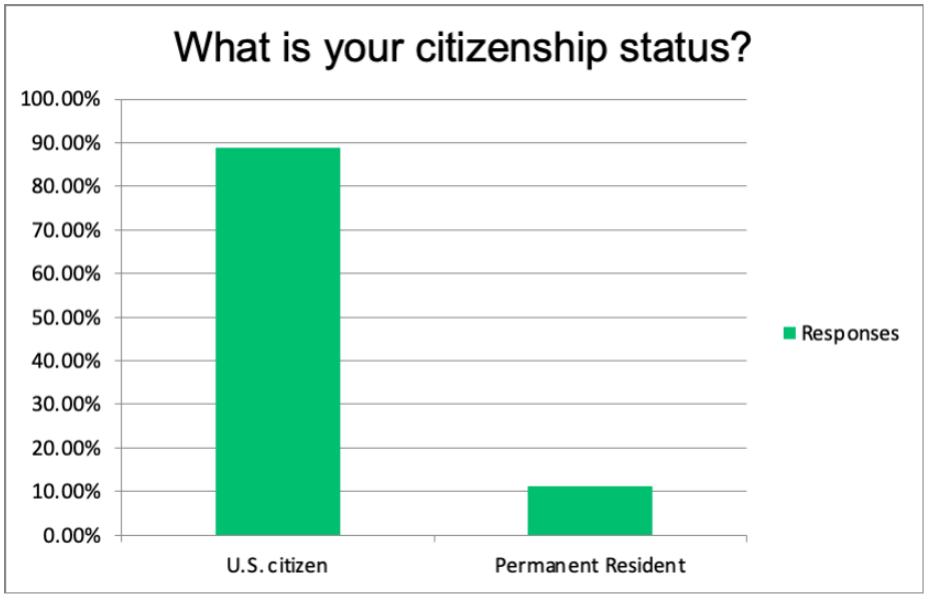

Figure 5: Citizenship Status

Answer Choices	Responses	
U.S. citizen	88.89%	56
Permanent Resident	62.35%	7
Other (please specify)		26
	Answered	63
	Skipped	28

Figure 5 indicates the participants is either a U.S citizen or a Permanent Resident. Overall, it can be seen that the highest percentage of participants are U.S citizens. However, our findings suggest that less than a quarter of participants were Permanent Residents.

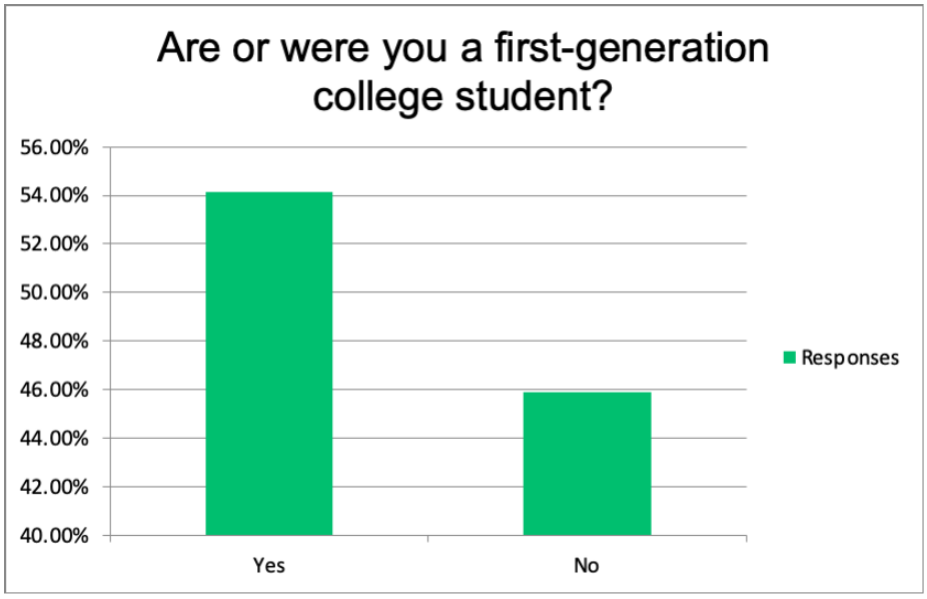

Figure 6: Are or were you a first-generation college student

Answer Choices	Responses	
Yes	54.12%	46
No	45.88%	39
	Answered	85
	Skipped	6

Figure 6 shows that out of 91 people surveyed 54% were first-generation college students and 45% were non-first-generation college students and 4% skipped.

3.2 Academic Characteristics- Undergraduates

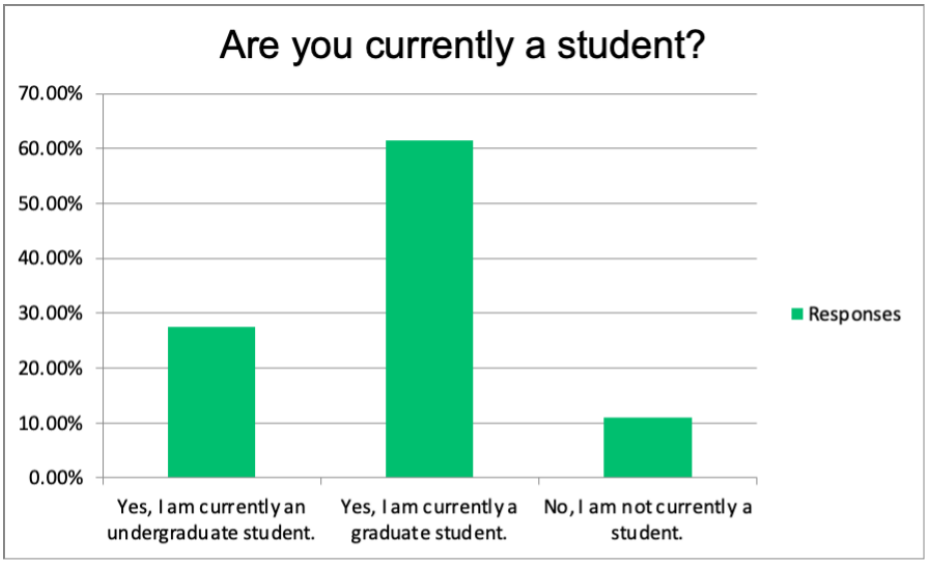

Figure 7: Current academic position

Answer Choices	Responses	
Yes, I am currently an undergraduate student.	27.47%	25
Yes, I am currently a graduate student.	61.54%	56
No, I am not currently a student.	10.99%	10
	Answered	91
	Skipped	0

An important part of the study is related to the respondents Undergraduate and graduate among which we consider personal questions. For each of those questions, the respondents express their own experiences.

Figure 7. shows the bar chart for the respective current academic position of the respondents. The most frequent categories are students in both levels, undergraduate (27%) and graduate (62%), as well as not student (11%).

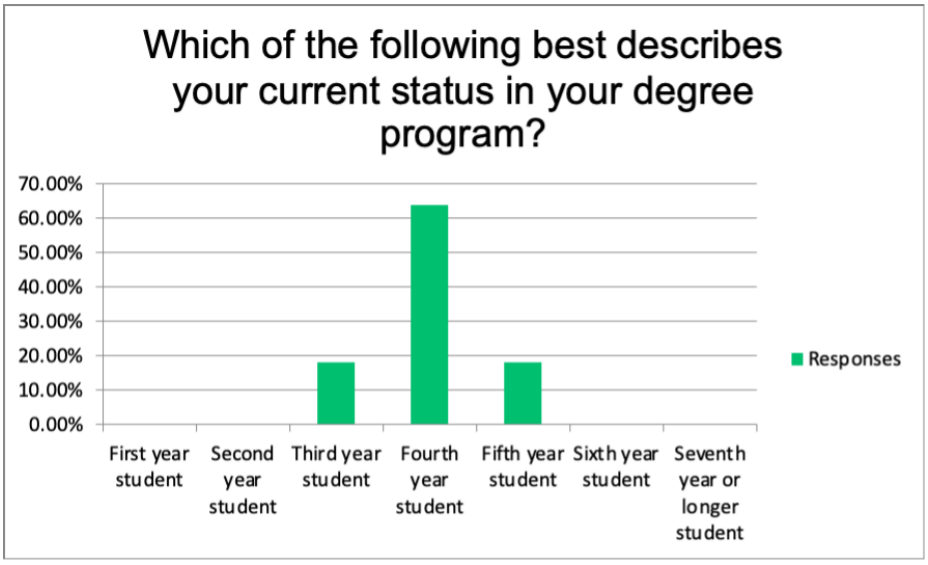

Figure 8: Current Status in degree program

Answer Choices	Responses	
First year student	0.00%	0
Second year student	0.00%	0
Third year student	18.18%	4
Fourth year student	63.64%	14
Fifth year student	18.18%	4
Sixth year student	0.00%	0
Seventh year or longer student	0.00%	0
	Answered	22
	Skipped	69

From figure 8. It can be seen that 62% of respondents were fourth year students with the remaining 18.18% of Third year students and 18.18% of fifth year students.

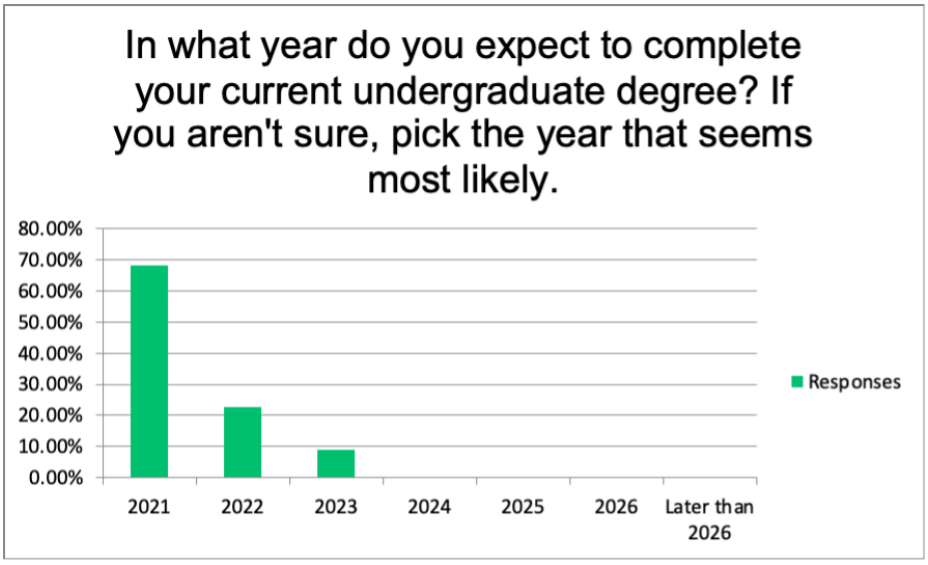

Figure 9: Graduation expectancy

Answer Choices	Responses	
2021	68.18%	15
2022	22.73%	5
2023	9.09%	2
2024	0.00%	0
2025	0.00%	0
2026	0.00%	0
later than 2026	0.00%	0
Other (please specify)		0
	Answered	22
	Skipped	69

Overall, it can be seen that in the year 2021, the highest percentage (68%) of undergraduate students expect to complete their degree while 22% of students expect to graduate in the year 2022 and 8% of students in 2023.

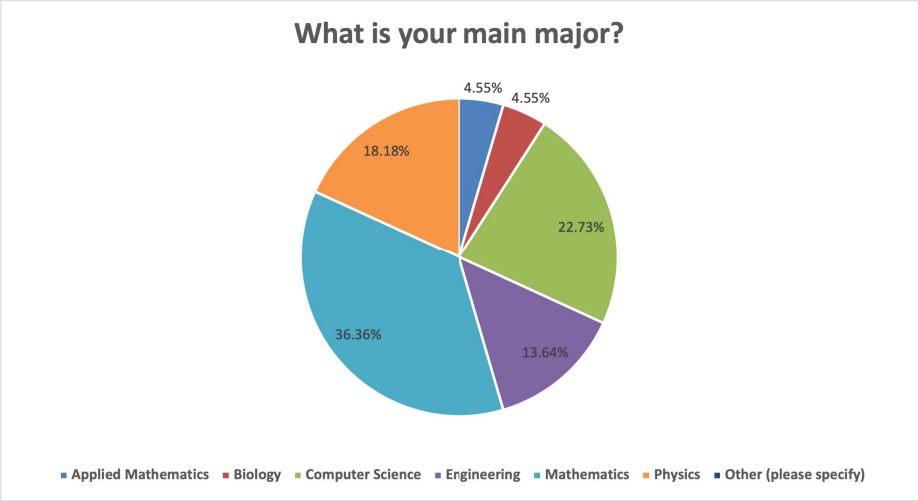

Figure 10: Major

Answer Choices	Responses	
Applied Mathematics	4.55%	1
Biology	4.55%	1
Computer Science	22.73%	5
Engineering	13.64%	3
Mathematics	36.36%	8
Physics	18.18%	4
Other (please specify)		1
	Answered	22
	Skipped	69

Here we have a bar graph that shows the number of students by majors. Mathematics shows 36%, Computer Science 24 6%, Physics 18%, Engineering 14%, Biology and Applied Mathematics 4%.

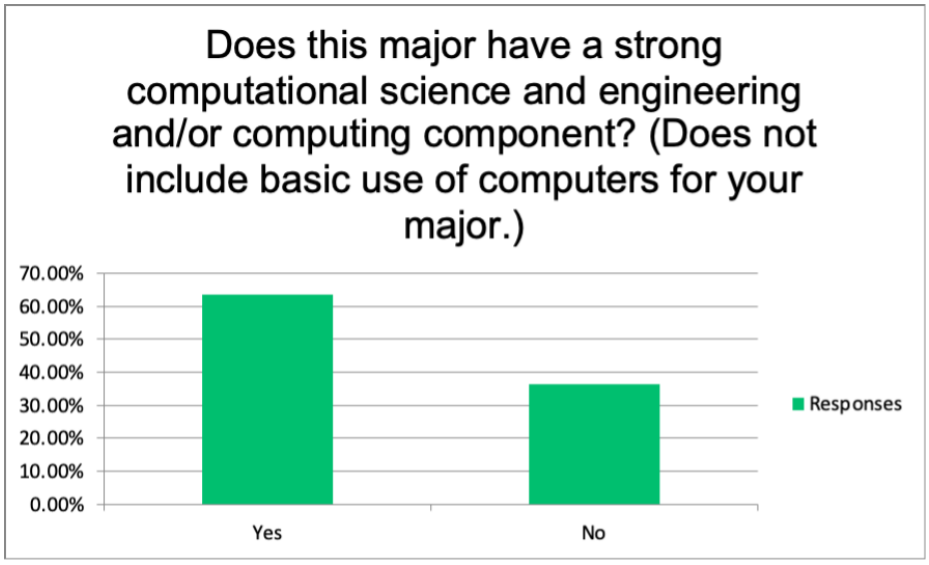

Figure 11: Does major have strong CSE component

Answer Choices	Responses	
Yes	63.64%	14
No	36.36%	8
	Answered	22
	Skipped	69

When asked about, does the major you selected has a strong computational science and engineering and/or computing component, 64% responded to Yes and 36% responded to No.

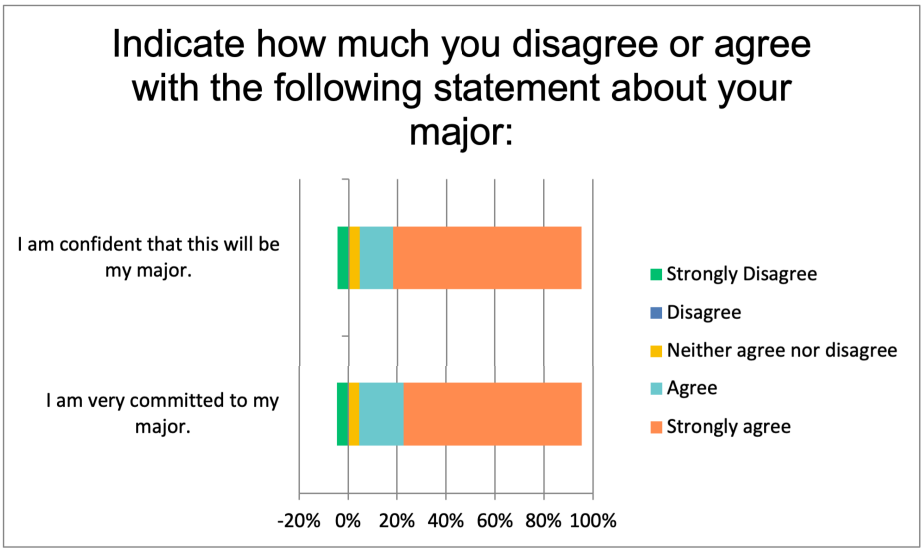

Figure 12: Agree or Disagree statement on major

Answer Choices	Strongly Disagree		Disagree		Neither agree nor disagree		Agree		Strongly agree		Total
I am very committed to my major	-4.55%	1	0.00%	0	4.55%	1	18.18%	4	72.73%	16	22
I am confident that this will be my major	-4.55%	1	0.00%	0	4.55%	1	13.64%	3	77.27%	17	22
										Answered	22
										Skipped	69

The bar chart above gives a pictorial representation of the responses regarding this question. The data showed the following responses for the statements, I am very committed to my major: Disagree - 0, Strongly Disagree - 4.55%, Neither agree nor disagree - 4.55%, Agree - 18.18%, Strongly agree - 72.73%. I am confident that this will be my major: Disagree -0, Strongly Disagree - 4.55%, Neither agree nor disagree - 4.55%, Agree - 13.64%, Strongly agree - 77.27%.

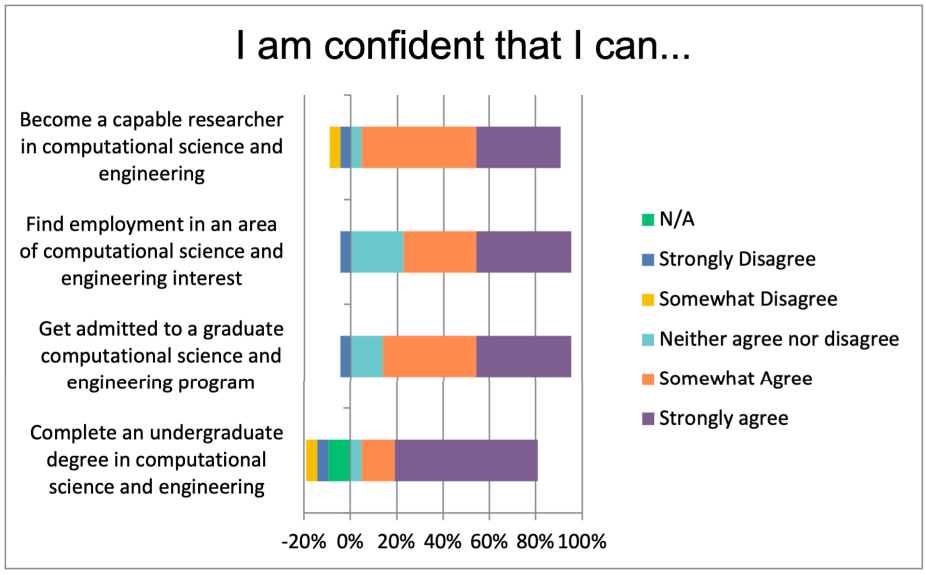

Figure 13: Responses on different self efficacy

Answer Choices	N/A		Strongly Disagree		Somewhat Disagree		Neither agree nor disagree		Somewhat Agree		Strongly agree		Total
Complete an undergraduate degree in computational science and engineering	9.52%	2	4.76%	1	4.76%	1	4.76%	1	14.29%	3	61.90%	13	21
Get admitted to a graduate computational science and engineering program	0.00%	0	4.55%	1	0.00%	0	13.64%	3	40.91%	9	40.91%	9	22
Find employment in an area of computational science and engineering interest	0.00%	0	4.55%	1	0.00%	0	22.73%	5	31.82%	7	40.91%	9	22
Become a capable researcher in computational science and engineering	0.00%	0	4.55%	1	4.55%	1	4.55%	1	50.00%	11	36.36%	8	22
												Answered	22
												Skipped	69

The bar graph above illustrates responses regarding this question. The data showed the following responses for the statements, I am confident that I can Complete an undergraduate degree in computational science and engineering: Strongly Disagree - 4.76%, Somewhat Disagree - 4.76%, Neither agree nor disagree - 4.76%, Somewhat Agree - 14.29%, Strongly agree - 61.90%, N/A - 9.52%. I am confident that I can Get admitted to a graduate computational science and engineering program: Strongly Disagree - 4.55%, Somewhat Disagree - 0%, Neither agree nor disagree - 13.64%, Somewhat Agree - 40.91%, Strongly agree - 40.91%, N/A - 0%. I am confident that I can Find employment in an area of computational science and engineering interest: Strongly Disagree - 4.55%, Somewhat Disagree - 0%, Neither agree nor disagree - 22.73%, Somewhat Agree - 31.82%, Strongly agree - 40.91%, N/A - 0%. I

am confident that I can Become a capable researcher in computational science and engineering: Strongly Disagree - 4.55%, Somewhat Disagree - 4.55%, Neither agree nor disagree - 4.55%, Somewhat Agree - 50.00%, Strongly agree - 36.36%, N/A - 0%.

3.2.1 Highest degree Intentions/Aspirations

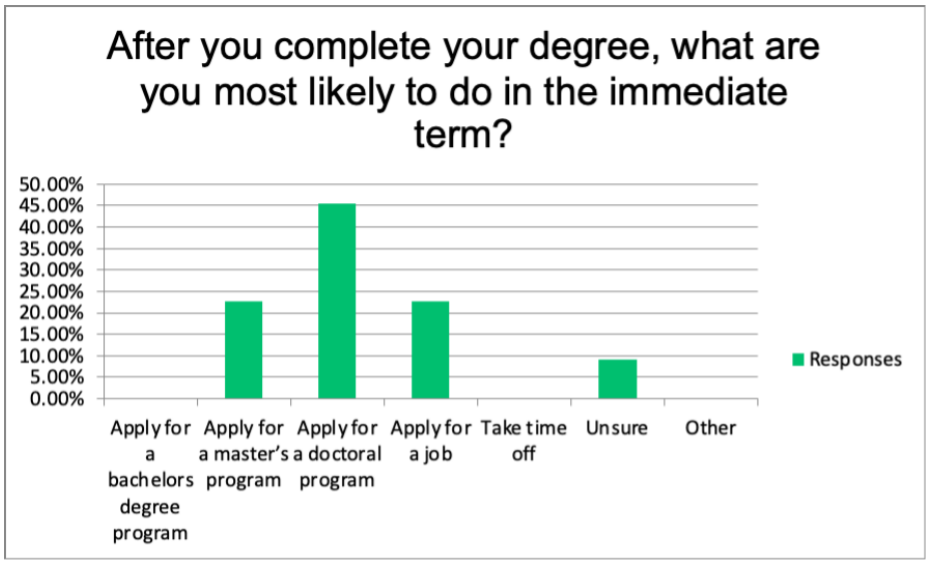

Figure 14: Most likely to do in the immediate term

Answer Choices	Responses	
Apply for a bachelors degree program	0.00%	0
Apply for a masters program	22.73%	5
Apply for a doctoral program	45.45%	10
Apply for a job	22.73%	5
Take time off	0.00%	0
Unsure	9.09%	2
Other	0.00%	0
	Answered	22
	Skipped	69

The bar chart above depicts the responses for this question. The data revealed the following responses for the statement. Apply for a bachelors degree program - 0%, Apply for a masters program - 22.73%, Apply for a doctoral program - 45.45%, Apply for a job - 22.73%, Take time off - 0%, Unsure - 9.09%, Other - 0%.

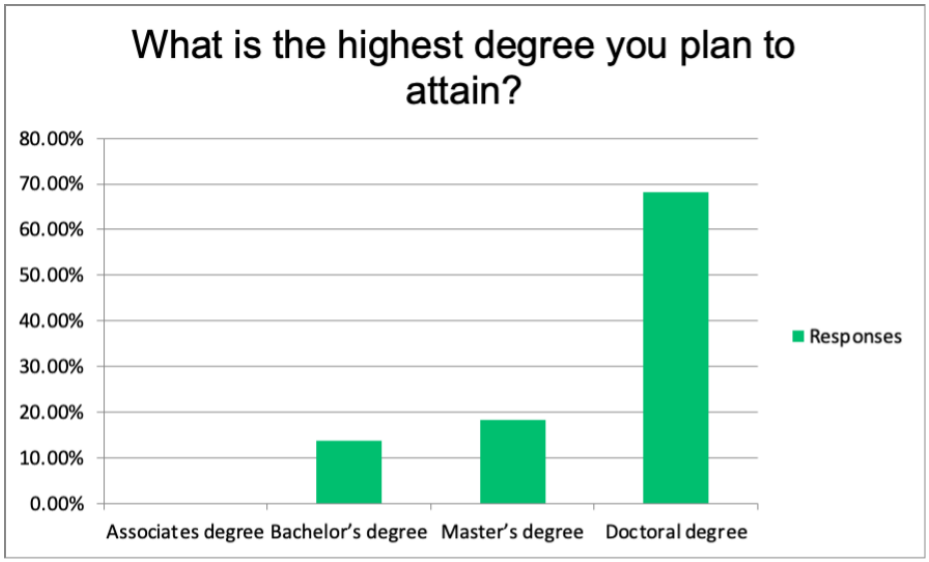

Figure 15: Highest degree planning to attain

Answer Choices	Responses	
Associates degree	0.00%	0
Bachelors degree	13.64%	3
Masters degree	18.18%	4
Doctoral degree	68.18%	15
	Answered	22
	Skipped	69

The bar chart illustrates the responses for figure 16. The data revealed the following responses for the statement: Associates Degree - (0), Bachelors Degree - 3 (13.64%), Masters Degree - 4 (18.18%), Doctoral Degree - 15 (68.18%).

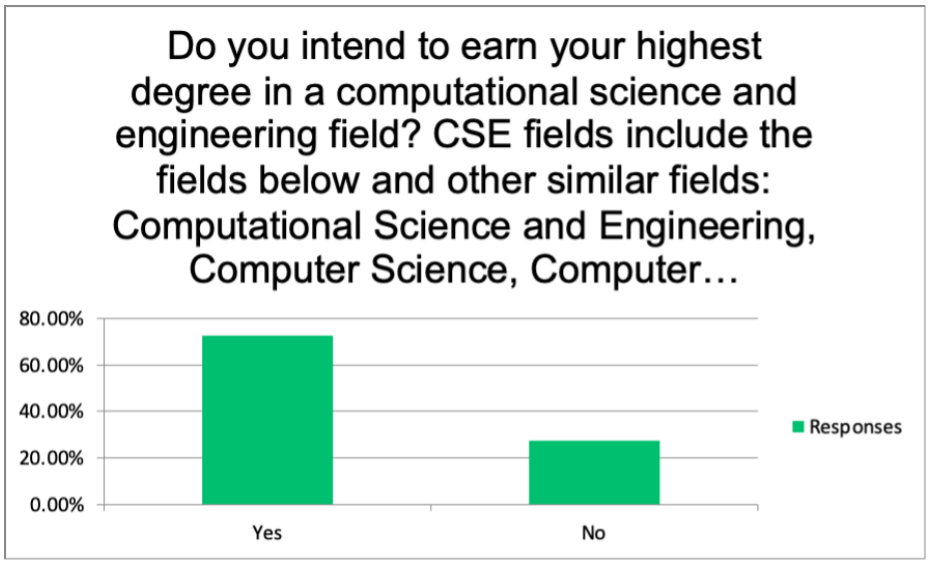

Figure 16: Intention to earn degree in CSE field

Answer Choices	Responses	
Yes	72.73%	16
No	27.27%	6
	Answered	22
	Skipped	69

The above bar chart depicts the responses for this question. The data revealed the following responses for the statement: Yes (72.73%), No (27.27%).

3.2.2 Career Values

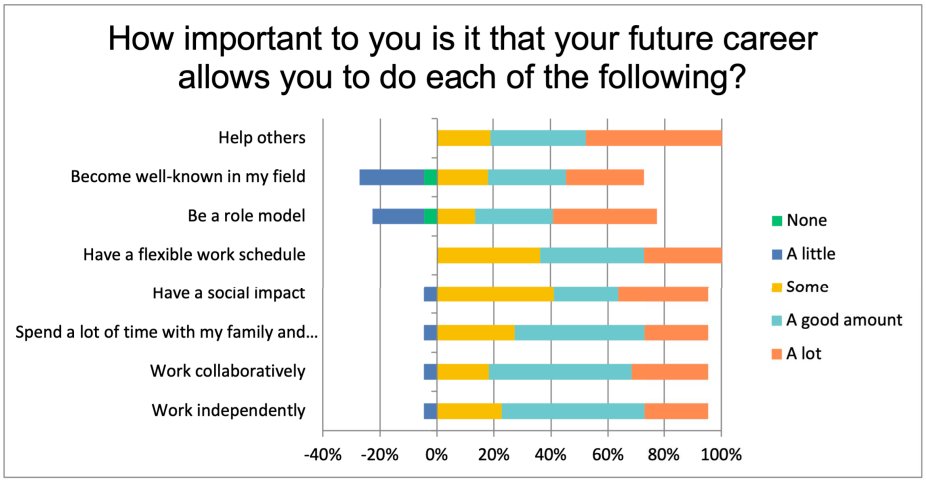

Figure 17: Future Career

Answer Choices	None		A little		Some		A good amount		A lot		Total
Work independently	0.00%	0	-4.55%	1	22.73%	5	50.00%	11	22.73%	5	22
Work collaboratively	0.00%	0	-4.55%	1	18.18%	4	50.00%	11	27.27%	6	22
Spend a lot of time with my family and friends	0.00%	0	-4.55%	1	27.27%	6	45.45%	10	22.73%	5	22
Have a social impact	0.00%	0	-4.55%	1	40.91%	9	22.73%	5	31.82%	7	22
Have a flexible work schedule	0.00%	0	0.00%	0	36.36%	8	36.36%	8	27.27%	6	22
Be a role model	-4.55%	1	-18.18%	4	13.64%	3	27.27%	6	36.36%	8	22
Become well-known in my field	-4.55%	1	-22.73%	5	18.18%	4	27.27%	6	27.27%	6	22
Help others	0.00%	0	0.00%	0	19.05%	4	33.33%	7	47.62%	10	21
										Answered	22
										Skipped	69

The bar chart above gives a pictorial representation of the responses for this question. The data revealed the following responses for the statement: Work independently: None - 0.00%, A little - 4.55%, Some- 22.73%, A good amount - 50.00%, A lot - 22.73%. Work collaboratively: None - 0.00%, A little - 4.55%, Some - 18.18%, A good amount - 50.00%, A lot - 27.27%. Spend a lot of time with my family and friends: None - 0.00%, A little - 4.55%, Some - 27.27%, A good amount - 45.45%, A lot - 22.73%. Have a social impact: None - 0.00%, A little - 4.55%, Some - 40.91%, A good amount - 22.73%, A lot - 31.82%. Have a flexible work schedule: None - 0.00%, A little - 0.00%, Some - 36.36%, A good amount - 50.00%, A lot - 22.73%. Be a role model: None - 0.00%, A little - 4.55%, Some - 36.36%, A good amount - 36.36%, A lot - 27.27%. Become well-known in my field: None - 4.55%, A little - 18.18%, Some - 13.64%, A good amount - 27.27%, A lot - 36.36%. Help others: None - 4.55%, A little - 4.55%, Some - 22.73%, A good amount - 50.00%, A lot - 22.73%.

3.2.3 Belonging and Identification

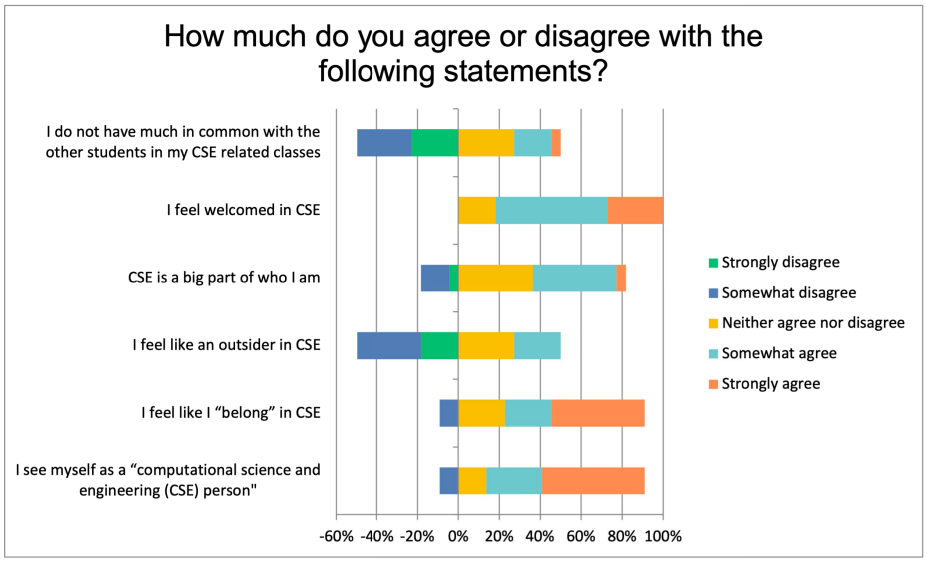

Figure 18: Agree or disagree statement on belonging and identification

Answer Choices	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Total
I see myself as a computational science and engineering (CSE) person"	0.00%	0	-9.09%	2	13.64%	3	27.27%	6	50.00%	11	22
I feel like I belong in CSE	0.00%	0	-9.09%	2	22.73%	5	22.73%	5	45.45%	10	22
I feel like an outsider in CSE	-18.18%	4	-31.82%	7	27.27%	6	22.73%	5	0.00%	0	22
CSE is a big part of who I am	-4.55%	1	-13.64%	3	36.36%	8	40.91%	9	4.55%	1	22
I feel welcomed in CSE	0.00%	0	0.00%	0	18.18%	4	54.55%	12	27.27%	6	22
I do not have much in common with the other students in my CSE related classes	-22.73%	5	-27.27%	6	27.27%	6	18.18%	4	4.55%	1	22
										Answered	22
										Skipped	69

The bar chart displays the responses for this question. The data showed the following responses for the statement. Strongly disagree - 10, Somewhat disagree - 20, Neither agree nor disagree - 32, Somewhat agree - 41, Strongly agree - 29.

3.2.4 Self Efficacy

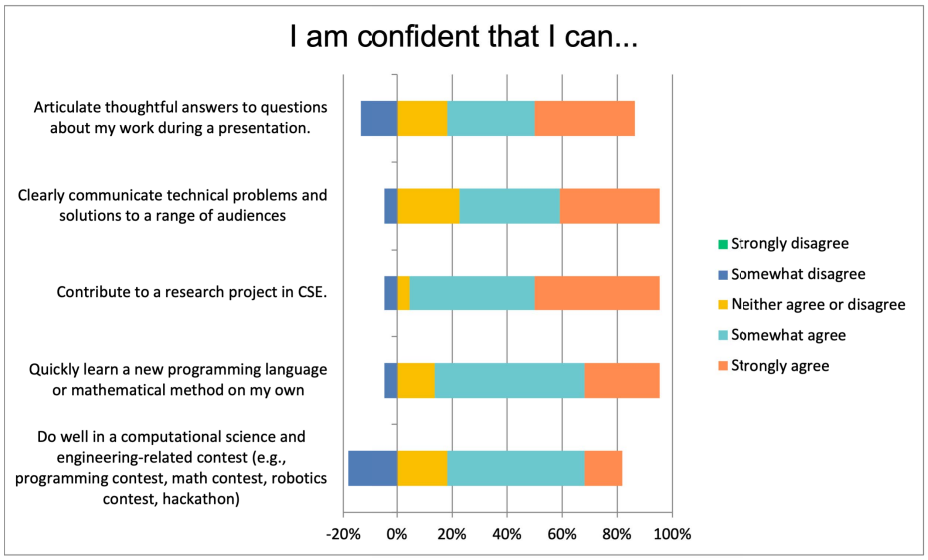

Figure 19: Responses on self efficacy

Answer Choices	Strongly Disagree		Somewhat Disagree		Neither agree nor disagree		Somewhat Agree		Strongly agree		Total
Do well in a computational science and engineering-related contest (e.g., programming contest, math contest, robotics contest, hackathon)	0.00%	0	-18.18%	4	-18.18%	4	50.00%	11	13.64%	3	22
Quickly learn a new programming language or mathematical method on my own	0.00%	0	-4.55%	1	13.64%	3	54.55%	12	27.27%	6	22
Contribute to a research project in CSE.	0.00%	0	-4.55%	1	4.55%	1	45.45%	10	45.45%	10	22
Clearly communicate technical problems and solutions to a range of audiences	0.00%	0	-4.55%	1	22.73%	5	36.36%	8	36.36%	8	22
Articulate thoughtful answers to questions about my work during a presentation.	0.00%	0	-13.64%	3	18.18%	4	31.82%	7	36.36%	8	22
										Answered	22
										Skipped	69

The bar chart above depicts the responses for this question. The data revealed the following responses for the statement. Do well in a computational science and engineering-related contest (e.g., programming contest, math contest, robotics contest, hackathon): Strongly disagree - 0, Somewhat disagree - 18.18%, Neither agree nor disagree - 18.18%, Somewhat agree - 50.00%, Strongly agree - 13.64%. Quickly learn a new programming language or mathematical method on my own: Strongly disagree -0, Somewhat disagree - 4.55%, Neither agree nor disagree - 13.64%, Somewhat agree - 54.55%, Strongly agree - 27.27%. Contribute to a research project in CSE: Strongly disagree - 0, Somewhat disagree - 4.55%, Neither agree nor disagree - 4.55%, Somewhat agree - 45.45%, Strongly agree - 45.45%. Clearly communicate

technical problems and solutions to a range of audiences: Strongly disagree - 0, Somewhat disagree - 4.55%, Neither agree nor disagree - 22.73%, Somewhat agree - 36.36%, Strongly agree - 36.36%. Articulate thoughtful answers to questions about my work during a presentation: Strongly disagree - 0, Somewhat disagree - 13.64%, Neither agree nor disagree - 18.18%, Somewhat agree - 31.82%, Strongly agree - 36.36%.

3.2.5 Mentor Support

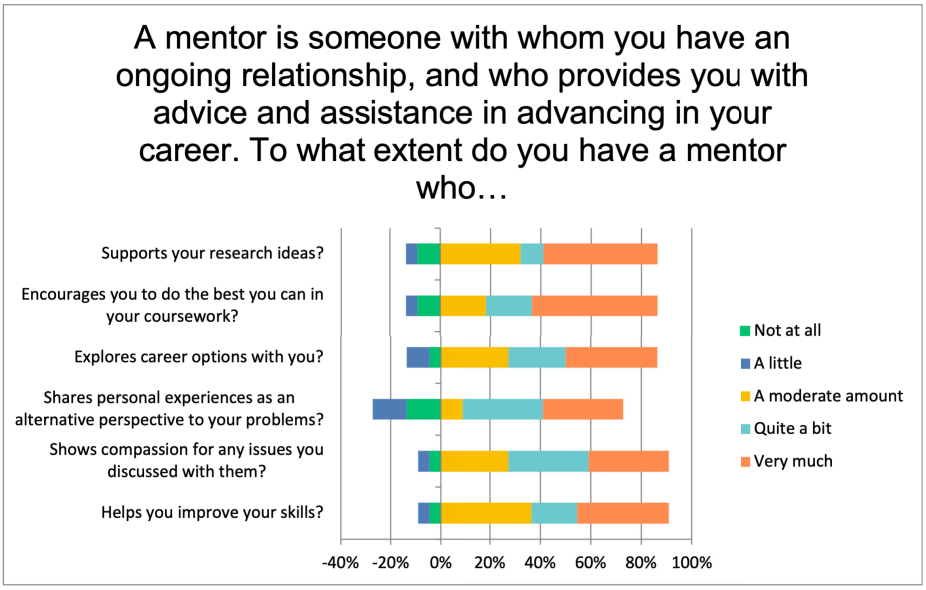

Figure 20: Ongoing relationship with mentor

Answer Choices	None		A little		Some		A good amount		A lot		Total
Helps you improve your skills?	-4.55%	1	-4.55%	1	36.36%	8	18.18%	4	36.36%	8	22
Shows compassion for any issues you discussed with them?	0.00%	0	-4.55%	1	27.27%	6	31.82%	7	31.82%	7	22
Shares personal experiences as an alternative perspective to your problems?	-13.64%	3	-13.64%	3	9.09%	2	31.82%	7	31.82%	7	22
Explores career options with you?	-4.55%	1	-9.09%	2	27.27%	6	22.73%	5	36.36%	8	22
Encourages you to do the best you can in your coursework?	-9.09%	2	-4.55%	1	18.18%	4	18.18%	4	50.00%	11	22
Supports your research ideas?	-9.09%	2	-4.55%	1	31.82%	7	9.09%	2	45.45%	10	22
										Answered	22
										Skipped	69

The bar chart above gives a pictorial representation of the responses regrading this question. The data showed the following responses for the statements: Helps

you improve your skills? Not at all - 4.55%, A little - 4.55%, A moderate amount - 36.36%, Quite a bit - 18.18%, Very much - 36.36%. Shows compassion for any issues you discussed with them? Not at all - 4.55%, A little - 4.55%, A moderate amount - 27.27%, Quite a bit - 31.82%, Very much - 31.82%. Shares personal experiences as an alternative perspective to your problems? Not at all - 13.64%, A little - 13.64%, A moderate amount - 9.09%, Quite a bit - 31.82%, Very much - 31.82%. Explores career options with you? Not at all - 4.55%, A little - 9.09%, A moderate amount - 27.27%, Quite a bit - 22.73%, Very much - 36.36%. Encourages you to do the best you can in your coursework? Not at all - 9.09%, A little - 4.55%, A moderate amount - 18.18%, Quite a bit - 18.18%, Very much - 50.00%. Supports your research ideas? Not at all - 9.09%, A little - 4.55%, A moderate amount - 31.82%, Quite a bit - 9.09%, Very much - 45.45%.

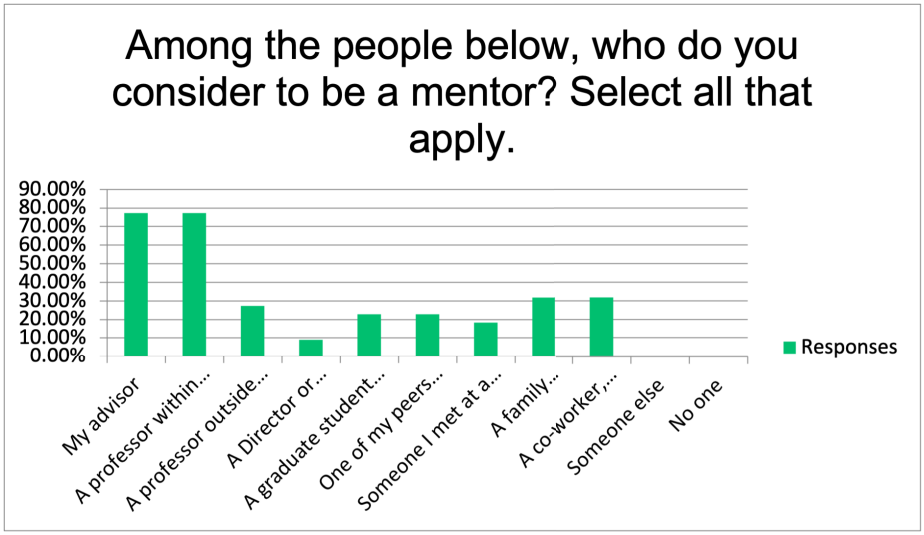

Figure 21: Who do you consider to be a mentor

Answer Choices	Responses	
My advisor	77.27%	17
A professor within my department (not my advisor)	77.27%	17
A professor outside of my department	27.27%	6
A Director or administrative faculty	9.09%	2
A graduate student (e.g., graduate teaching/research assistant, graduate student mentor)	22.73%	5
One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor)	22.73%	5
Someone I met at a conference or mentoring program sponsored (or other professional activity)	18.18%	4
A family member/partner, friend, pastor, or someone else with whom I have a personal relationship	31.82%	7
A co-worker, supervisor, or someone else with whom I have a professional relationship	31.82%	7
Someone else	0.00%	0
No one	0.00%	0
	Answered	22
	Skipped	69

The bar chart above illustrates responses regarding this question. The data showed the following responses for this statement: My advisor - 77.27%, A professor within my department (not my advisor) - 77.27%, A professor outside of my department - 27.27%,A Director or administrative faculty - 9.09%, A graduate student (e.g., graduate teaching/research assistant, graduate student mentor) - 22.73%, One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor) - 22.73%, Someone I met at a conference or mentoring program sponsored (or other professional activity) - 18.18%, A family member/partner, friend, pastor, or someone else with whom I have a personal relationship - 31.82%, A co-worker, supervisor, or someone else with whom I have a professional relationship - 31.82%, Someone else - 0%, No one - 0%.

3.2.6 Academic and Research skills

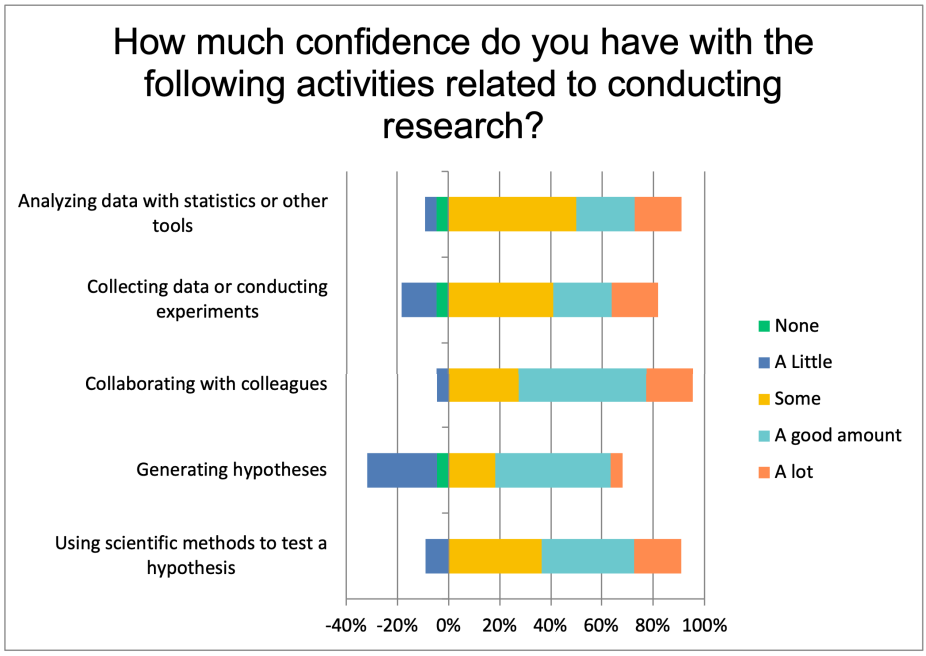

Figure 22: Confidence related to conducting research

Answer Choices	None		A little		Some		A good amount		A lot		Total
Using scientific methods to test a hypothesis	0.00%	0	-9.09%	2	36.36%	8	36.36%	8	18.18%	4	22
Generating hypotheses	-4.55%	1	-27.27%	6	18.18%	4	45.45%	10	4.55%	1	22
Collaborating with colleagues	0.00%	0	-4.55%	1	27.27%	6	50.00%	11	18.18%	4	22
Collecting data or conducting experiments	-4.55%	1	-13.64%	3	40.91%	9	22.73%	5	18.18%	4	22
Analyzing data with statistics or other tools	-4.55%	1	-4.55%	1	50.00%	11	22.73%	5	18.18%	4	22
										Answered	22
										Skipped	69

The bar chart above describes responses for this question. The data revealed the following responses for the statement: Using scientific methods to test a hypothesis - 22, Generating hypotheses - 22, Collaborating with colleagues - 22, Collecting data or conducting experiments - 22, Analyzing data with statistics or other tools - 22.

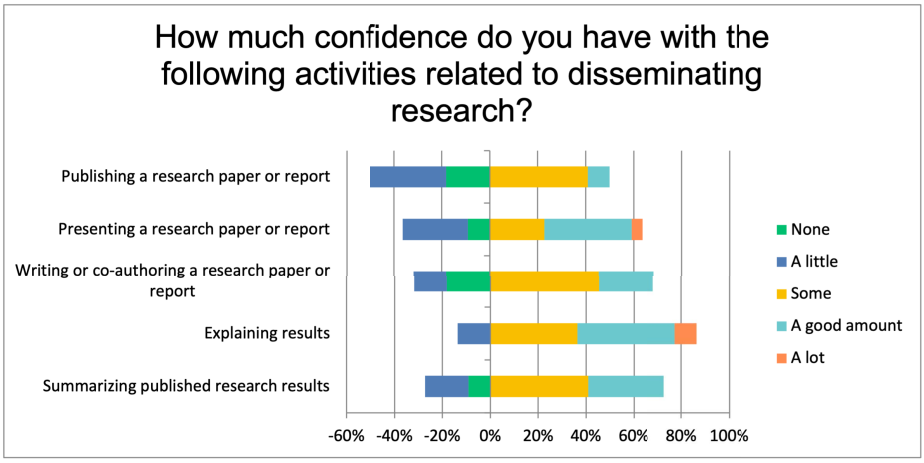

Figure 23: Confidence related to disseminating research

Answer Choices	None		A little		Some		A good amount		A lot		Total
Summarizing published research results	-9.09%	2	-18.18%	4	40.91%	9	31.82%	7	0.00%	0	22
Explaining results	0.00%	0	-13.64%	3	36.36%	8	40.91%	9	9.09%	2	22
Writing or co-authoring a research paper or report	-18.18%	4	-13.64%	3	45.45%	10	22.73%	5	0.00%	0	22
Presenting a research paper or report	-9.09%	2	-27.27%	6	22.73%	5	36.36%	8	4.55%	1	22
Publishing a research paper or report	-18.18%	4	-31.82%	7	40.91%	9	9.09%	2	0.00%	0	22
										Answered	22
										Skipped	69

The bar chart above represents the responses for this question. The data revealed the following responses for the statement: Summarizing published research results - 22, Explaining results - 22, Writing or co-authoring a research paper or report - 22, Presenting a research paper or report - 22, Publishing a research paper or report - 22.

3.3 Academic characteristics- Graduates

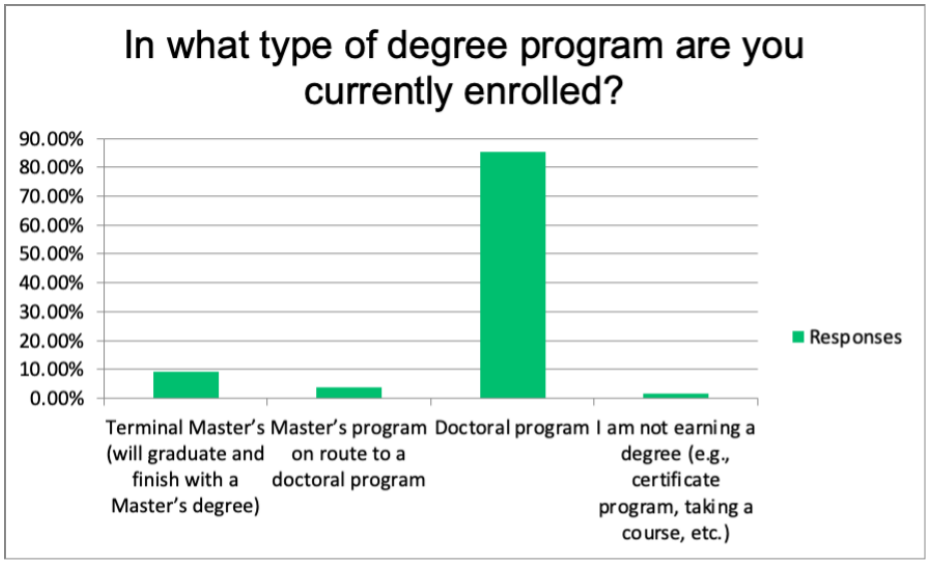

Figure 24: Degree program currently enrolled

Answer Choices	Responses	
Terminal Masters (will graduate and finish with a Masters degree)	9.09%	5
Masters program on route to a doctoral program	3.64%	2
Doctoral program	85.45%	47
I am not earning a degree (e.g., certificate program, taking a course, etc.)	1.82%	1
	Answered	55
	Skipped	36

The bar chart displays the responses for this question. The data showed the following responses for the statement: Terminal Masters (will graduate and finish with a masters degree) - 5 (9.09%), Masters program on route to a doctoral program - 2 (3.64%), Doctoral Program - 47 (85.45%), I am not earning a degree (e.g., certificate program, taking a course, etc.) - 1 (1.82%).

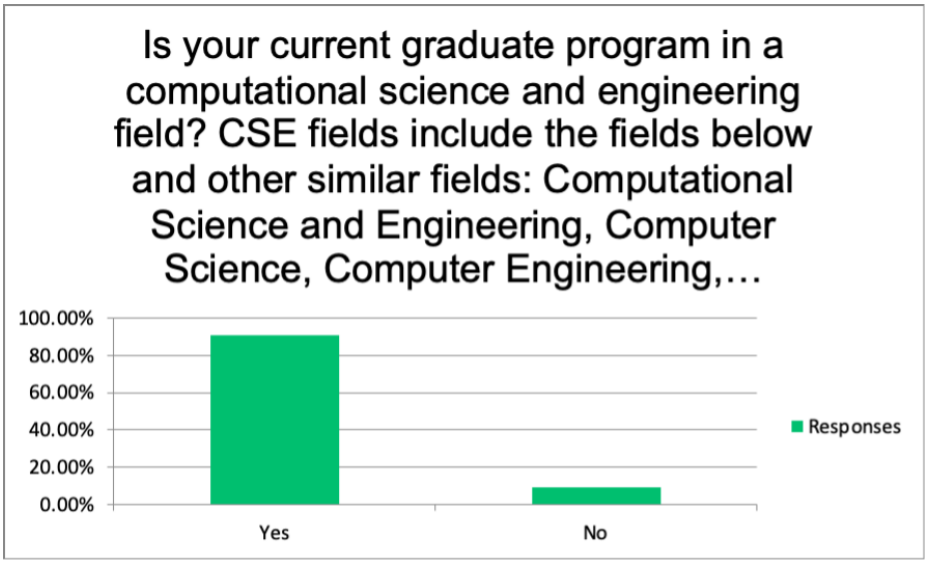

Figure 25: Current graduate program in CSE field

Answer Choices	Responses	
Yes	90.91%	50
No	9.09%	5
	Answered	55
	Skipped	36

The bar chart above illustrates responses regarding this question. The data showed the following responses for the statement: Yes - 50 (90.91%), No - 5 (9.09%).

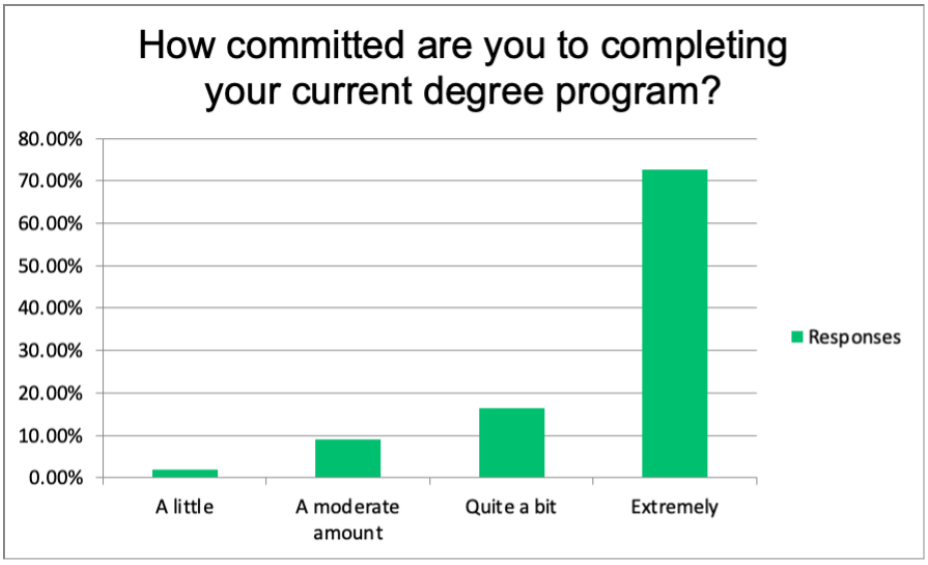

Figure 26: Commitment on degree completion

Answer Choices	Responses	
A little	1.82%	1
A moderate amount	9.09%	5
Quite a bit	16.36%	9
Extremely	72.73%	40
	Answered	55
	Skipped	36

The bar chart above describes responses or this question. The data revealed the following responses for the statement: A little - 1.82%, A moderate amount - 9.09%, Quite a bit - 16.36%, Extremely - 72.73%.

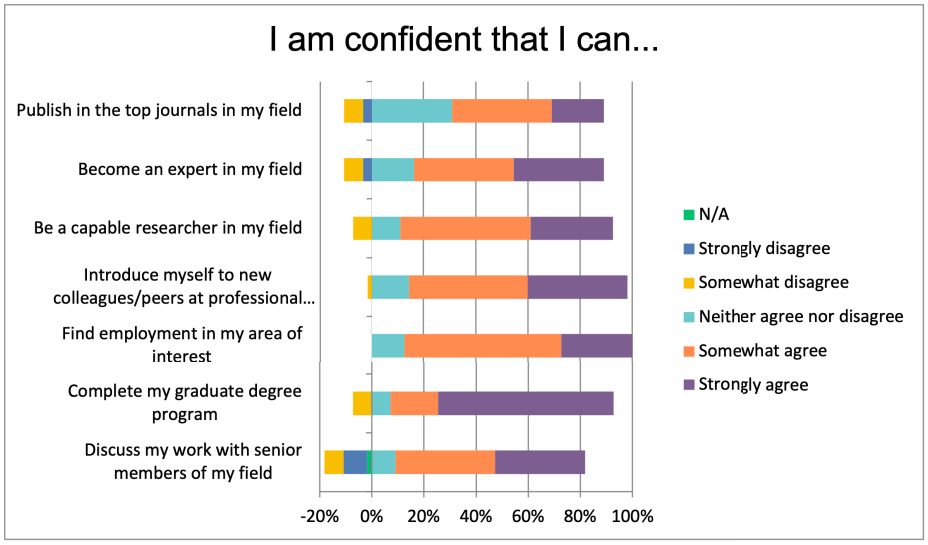

Figure 27: Statements on Confidence

Answer Choices	N/A		Strongly Disagree		Somewhat Disagree		Neither agree nor disagree		Somewhat Agree		Strongly agree		Total
Discuss my work with senior members of my field	-1.82%	1	-9.09%	5	-7.27%	4	9.09%	5	38.18%	21	34.55%	19	55
Complete my graduate degree program	0.00%	0	0.00%	0	-7.27%	4	7.27%	4	18.18%	10	67.27%	37	55
Find employment in my area of interest	0.00%	0	0.00%	0	0.00%	0	12.73%	7	60.00%	33	27.27%	15	55
Introduce myself to new colleagues/peers at professional meetings	0.00%	0	0.00%	0	-1.82%	1	14.55%	8	45.45%	25	38.18%	21	55
Be a capable researcher in my field	0.00%	0	0.00%	0	-7.41%	4	11.11%	6	50.00%	27	31.48%	17	54
Become an expert in my field	0.00%	0	-3.64%	2	-7.27%	4	16.36%	9	38.18%	21	34.55%	19	55
Publish in the top journals in my field	0.00%	0	-3.64%	2	-7.27%	4	30.91%	17	38.18%	21	20.00%	11	55
												Answered	55
												Skipped	36

The bar chart gives a view of the responses for this question. The data revealed the following responses for the statement: Discuss my work with senior members of my field -19, Complete my graduate degree program - 37, Find employment in my area of interest - 15, Introduce myself to new colleagues/peers at professional meetings - 21, Be a capable researcher in my field - 17, Become an expert in my field - 19, Publish in the top journals in my field - 11.

3.3.1 Highest degree Intentions/Aspirations

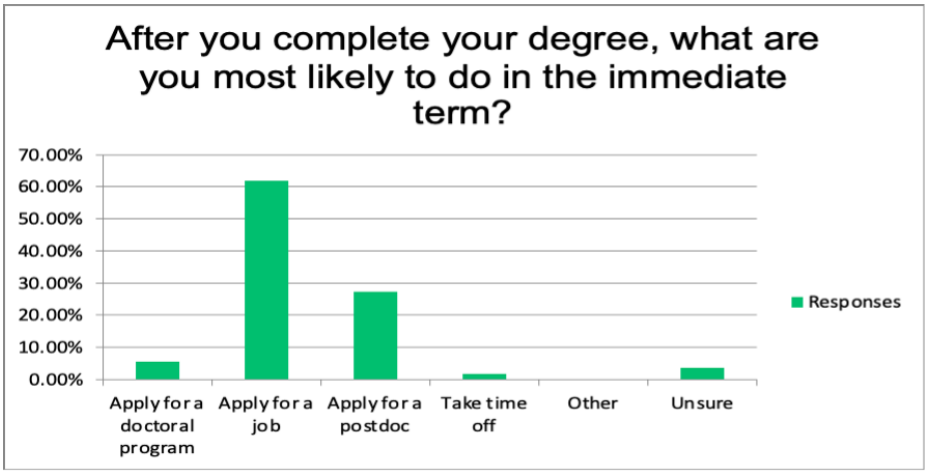

Figure 28: Likely to do in the immediate term

Answer Choices	Responses	
Apply for a doctoral program	5.45%	3
Apply for a job	61.82%	34
Apply for a post doc	27.27%	15
Take time off	1.82%	1
Other	0.00%	0
Unsure	3.64%	2
	Answered	55
	Skipped	36

The bar chart demonstrates the responses for this question. The data revealed the following responses for the statement: Apply for a doctoral program - 5.45%, Apply for a job - 61.82%, Apply for a postdoc - 27.27%, Take time off - 1.82%, Other - 0, Unsure - 3.64%.

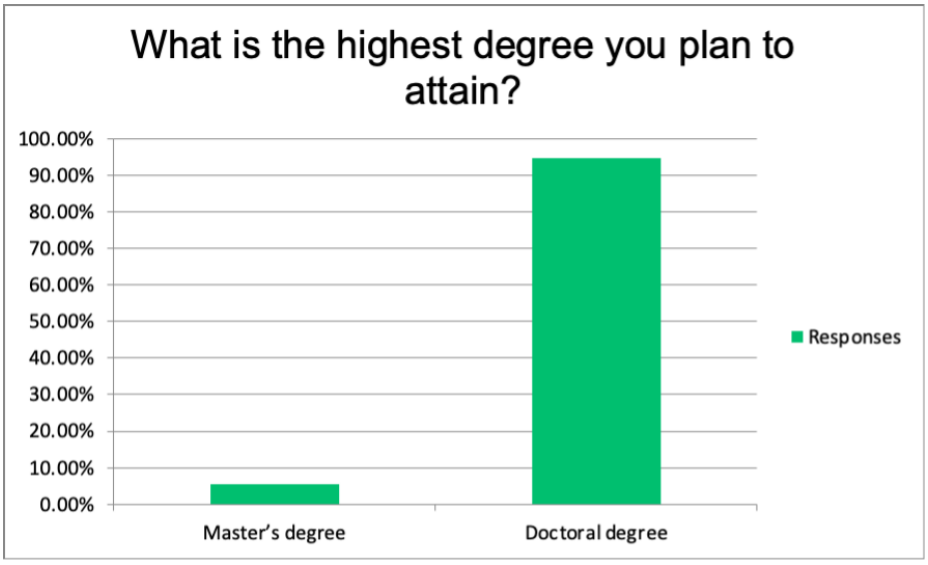

Figure 29: Highest degree planning to attain

Answer Choices	Responses	
Masters degree	5.45%	3
Doctoral degree	94.55%	52
	Answered	55
	Skipped	36

The bar chart above represents the responses for this question. The data revealed the following responses for the statement: Masters degree - 5.45%, Doctoral degree - 94.55%.

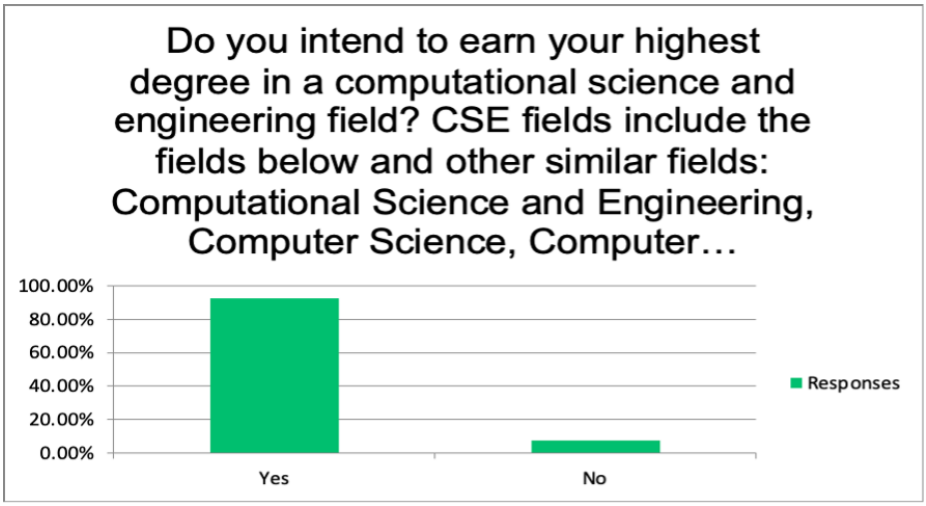

Figure 30: Intention to earn highest degree in CSE field

Answer Choices	Responses	
Yes	92.73%	51
No	7.27%	4
	Answered	55
	Skipped	36

The bar chart illustrates the responses for the above question. The data revealed the following responses for the statement: Yes - 92.73%, No - 7.27%.

3.3.2 Career Values

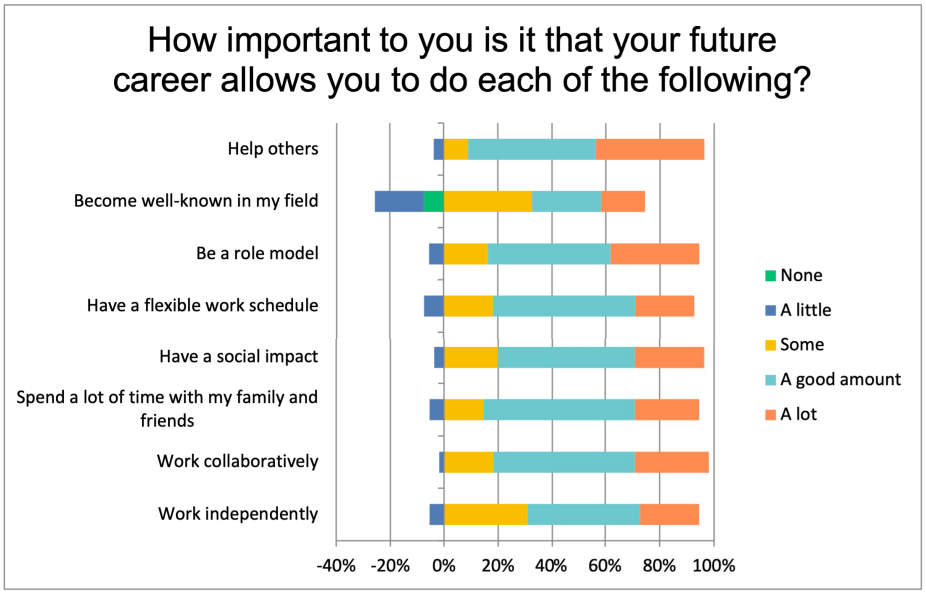

Figure 31: Future career

Answer Choices	None		A little		Some		A good amount		A lot		Total
Work independently	0.00%	0	5.45%	3	30.91%	17	41.82%	23	21.82%	12	55
Work collaboratively	0.00%	0	1.82%	1	18.18%	10	52.73%	29	27.27%	15	55
Spend a lot of time with my family and friends	0.00%	0	5.45%	3	14.55%	8	56.36%	31	23.64%	13	55
Have a social impact	0.00%	0	3.64%	2	20.00%	11	50.91%	28	25.45%	14	55
Have a flexible work schedule	0.00%	0	7.27%	4	18.18%	10	52.73%	29	21.82%	12	55
Be a role model	0.00%	0	5.45%	3	16.36%	9	45.45%	25	32.73%	18	55
Become well-known in my field	7.27%	4	18.18%	10	32.73%	18	25.45%	14	16.36%	9	55
Help others	0.00%	0	3.64%	2	9.09%	5	47.27%	26	40.00%	22	55
										Answered	55
										Skipped	36

The bar chart above gives a pictorial representation of the responses for this question. The data revealed the following responses for the statement: Work independently: None - 0.00%, A little - 5.45%, Some - 30.91%, A good amount - 41.82%, A lot - 21.82%. Work collaboratively: None - 0.00%, A little - 1.82%, Some - 18.18%, A good amount - 52.73%, A lot - 27.27%. Spend a lot of time with my family and friends: None - 0.00%, A little - 5.45%, Some - 14.55%, A good amount - 56.36%, A

lot - 23.64%. Have a social impact: None - 0.00%, A little - 3.64%, Some - 20.00%, A good amount - 50.91%, A lot - 25.45%. Have a flexible work schedule: None - 0.00%, A little - 7.27%, Some - 18.18%, A good amount - 52.73%, A lot - 21.82%. Be a role model: None - 0.00%, A little - 5.45%, Some - 16.36%, A good amount - 45.45%, A lot - 32.73%. Become well-known in my field: None - 7.27%, A little - 18.18%, Some - 32.73%, A good amount - 25.45%, A lot - 16.36%. Help others: None - 0.00%, A little - 3.64%, Some - 9.09%, A good amount - 47.27%, A lot - 40.00%.

3.3.3 Belonging and Identification

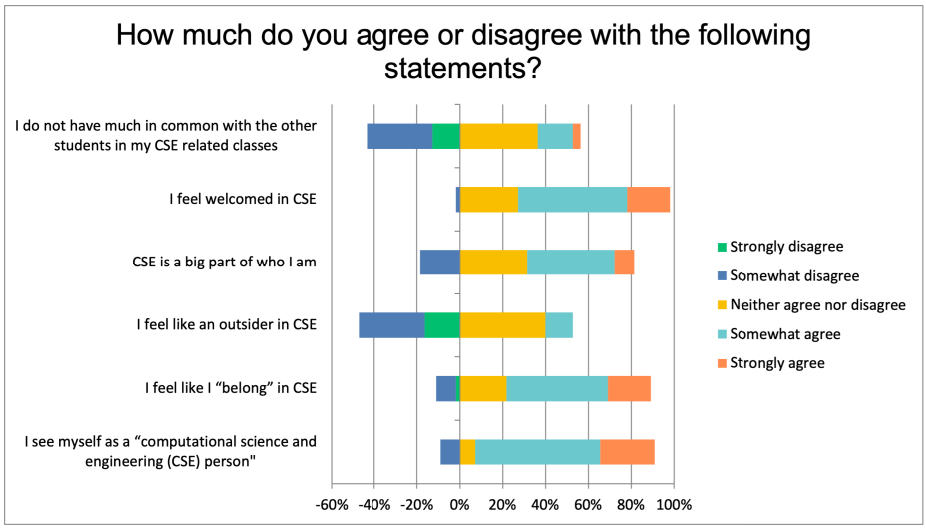

Figure 32: Statement on belonging and Identification

Answer Choices	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Total
I see myself as a computational science and engineering (CSE) person"	0.00%	0	-9.09%	5	7.27%	4	58.18%	32	25.45%	14	55
I feel like I belong in CSE	-1.82%	1	-9.09%	5	21.82%	12	47.27%	26	20.00%	11	55
I feel like an outsider in CSE	-16.36%	9	-30.91%	17	40.00%	22	12.73%	7	0.00%	0	55
CSE is a big part of who I am	0.00%	0	-18.52%	10	31.48%	17	40.74%	22	9.26%	5	54
I feel welcomed in CSE	0.00%	0	-1.82%	1	27.27%	15	50.91%	28	20.00%	11	55
I do not have much in common with the other students in my CSE related classes	-12.73%	7	-30.91%	17	36.36%	20	16.36%	9	3.64%	2	55
										Answered	55
										Skipped	36

The bar chart displays the responses for this question. The data showed the following responses for the statement. Strongly disagree - 17, Somewhat disagree - 55, Neither agree nor disagree - 90, Somewhat agree - 124, Strongly agree - 43.

3.3.4 Self Efficacy

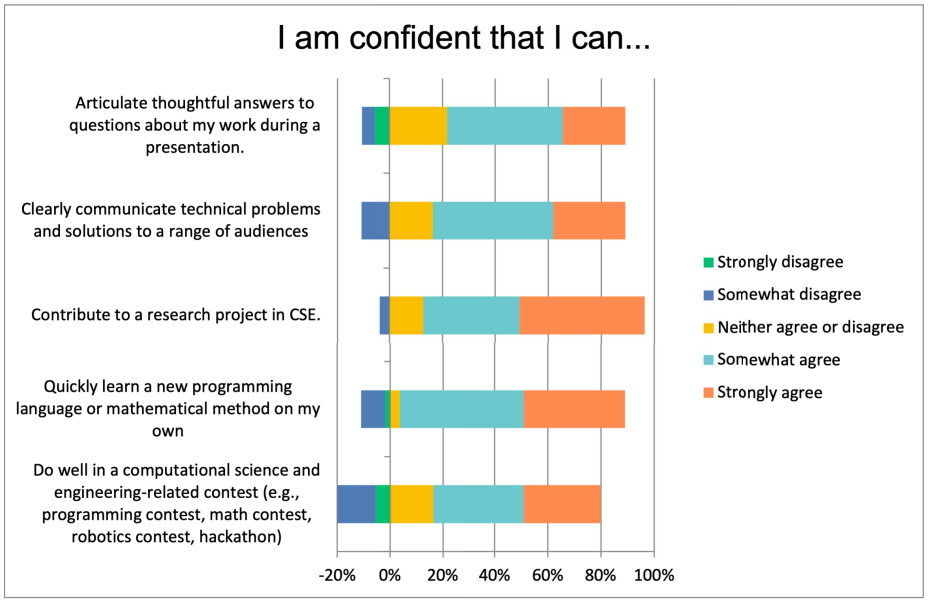

Figure 33: Self Efficacy

Answer Choices	Strongly Disagree		Somewhat Disagree		Neither agree nor disagree		Somewhat Agree		Strongly agree		Total
Do well in a computational science and engineering-related contest (e.g., programming contest, math contest, robotics contest, hackathon)	-5.45%	3	-14.55%	8	16.36%	9	34.55%	19	29.09%	16	55
Quickly learn a new programming language or mathematical method on my own	-1.82%	1	-9.09%	5	3.64%	2	47.27%	26	38.18%	21	55
Contribute to a research project in CSE.	0.00%	0	-3.64%	2	12.73%	7	36.36%	20	47.27%	26	55
Clearly communicate technical problems and solutions to a range of audiences	0.00%	0	-10.91%	6	16.36%	9	45.45%	25	27.27%	15	55
Articulate thoughtful answers to questions about my work during a presentation.	-5.45%	3	-5.45%	3	21.82%	12	43.64%	24	23.64%	13	55
										Answered	55
										Skipped	36

The bar chart above depicts the responses for this question. The data revealed the following responses for the statement. Do well in a computational science and engineering-related contest (e.g., programming contest, math contest, robotics contest, hackathon): Strongly disagree - 5.45%, Somewhat disagree - 14.55%, Neither agree nor disagree - 16.36%, Somewhat agree - 34.55%, Strongly agree - 29.09%. Quickly learn a new programming language or mathematical method on my own: Strongly disagree - 1.82%, Somewhat disagree - 9.09%, Neither agree nor disagree - 3.64%, Somewhat agree - 47.27%, Strongly agree - 38.18%. Contribute to a research project in CSE: Strongly disagree - 0, Somewhat disagree - 3.64%, Neither agree nor

disagree - 12.73%, Somewhat agree - 36.36%, Strongly agree - 47.27%. Clearly communicate technical problems and solutions to a range of audiences: Strongly disagree - 0, Somewhat disagree - 10.91%, Neither agree nor disagree - 16.36%, Somewhat agree - 45.45%, Strongly agree - 27.27%. Articulate thoughtful answers to questions about my work during a presentation: Strongly disagree - 5.45%, Somewhat disagree - 5.45%, Neither agree nor disagree - 21.82%, Somewhat agree - 43.64%, Strongly agree - 23.64%.

3.3.5 Mentor Support

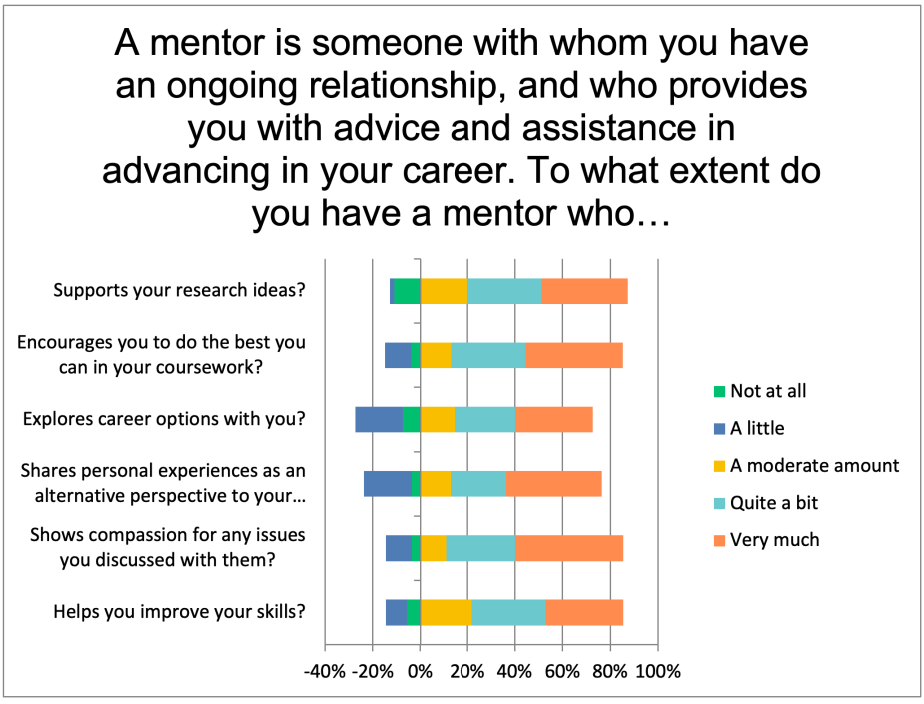

Figure 34: With whom they want an ongoing relationship as an mentor

Answer Choices	None		A little		Some		A good amount		A lot		Total
Helps you improve your skills?	-5.45%	3	-9.09%	5	21.82%	12	30.91%	17	32.73%	18	55
Shows compassion for any issues you discussed with them?	-3.64%	2	-10.91%	6	10.91%	6	29.09%	16	45.45%	25	55
Shares personal experiences as an alternative perspective to your problems?	-3.64%	2	-20.00%	11	12.73%	7	23.64%	13	40.00%	22	55
Explores career options with you?	-7.27%	4	-20.00%	11	14.55%	8	25.45%	14	32.73%	18	55
Encourages you to do the best you can in your coursework?	-3.70%	2	-11.11%	6	12.96%	7	31.48%	17	40.74%	22	54
Supports your research ideas?	-10.91%	6	-1.82%	1	20.00%	11	30.91%	17	36.36%	20	55
										Answered	55
										Skipped	36

The bar chart above gives a pictorial representation of the responses regrading this question. The data showed the following responses for the statements: Helps you improve your skills? Not at all - 0, A little - 12.50%, A moderate amount - 0, Quite a bit - 37.50%, Very much - 50.00%. Shows compassion for any issues you discussed with them? Not at all - 0, A little - 25.00%, A moderate amount - 12.50%, Quite a bit - 25.00%, Very much - 37.50%. Shares personal experiences as an alternative perspective to your problems? Not at all - 12.50%, A little - 0, A moderate amount - 25.00%, Quite a bit - 25.00%, Very much - 37.50%. Explores career options with you? Not at all - 0, A little - 12.50%, A moderate amount - 0, Quite a bit - 37.50%, Very much - 25.00%. Encourages you to do the best you can in your coursework? Not at all - 12.50%, A little - 0, A moderate amount - 12.50%, Quite a bit - 37.50%, Very much - 37.50%. Supports your research ideas? Not at all - 0, A little - 12.50%, A moderate amount - 12.50%, Quite a bit - 37.50%, Very much - 37.50%.

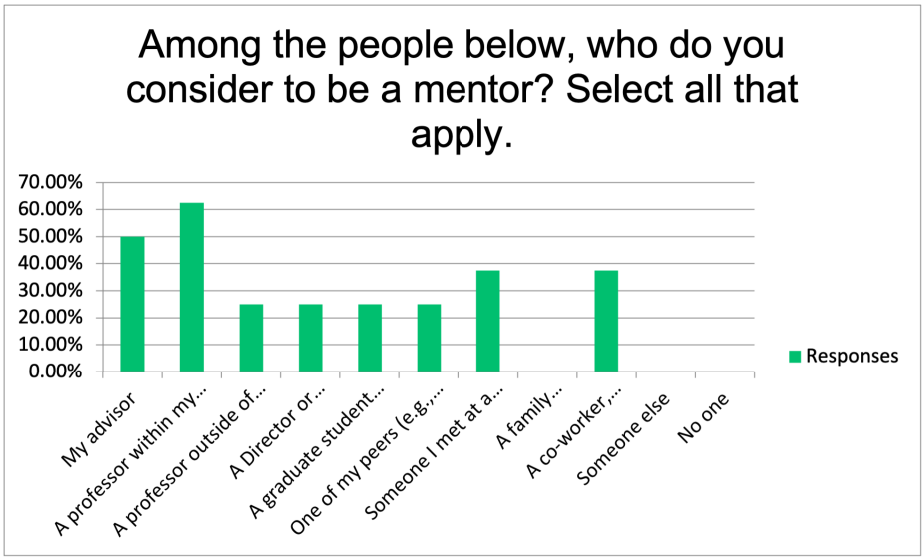

Figure 35: Who do they want to consider to be a mentor

Answer Choices	Responses	
My advisor	80.00%	44
A professor within my department (not my advisor)	34.55%	19
A professor outside of my department	36.36%	20
A Director or administrative faculty	16.36%	9
A graduate student (e.g., graduate teaching/research assistant, graduate student mentor)	40.00%	22
One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor)	18.18%	10
Someone I met at a conference or mentoring program sponsored (or other professional activity)	23.64%	13
A family member/partner, friend, pastor, or someone else with whom I have a personal relationship	41.82%	23
A co-worker, supervisor, or someone else with whom I have a professional relationship	30.91%	17
Someone else	3.64%	2
No one	3.64%	2
	Answered	55
	Skipped	36

The bar chart above gives a pictorial representation of the responses for this question. The data revealed the following responses for the statement. Learned new things from the technical content: Not at all - 1.75%, Very little - 5.26%, Somewhat - 54.39%, Very much - 38.60%. The program helped me develop my existing technical skills: Not at all - 0.00%, Very little - 17.54%, Somewhat - 52.63%, Very much - 29.82%. Learned strategies for advancing my research or graduate school career: Not at all - 1.75%, Very little - 8.77%, Somewhat - 49.12%, Very much - 40.35%. I learned

methods for getting more out of technical conferences that I attend: Not at all - 1.75%, Very little - 12.28%, Somewhat - 43.86%, Very much - 42.11%. The technical content sparked some research ideas for me: Not at all - 3.57%, Very little - 21.43%, Somewhat - 39.29%, Very much - 35.71%. I learned more about what it is like to be a researcher in this area: Not at all - 3.51%, Very little - 5.26%, Somewhat - 47.37%, Very much - 43.86%.

3.3.6 Academic and Research skills

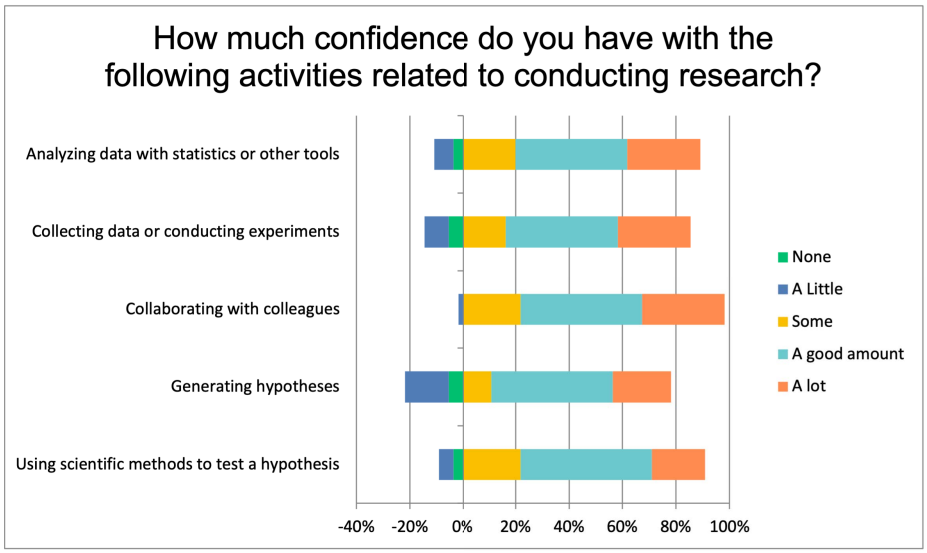

Figure 36: Activities related to conducting research

Answer Choices	None		A little		Some		A good amount		A lot		Total
Using scientific methods to test a hypothesis	-3.64%	2	-5.45%	3	21.82%	12	49.09%	27	20.00%	11	55
Generating hypotheses	-5.45%	3	-16.36%	9	10.91%	6	45.45%	25	21.82%	12	55
Collaborating with colleagues	0.00%	0	-1.82%	1	21.82%	12	45.45%	25	30.91%	17	55
Collecting data or conducting experiments	-5.45%	3	-9.09%	5	16.36%	9	41.82%	23	27.27%	15	55
Analyzing data with statistics or other tools	-3.64%	2	-7.27%	4	20.00%	11	41.82%	23	27.27%	15	55
										Answered	55
										Skipped	36

The bar chart above describes responses for this question. The data revealed the following responses for the statement: Using scientific methods to test a hypoth-

esis - 8, Generating hypotheses - 8, Collaborating with colleagues - 7, Collecting data or conducting experiments - 8, Analyzing data with statistics or other tools - 8.

Figure 37: Confidence on disseminating research

Answer Choices	None		A little		Some		A good amount		A lot		Total
Summarizing published research results	-5.45%	3	-12.73%	7	21.82%	12	52.73%	29	7.27%	4	55
Explaining results	-3.64%	2	-7.27%	4	32.73%	18	43.64%	24	12.73%	7	55
Writing or co-authoring a research paper or report	-10.91%	6	-10.91%	6	25.45%	14	43.64%	24	9.09%	5	55
Presenting a research paper or report	-3.64%	2	-12.73%	7	20.00%	11	45.45%	25	18.18%	10	55
Publishing a research paper or report	-18.52%	10	-12.96%	7	24.07%	13	35.19%	19	9.26%	5	54
										Answered	22
										Skipped	69

The bar chart above represents the responses for this question. The data revealed the following responses for the statement: Summarizing published research results - 8, Explaining results - 8, Writing or co-authoring a research paper or report - 8, Presenting a research paper or report - 8, Publishing a research paper or report - 8.

4 Post-Survey

4.1 Academic Characteristics- Undergraduates

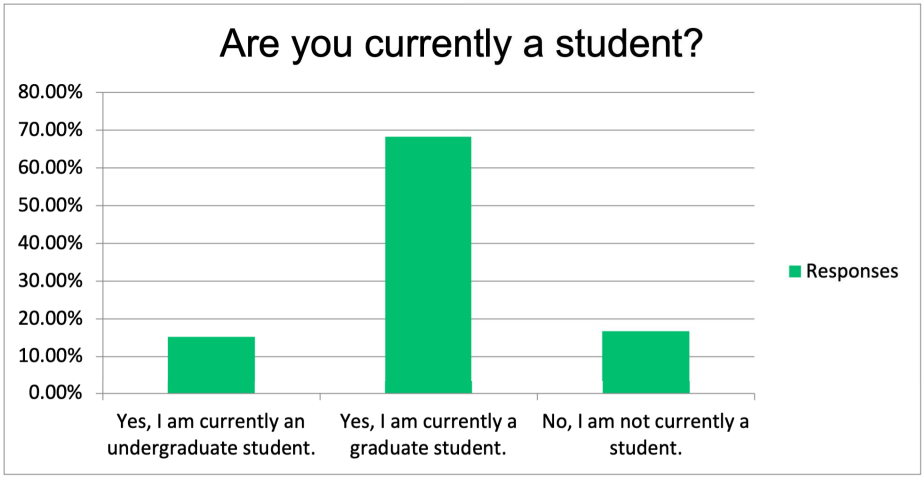

Figure 38: Current Academic status

Answer Choices	Responses	
Yes, I am currently an undergraduate student.	15.15%	10
Yes, I am currently a graduate student.	68.18%	45
No, I am not currently a student.	16.67%	11
	Answered	66
	Skipped	0

The bar chart above gives pictorial representation of the responses regarding this question. The data showed the following responses for the statements: Yes, I am currently an Undergraduate student - 15.15%, Yes, I am currently a graduate student - 68.18%, No, I am not currently a student - 16.67%.

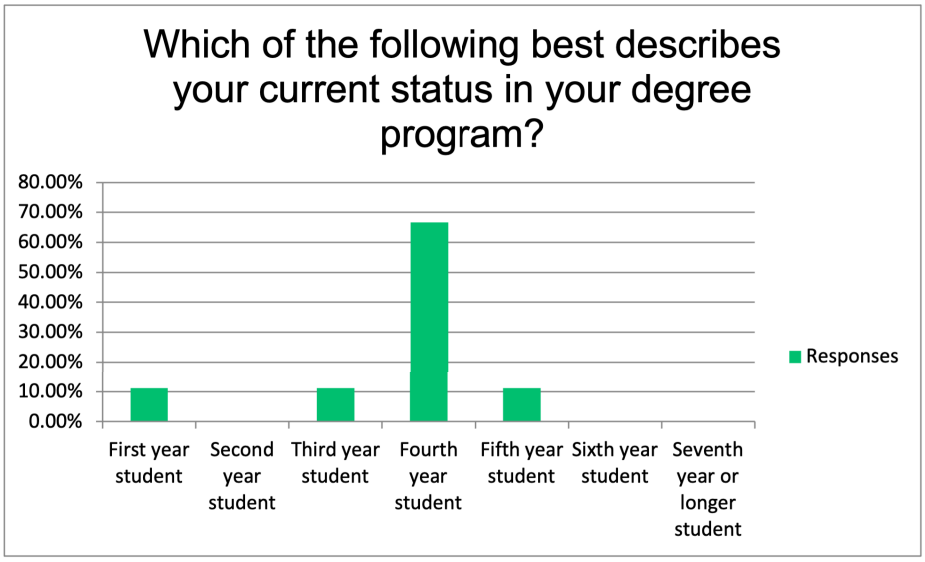

Figure 39: Current status in degree program

Answer Choices	Responses	
First year student	11.11%	1
Second year student	0.00%	0
Third year student	11.11%	1
Fourth year student	66.67%	6
Fifth year student	11.11%	1
Sixth year student	0.00%	0
Seventh year or longer student	0.00%	0
	Answered	9
	Skipped	57

The bar chart above illustrates responses regarding this question. The data showed the following responses for the statement: First year student, Third year student and Fifth year student - 11.11%, fourth year student - 66.67%, Second, Sixth and seventh years or longer students - 0%

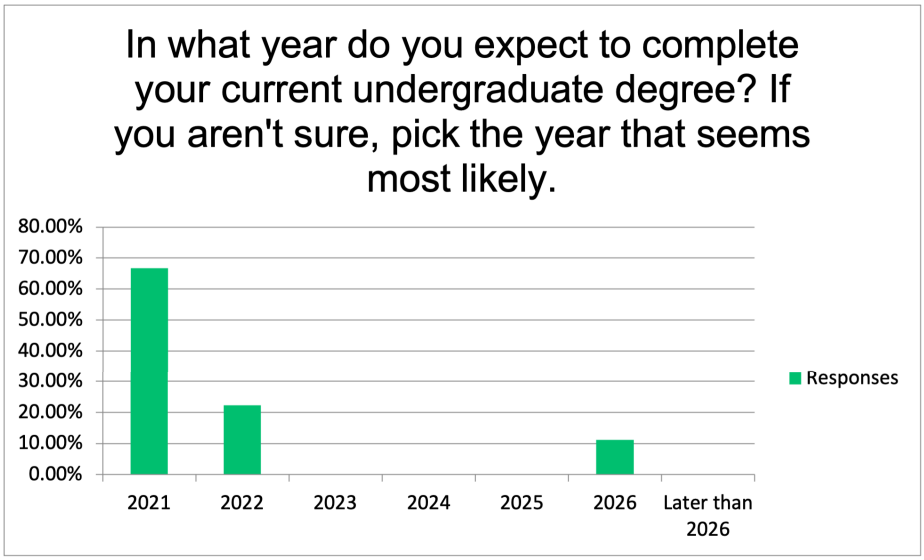

Figure 40: Graduation Expectancy

Answer Choices	Responses	
2021	66.67%	6
2022	22.22%	2
2023	0.00%	0
2024	0.00%	0
2025	0.00%	0
2026	11.11%	1
later than 2026	0.00%	0
Other (please specify)		0
	Answered	9
	Skipped	57

The bar chart displays the responses for this question. The data showed the following responses for the statement: 2021 - 66.67%, 2022 - 22.22%, 2026 - 11.11%, 2023,2024, 2025 and later than 2026 - 0%.

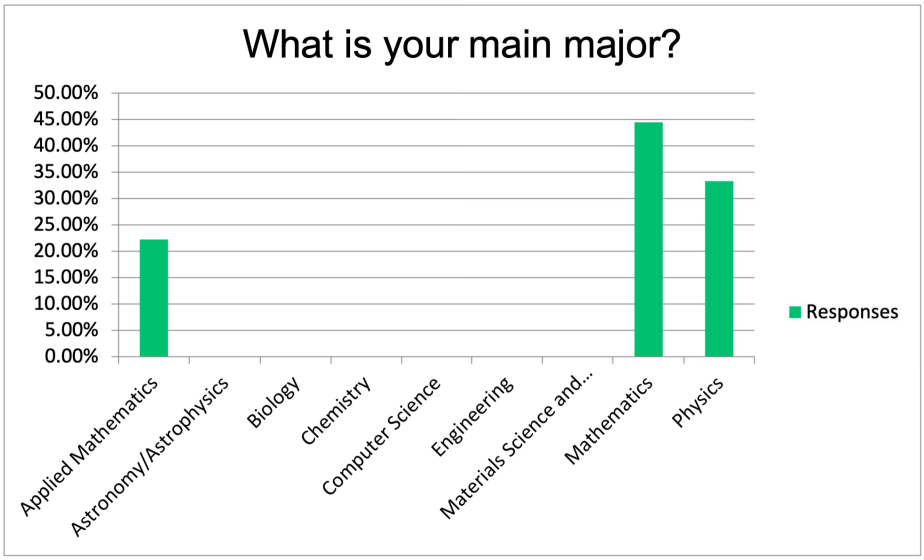

Figure 41: Main Major Enrolled

Answer Choices	Responses	
Applied Mathematics	22.22%	2
Astronomy/Astrophysics	0.00%	0
Chemistry	0.00%	0
Materials Science and Engineering	0.00%	0
Biology	0.00%	0
Computer Science	0.00%	0
Engineering	0.00%	0
Mathematics	44.44%	4
Physics	33.33%	3
Other (please specify)		1
	Answered	9
	Skipped	57

The bar chart above describes the responses for this question. The data re-

vealed the following responses for the statement: Applied mathematics - 22.22%, mathematics - 44.44%, Physics - 33.33%, Biology, Chemistry, CS, Engineering, Material Science and Engineering - 0%.

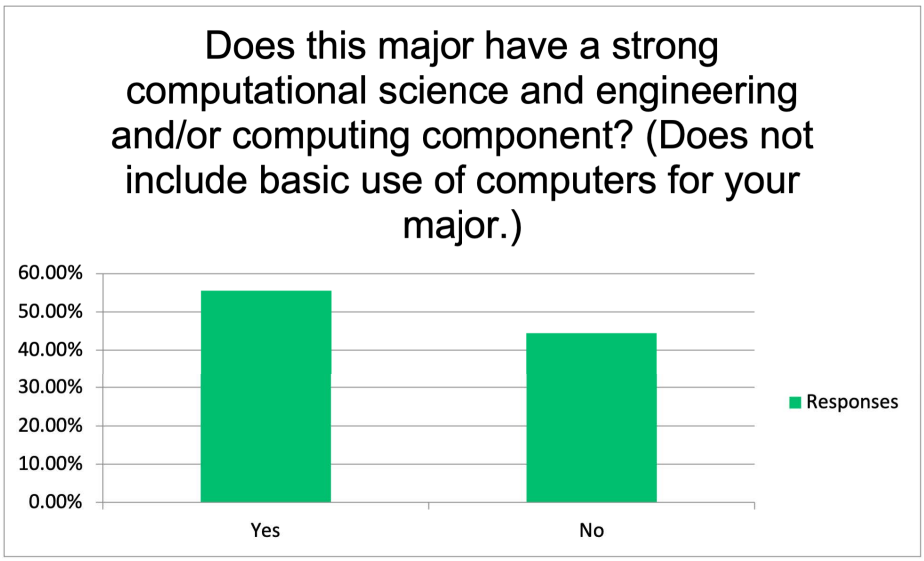

Figure 42: Responses on having a strong CSE component in enrolled major

Answer Choices	Responses	
Yes	55.56%	5
No	44.44%	4
	Answered	9
	Skipped	57

The bar chart gives the responses for this question. The data revealed the following responses for the statement: Yes - 55.56%, No - 44.44%.

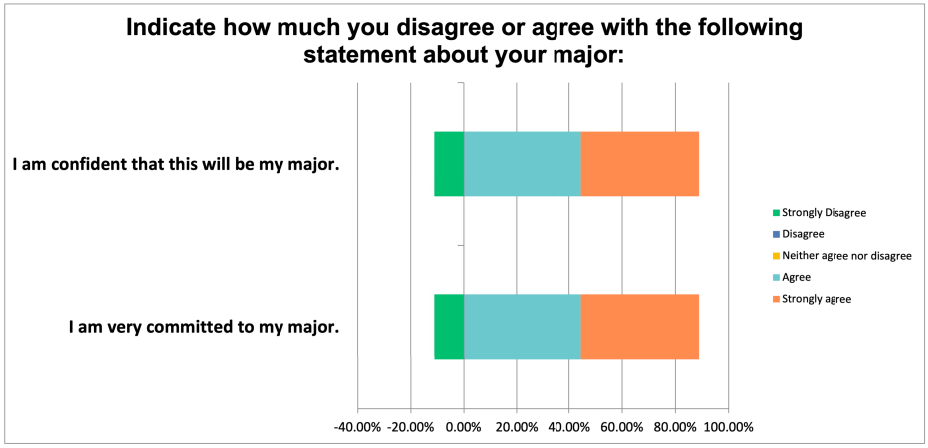

Figure 43: Responses on commitment to major

Answer Choices	Strongly Disagree		Disagree		Neither agree nor disagree		Agree		Strongly agree		Total
I am very committed to my major	-11.11%	1	0.00%	0	0.00%	0	44.44%	4	44.44%	4	9
I am confident that this will be my major	-11.11%	1	0.00%	0	0.00%	0	44.44%	4	44.44%	4	9
										Answered	9
										Skipped	57

The bar chart demonstrates the responses for this question. The data revealed the following responses for this statement. I am very committed to my major: Strongly Disagree - 11.11%, Agree - 44.44%, Strongly agree - 44.44%. I am confident that this will be my major: Strongly Disagree - 11.11%, Agree - 44.44%, Strongly agree - 44.44%.

4.1.1 Self Efficacy

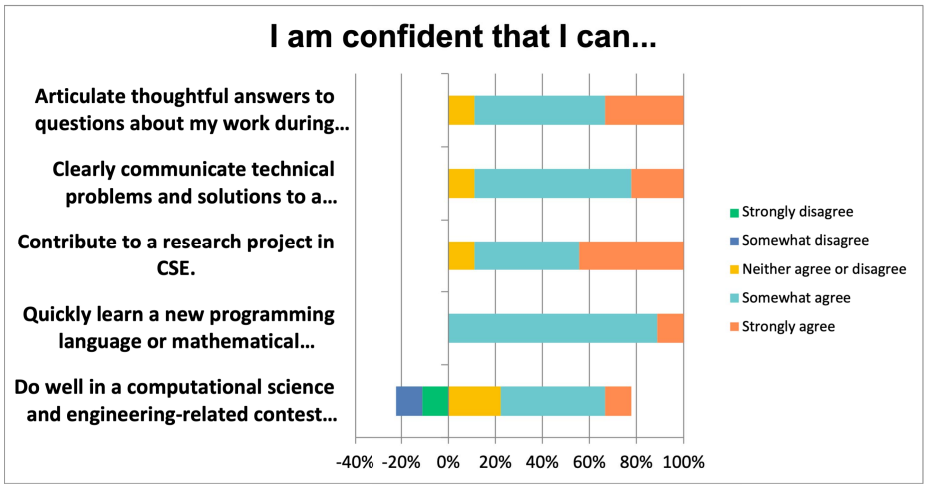

Figure 44: Responses on Self efficacy

Answer Choices	Strongly Disagree		Somewhat Disagree		Neither agree nor disagree		Somewhat Agree		Strongly agree		Total
Do well in a computational science and engineering-related contest (e.g., programming contest, math contest, robotics contest, hackathon)	-11.11%	1	-11.11%	1	22.22%	2	44.44%	4	11.11%	1	9
Quickly learn a new programming language or mathematical method on my own	0.00%	0	0.00%	0	0.00%	0	88.89%	8	11.11%	1	9
Contribute to a research project in CSE.	0.00%	0	0.00%	0	11.11%	1	44.44%	4	44.44%	4	9
Clearly communicate technical problems and solutions to a range of audiences	0.00%	0	0.00%	0	11.11%	1	66.67%	6	22.22%	2	9
Articulate thoughtful answers to questions about my work during a presentation.	0.00%	0	0.00%	0	11.11%	1	55.56%	5	33.33%	3	9
										Answered	9
										Skipped	57

The bar chart reveals a pictorial representation of the responses for this question. The data revealed the following responses for the statement: Strongly disagree - 1, Somewhat disagree - 1, Neither agree nor disagree - 5, Somewhat agree - 13, Strongly agree - 10.

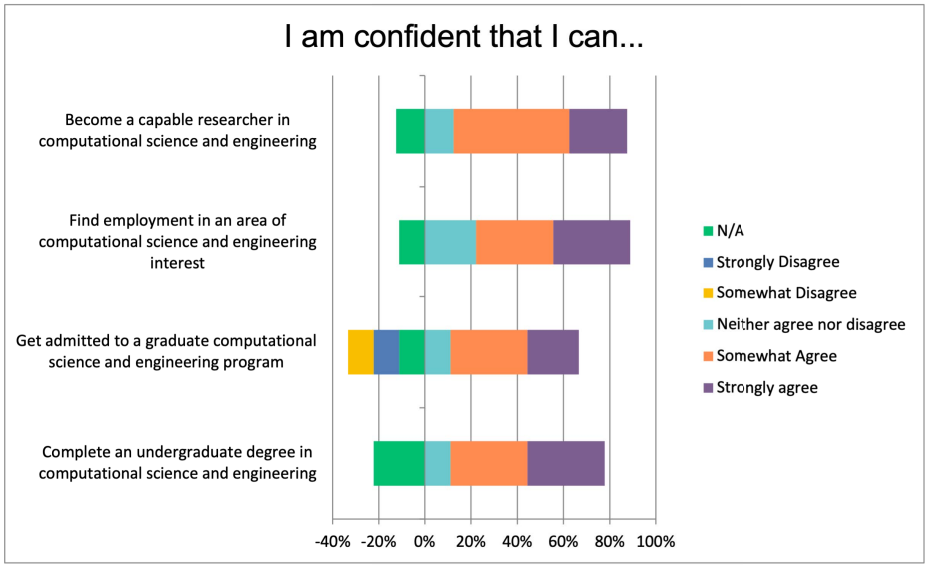

Figure 45: Responses on self efficacy

Answer Choices	N/A		Strongly Disagree		Somewhat Disagree		Neither agree nor disagree		Somewhat Agree		Strongly agree		Total
Complete an undergraduate degree in computational science and engineering	-22.22%	2	0.00%	0	0.00%	0	11.11%	1	33.33%	3	33.33%	3	9
Get admitted to a graduate computational science and engineering program	-11.11%	1	-11.11%	1	-11.11%	1	11.11%	1	33.33%	3	22.22%	2	9
Find employment in an area of computational science and engineering interest	-11.11%	1	0.00%	0	0.00%	0	22.22%	2	33.33%	3	33.33%	3	9
Become a capable researcher in computational science and engineering	-12.50%	1	0.00%	0	0.00%	0	12.50%	1	50.00%	4	25.00%	2	8
												Answered	9
												Skipped	57

The bar chart reveals a pictorial representation of the responses for this question. The data revealed the following responses for the statement: Strongly disagree - 1, Somewhat disagree - 1, Neither agree nor disagree - 5, Somewhat agree - 13, Strongly agree - 10, N/A - 5.

4.1.2 Highest Degree Intentions/Aspirations

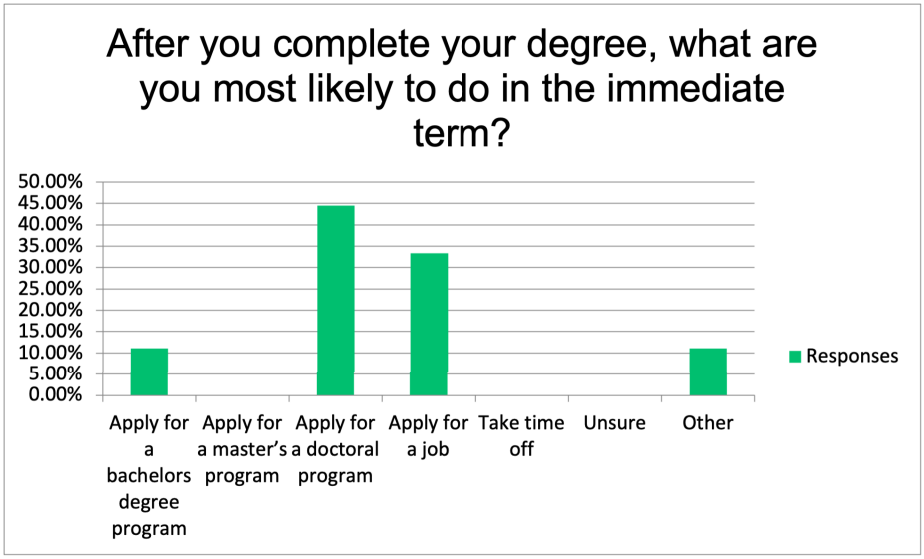

Figure 46: Responses on students likely to do in the immediate term

Answer Choices	Responses	
Apply for a bachelors degree program	11.11%	1
Apply for a masters program	0.00%	0
Apply for a doctoral program	44.44%	4
Apply for a job	33.33%	3
Take time off	0.00%	0
Unsure	0.00%	0
Other	11.11%	1
	Answered	9
	Skipped	57

The bar chart above illustrates responses regarding this question. The data showed the following responses for the statement: Apply a bachelors degree program -

11.11%, Apply doctoral program - 44.44%, Apply for a job - 33.33%, Other - 11.11%.

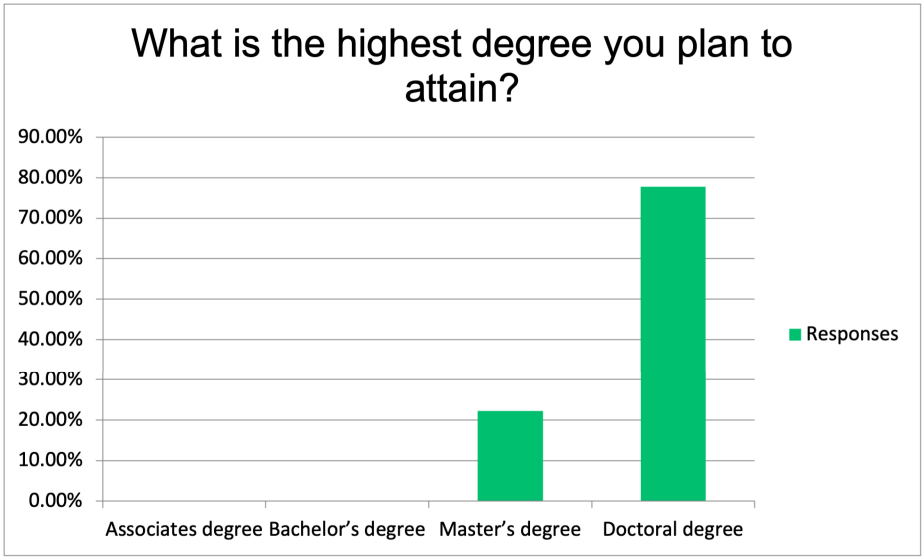

Figure 47: Highest degree planning to attain

Answer Choices	Responses	
Associates degree	0.00%	0
Bachelors degree	0.00%	0
Masters degree	22.22%	2
Doctoral degree	77.78%	7
	Answered	9
	Skipped	57

The bar chart above illustrates responses regarding this question. The data showed the following responses for the statement: Associates Degree, Bachelors Degree - 0%, Masters Degree - 22.22%, Doctoral Degree - 77.78%.

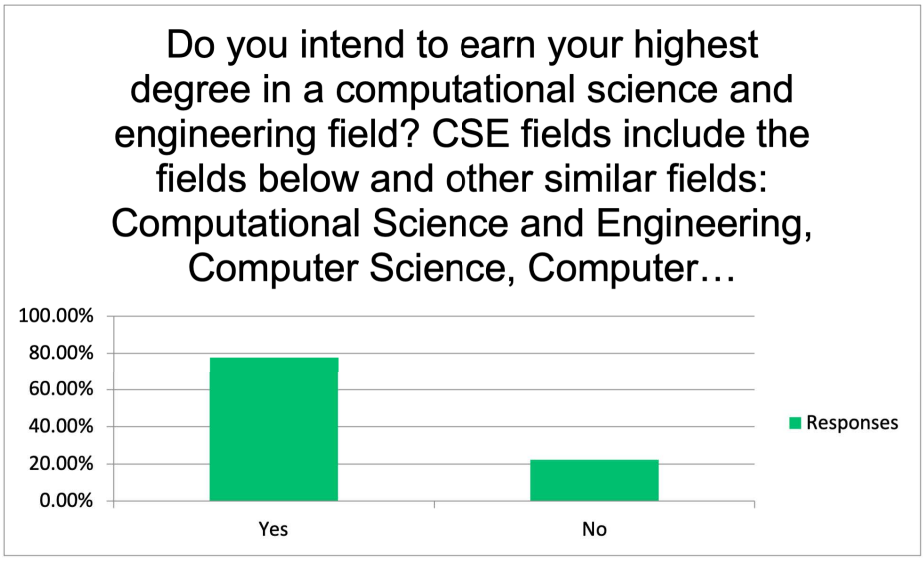

Figure 48: Intend to earn highest degree in CSE field

Answer Choices	Responses	
Yes	77.78%	7
No	22.22%	2
	Answered	9
	Skipped	57

The bar chart displays the responses for this question. The data showed the following responses for the statement: Yes - 77.78%, No - 22.22%.

4.1.3 Career Values

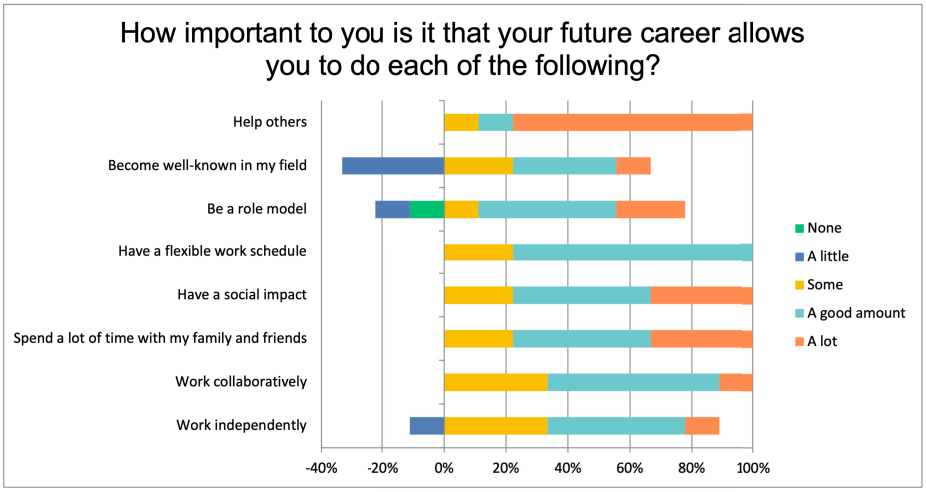

Figure 49: Responses on different future career

Answer Choices	None		A little		Some		A good amount		A lot		Total
Work independently	0.00%	0	-11.11%	1	33.33%	3	44.44%	4	11.11%	1	9
Work collaboratively	0.00%	0	0.00%	0	33.33%	3	55.56%	5	11.11%	1	9
Spend a lot of time with my family and friends	0.00%	0	0.00%	0	22.22%	2	44.44%	4	33.33%	3	9
Have a social impact	0.00%	0	0.00%	0	22.22%	2	44.44%	4	33.33%	3	9
Have a flexible work schedule	0.00%	0	0.00%	0	22.22%	2	77.78%	7	0.00%	0	9
Be a role model	-11.11%	1	-11.11%	1	11.11%	1	44.44%	4	22.22%	2	9
Become well-known in my field	0.00%	0	-33.33%	3	22.22%	2	33.33%	3	11.11%	1	9
Help others	0.00%	0	0.00%	0	11.11%	1	11.11%	1	77.78%	7	9
										Answered	9
										Skipped	57

The bar chart above gives a pictorial representation of the responses for this question. The data revealed the following responses for the statement: Work independently: None - 0.00%, A little - 11.11%, Some - 33.33%, A good amount - 44.44%, A lot - 11.11%. Work collaboratively: None - 0.00%, A little - 0.00%, Some - 33.33%, A good amount - 55.56%, A lot - 27.27%. Spend a lot of time with my family and friends: None - 0.00%, A little - 0.00%, Some - 22.22%, A good amount - 55.56%, A lot - 33.33%. Have a social impact: None - 0.00%, A little - 0.00%, Some - 22.22%, A good amount - 44.44%, A lot - 33.33%. Have a flexible work schedule: None - 0.00%,

A little - 0.00%, Some - 22.22%, A good amount - 77.78%, A lot - 0.00%. Be a role model: None - 11.11%, A little - 11.11%, Some - 0.00%, A good amount - 44.44%, A lot - 22.22%. Become well-known in my field: None - 0.00%, A little - 33.33%, Some - 22.22%, A good amount - 33.33%, A lot - 11.11%. Help others: None - 0.00%, A little - 0.00%, Some - 11.11%, A good amount - 11.11%, A lot - 77.78%.

4.1.4 Belonging and Identification

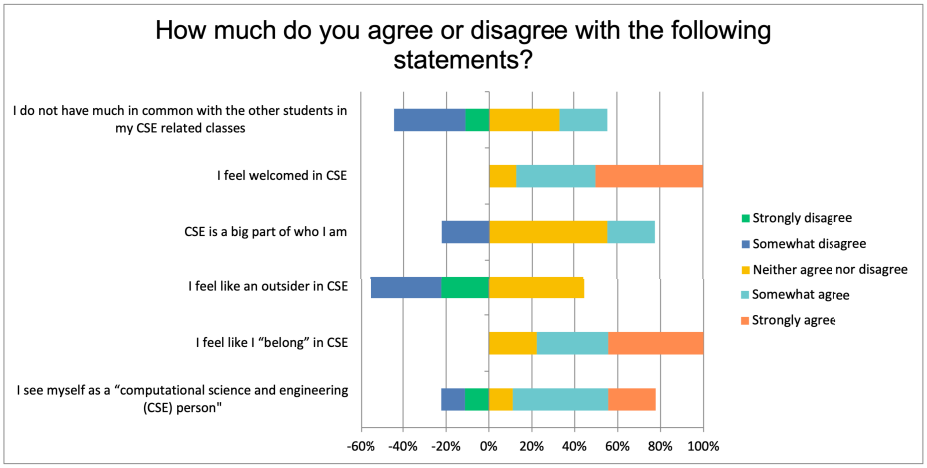

Figure 50: Responses on agree or disagree statement in belonging and identification

Answer Choices	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Total
I see myself as a computational science and engineering (CSE) person"	-11.11%	1	-11.11%	1	11.11%	1	44.44%	4	22.22%	2	9
I feel like I belong in CSE	0.00%	0	0.00%	0	22.22%	2	33.33%	3	44.44%	4	9
I feel like an outsider in CSE	-22.22%	2	-33.33%	3	44.44%	4	0.00%	0	0.00%	0	9
CSE is a big part of who I am	0.00%	0	-22.22%	2	55.56%	5	22.22%	2	0.00%	0	9
I feel welcomed in CSE	0.00%	0	0.00%	0	12.50%	1	37.50%	3	50.00%	4	8
I do not have much in common with the other students in my CSE related classes	-11.11%	1	-33.33%	3	33.33%	3	22.22%	2	0.00%	0	9
										Answered	9
										Skipped	57

The bar chart displays the responses for this question. The data showed the following responses for the statement. Strongly disagree - 22, Somewhat disagree - 41, Neither agree nor disagree - 42, Somewhat agree - 89, Strongly agree - 51.

4.1.5 Academic and Research Skills

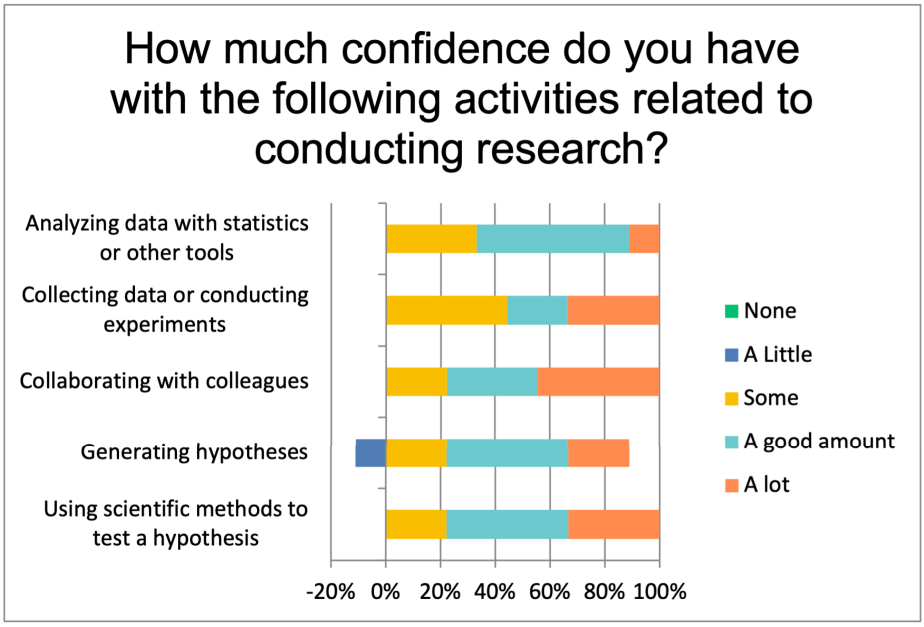

Figure 51: Responses on confidence with the activities related to conducting research

Answer Choices	None		A little		Some		A good amount		A lot		Total
Using scientific methods to test a hypothesis	0.00%	0	0.00%	0	22.22%	2	44.44%	4	33.33%	3	9
Generating hypotheses	0.00%	0	-11.11%	1	22.22%	2	44.44%	4	22.22%	2	9
Collaborating with colleagues	0.00%	0	0.00%	0	22.22%	2	33.33%	3	44.44%	4	9
Collecting data or conducting experiments	0.00%	0	0.00%	0	44.44%	4	22.22%	2	33.33%	3	9
Analyzing data with statistics or other tools	0.00%	0	0.00%	0	33.33%	3	55.56%	5	11.11%	1	9
										Answered	9
										Skipped	57

The bar chart above describes responses for this question. The data revealed the following responses for the statement: Using scientific methods to test a hypothesis - 9, Generating hypotheses - 9 Collaborating with colleagues - 9, Collecting data or conducting experiments - 9, Analyzing data with statistics or other tools - 9.

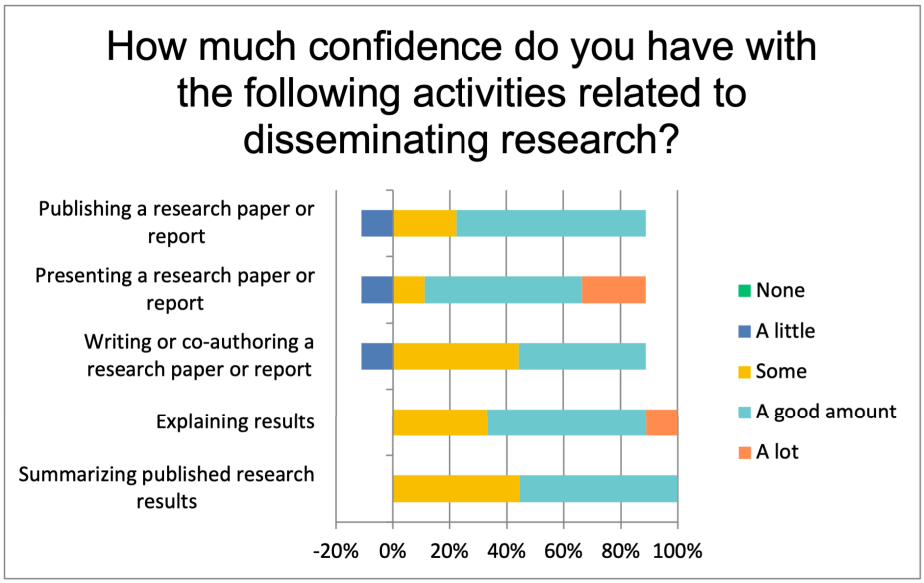

Figure 52: Responses on confidence with the activities related to disseminating research

Answer Choices	None		A little		Some		A good amount		A lot		Total
Summarizing published research results	0.00%	0	0.00%	0	44.44%	4	55.56%	5	0.00%	0	9
Explaining results	0.00%	0	0.00%	0	33.33%	3	55.56%	5	11.11%	1	9
Writing or co-authoring a research paper or report	0.00%	0	-11.11%	1	44.44%	4	44.44%	4	0.00%	0	9
Presenting a research paper or report	0.00%	0	-11.11%	1	11.11%	1	55.56%	5	22.22%	2	9
Publishing a research paper or report	0.00%	0	-11.11%	1	22.22%	2	66.67%	6	0.00%	0	9
										Answered	9
										Skipped	57

The bar chart above represents the responses for this question. The data revealed the following responses for the statement: Summarizing published research results - 9, Explaining results - 9, Writing or co-authoring a research paper or report - 9, Presenting a research paper or report - 9, Publishing a research paper or report - 9.

4.1.6 Mentor Support

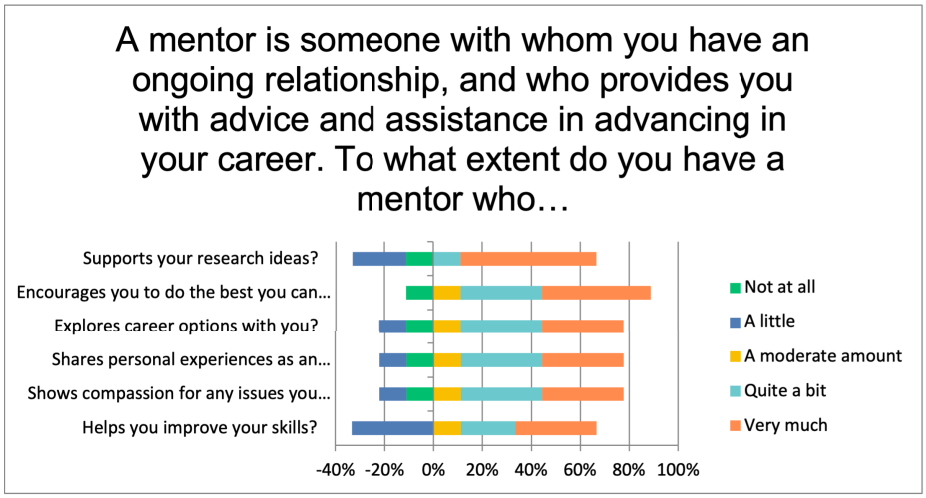

Figure 53: Student ongoing relationship with mentor

Answer Choices	None		A little		Some		A good amount		A lot		Total
Helps you improve your skills?	0.00%	0	-33.33%	3	11.11%	1	22.22%	2	33.33%	3	9
Shows compassion for any issues you discussed with them?	-11.11%	1	-11.11%	1	11.11%	1	33.33%	3	33.33%	3	9
Shares personal experiences as an alternative perspective to your problems?	-11.11%	1	-11.11%	1	11.11%	1	33.33%	3	33.33%	3	9
Explores career options with you?	-11.11%	1	-11.11%	1	11.11%	1	33.33%	3	33.33%	3	9
Encourages you to do the best you can in your coursework?	-11.11%	1	0.00%	0	11.11%	1	33.33%	3	44.44%	4	9
Supports your research ideas?	-11.11%	1	-22.22%	2	0.00%	0	11.11%	1	55.56%	5	9
										Answered	9
										Skipped	57

The bar chart above gives a pictorial representation of the responses regrading this question. The data showed the following responses for the statements: Helps you improve your skills? Not at all - 0, A little- 12.50%, A moderate amount - 0, Quite a bit - 37.50%, Very much - 50.00%. Shows compassion for any issues you discussed with them? Not at all - 0, A little - 25.00%, A moderate amount - 12.50%, Quite a bit - 25.00%, Very much - 37.50%. Shares personal experiences as an alternative perspective to your problems? Not at all - 12.50%, A little - 0, A moderate amount - 25.00%, Quite a bit - 25.00%, Very much - 37.50%. Explores career options with you? Not at all - 0, A little - 12.50%, A moderate amount - 0, Quite a bit - 37.50%,

Very much - 25.00%. Encourages you to do the best you can in your coursework? Not at all - 12.50%, A little - 0, A moderate amount - 12.50%, Quite a bit - 37.50%, Very much - 37.50%. Supports your research ideas? Not at all - 0, A little - 12.50%, A moderate amount - 12.50%, Quite a bit - 37.50%, Very much - 37.50%.

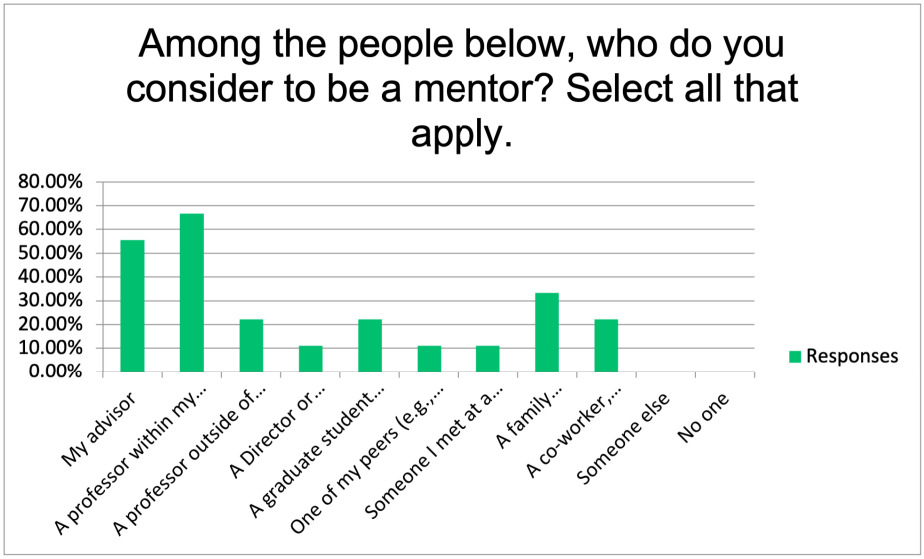

Figure 54: Responses on who do they consider to be a mentor

Answer Choices	Responses	
My advisor	55.56%	5
A professor within my department (not my advisor)	66.67%	6
A professor outside of my department	22.22%	2
A Director or administrative faculty	11.11%	1
A graduate student (e.g., graduate teaching/research assistant, graduate student mentor)	22.22%	2
One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor)	11.11%	1
Someone I met at a conference or mentoring program sponsored (or other professional activity)	11.11%	1
A family member/partner, friend, pastor, or someone else with whom I have a personal relationship	33.33%	3
A co-worker, supervisor, or someone else with whom I have a professional relationship	22.22%	2
Someone else	0.00%	0
No one	0.00%	0
	Answered	9
	Skipped	57

The bar chart above illustrates responses regarding this question. The data showed the following responses for this statement: My advisor - 50.00%, A professor

within my department (not my advisor) - 62.50%, A professor outside of my department - 25.00%, A Director or administrative faculty - 25.00%, A graduate student (e.g., graduate teaching/research assistant, graduate student mentor) - 25.00%, One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor) - 25.00%, Someone I met at a conference or mentoring program sponsored (or other professional activity) - 37.50%, A family member/partner, friend, pastor, or someone else with whom I have a personal relationship - 0%, A co-worker, supervisor, or someone else with whom I have a professional relationship - 37.50%, Someone else - 0%, No one - 0%.

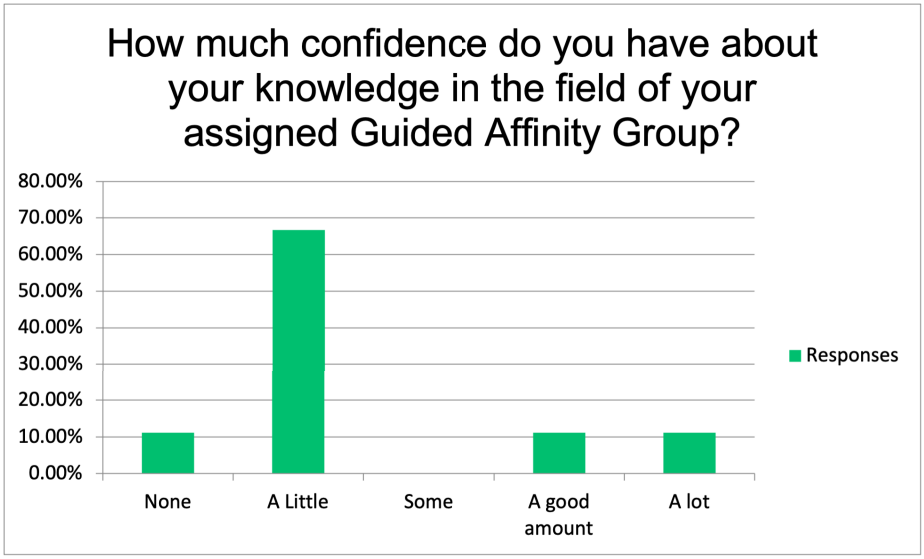

Figure 55: Confidence about their knowledge in the field

Answer Choices	Responses	
None	11.11%	1
A little	66.67%	6
Some	0.00%	0
A good amount	11.11%	1
A lot	11.11%	1
	Answered	9
	Skipped	57

The bar chart demonstrates the responses for this question. The data revealed the following responses for the statement: None - 11.11%, A Little - 66.67%, Some - 0, A good amount - 11.11%, A lot - 11.11%.

4.2 Academic Characteristics- Graduates

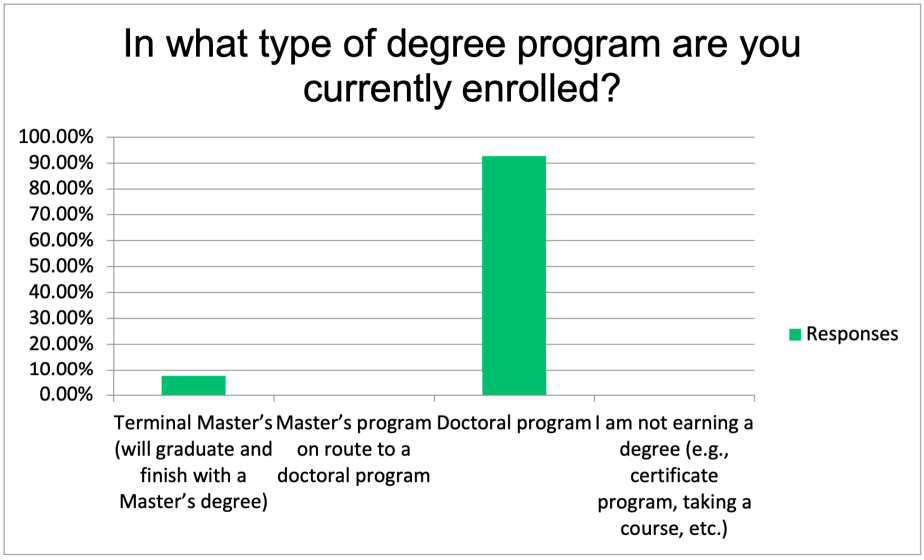

Figure 56: Currently enrolled degree program

Answer Choices	Responses	
Terminal Masters (will graduate and finish with a Masters degree)	7.32%	3
Masters program on route to a doctoral program	0.00%	0
Doctoral program	92.68%	38
I am not earning a degree (e.g., certificate program, taking a course, etc.)	0.00%	0
	Answered	41
	Skipped	25

The bar chart displays the responses for this question. The data showed the following responses for the statement: Terminal masters (will graduate and finish with a masters degree) - 7.32%, Doctoral Program - 92.68%.

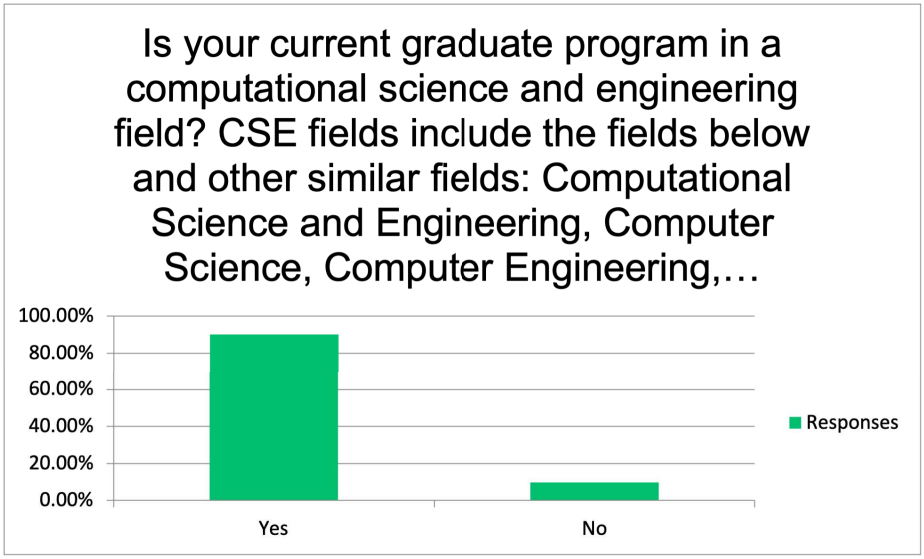

Figure 57: Responses on current graduate program in CSE field

Answer Choices	Responses	
Yes	90.24%	37
No	9.76%	4
	Answered	41
	Skipped	25

The bar chart above describes responses for this question. The data revealed the following responses for the statement: Yes - 90.24%, No - 9.76%.

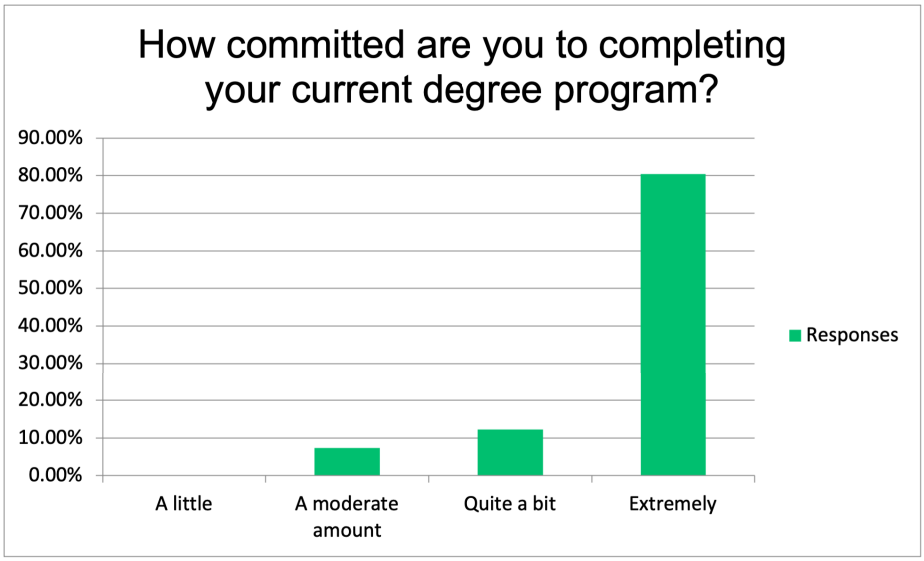

Figure 58: Commitment on completing degree program

Answer Choices	Responses	
A little	0.00%	0
A moderate amount	7.32%	3
Quite a bit	12.20%	5
Extremely	80.49%	33
	Answered	41
	Skipped	25

The bar chart gives a view of the responses for this question. The data revealed the following responses for the statement: A moderate amount - 7.32%, Quite a bit - 12.20%, Extremely - 80.49%.

4.2.1 Self Efficacy

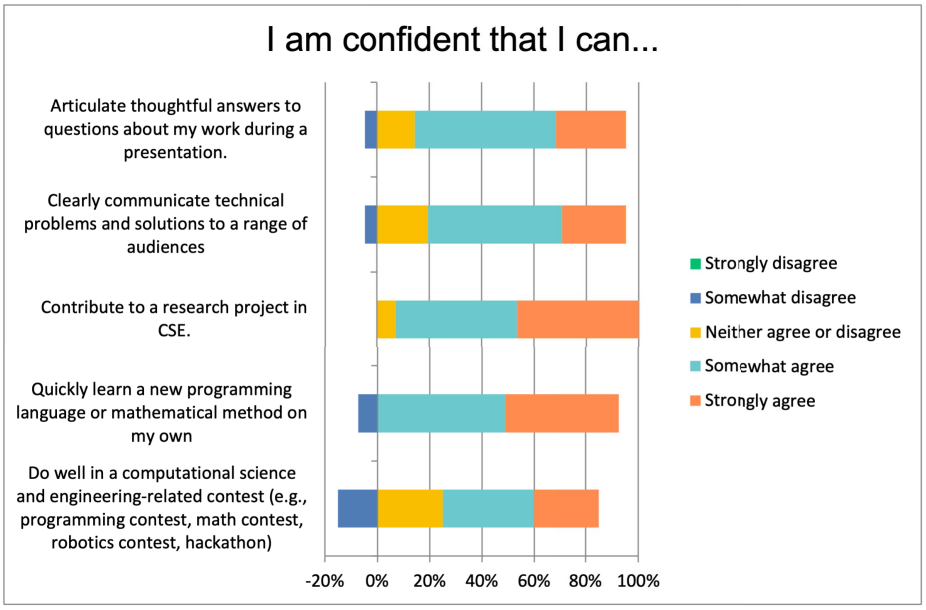

Figure 59: Responses on self efficacy

Answer Choices	Strongly Disagree		Somewhat Disagree		Neither agree nor disagree		Somewhat Agree		Strongly agree		Total
Do well in a computational science and engineering-related contest (e.g., programming contest, math contest, robotics contest, hackathon)	0.00%	0	15.00%	6	25.00%	10	35.00%	14	25.00%	10	40
Quickly learn a new programming language or mathematical method on my own	0.00%	0	7.32%	3	0.00%	0	48.78%	20	43.90%	18	41
Contribute to a research project in CSE.	0.00%	0	0.00%	0	7.32%	3	46.34%	19	46.34%	19	41
Clearly communicate technical problems and solutions to a range of audiences	0.00%	0	4.88%	2	19.51%	8	51.22%	21	24.39%	10	41
Articulate thoughtful answers to questions about my work during a presentation.	0.00%	0	4.88%	2	14.63%	6	53.66%	22	26.83%	11	41
										Answered	41
										Skipped	25

The bar chart above depicts the responses for this question. The data revealed the following responses for the statement. Do well in a computational science and engineering-related contest (e.g., programming contest, math contest, robotics contest, hackathon): Strongly disagree - 0.00%, Somewhat disagree - 15.00%, Neither agree nor disagree - 25.00%, Somewhat agree - 35.00%, Strongly agree - 25.00%. Quickly learn a new programming language or mathematical method on my own: Strongly disagree - 0.00%, Somewhat disagree - 7.32%, Neither agree nor disagree - 0.00%, Somewhat agree - 48.78%, Strongly agree - 43.90%. Contribute to a research project in CSE: Strongly disagree - 0, Somewhat disagree - 0.00%, Neither agree nor

disagree - 7.32%, Somewhat agree - 46.34%, Strongly agree - 46.34%. Clearly communicate technical problems and solutions to a range of audiences: Strongly disagree-0, Somewhat disagree - 4.88%, Neither agree nor disagree - 19.51%, Somewhat agree - 51.22%, Strongly agree - 24.39%. Articulate thoughtful answers to questions about my work during a presentation: Strongly disagree - 0.00%, Somewhat disagree - 4.88%, Neither agree nor disagree - 14.63%, Somewhat agree - 53.66%, Strongly agree - 26.83%.

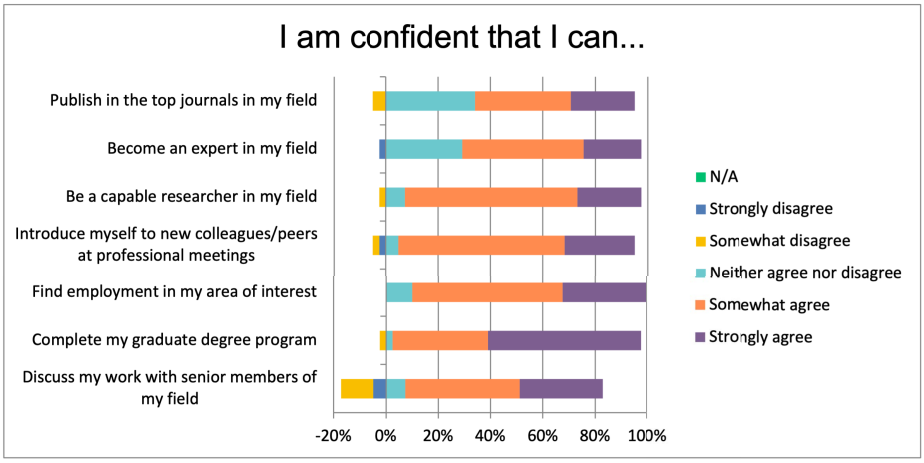

Figure 60: Responses on self efficacy

Answer Choices	N/A		Strongly Disagree		Somewhat Disagree		Neither agree nor disagree		Somewhat Agree		Strongly agree		Total
Discuss my work with senior members of my field	0.00%	0	-4.88%	2	-12.20%	5	7.32%	3	43.90%	18	31.71%	13	41
Complete my graduate degree program	0.00%	0	0.00%	0	-2.44%	1	2.44%	1	36.59%	15	58.54%	24	41
Find employment in my area of interest	0.00%	0	0.00%	0	0.00%	0	10.00%	4	57.50%	23	32.50%	13	40
Introduce myself to new colleagues/peers at professional meetings	0.00%	0	-2.44%	1	-2.44%	1	4.88%	2	63.41%	26	26.83%	11	41
Be a capable researcher in my field	0.00%	0	0.00%	0	-2.44%	1	7.32%	3	65.85%	27	24.39%	10	41
Become an expert in my field	0.00%	0	-2.44%	1	0.00%	0	29.27%	12	46.34%	19	21.95%	9	41
Publish in the top journals in my field	0.00%	0	0.00%	0	-4.88%	2	34.15%	14	36.59%	15	24.39%	10	41
												Answered	41
												Skipped	25

The bar chart gives a view of the responses for this question. The data revealed the following responses for the statement: Discuss my work with senior members of my field - 13, Complete my graduate degree program - 24, Find employment in my area of interest - 13, Introduce myself to new colleagues/peers at professional meetings -

11, Be a capable researcher in my field - 10, Become an expert in my field - 9, Publish in the top journals in my field - 10.

4.2.2 Highest Degree Intentions/Aspirations

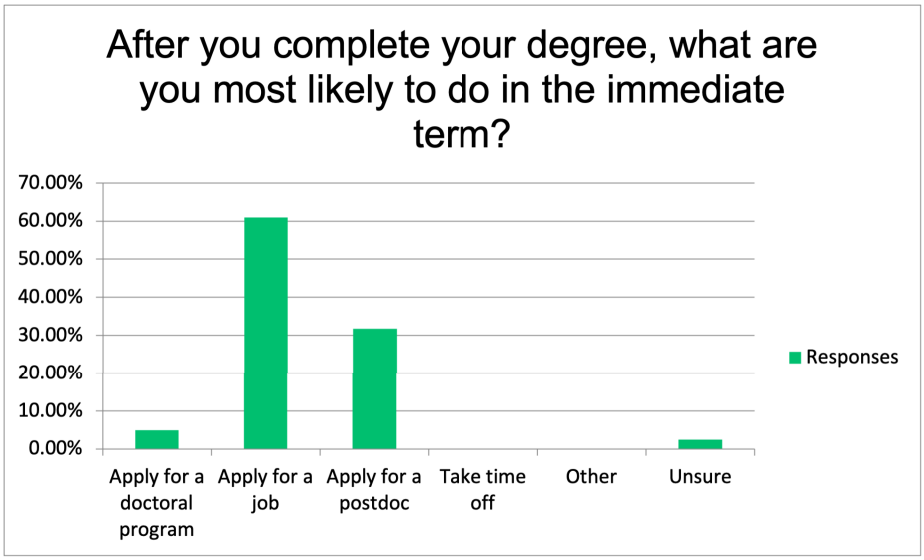

Figure 61: Students most likely to do in immediate term

Answer Choices	Responses	
Apply for a doctoral program	4.88%	2
Apply for a job	60.98%	25
Apply for a post doc	31.71%	13
Take time off	0.00%	0
Other	0.00%	0
Unsure	2.44%	1
	Answered	41
	Skipped	25

The bar chart demonstrates the responses for this question. The data revealed the following responses for the statement: Apply for a doctoral program - 4.88%, Apply for a job - 60.98%, Apply for a postdoc - 31.71%, Unsure - 2.44%.

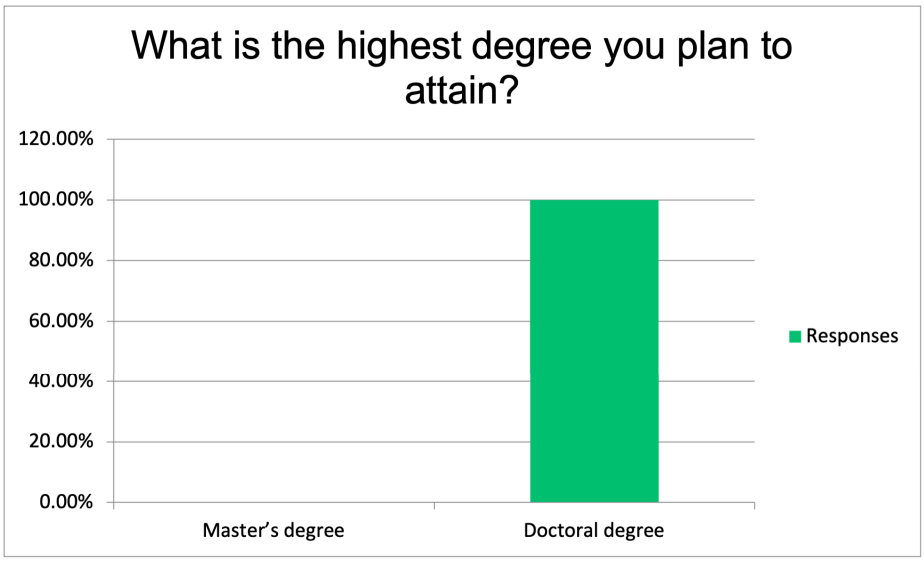

Figure 62: Responses on highest degree plan to attain

Answer Choices	Responses	
Masters degree	0.00%	0
Doctoral degree	100.00%	41
	Answered	41
	Skipped	25

The bar chart reveals a pictorial representation of the responses for this question. The data revealed the following responses for the statement: Masters degree - 0%, Doctoral degree - 100%.

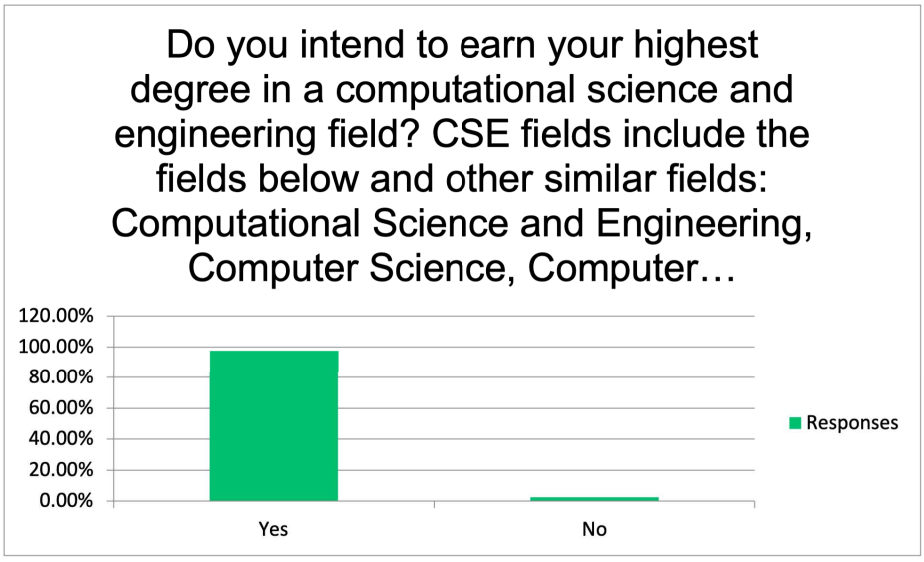

Figure 63: Intention on earning highest degree

Answer Choices	Responses	
Yes	97.50%	39
No	2.50%	1
	Answered	40
	Skipped	26

The bar chart above gives a pictorial representation of the responses for this question. The data resulted in the following responses for the statement: Yes - 97.50%, No - 2.50%.

4.2.3 Career Values

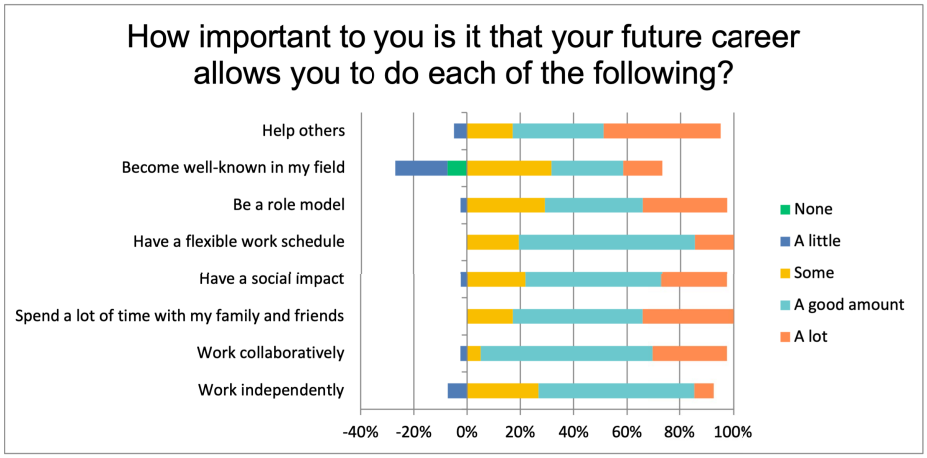

Figure 64: future career

Answer Choices	None		A little		Some		A good amount		A lot		Total
Work independently	0.00%	0	-7.32%	3	26.83%	11	58.54%	24	7.32%	3	41
Work collaboratively	0.00%	0	-2.50%	1	5.00%	2	65.00%	26	27.50%	11	40
Spend a lot of time with my family and friends	0.00%	0	0.00%	0	17.07%	7	48.78%	20	34.15%	14	41
Have a social impact	0.00%	0	-2.44%	1	21.95%	9	51.22%	21	24.39%	10	41
Have a flexible work schedule	0.00%	0	0.00%	0	19.51%	8	65.85%	27	14.63%	6	41
Be a role model	0.00%	0	-2.44%	1	29.27%	12	36.59%	15	31.71%	13	41
Become well-known in my field	-7.32%	3	-19.51%	8	31.71%	13	26.83%	11	14.63%	6	41
Help others	0.00%	0	-4.88%	2	17.07%	7	34.15%	14	43.90%	18	41
										Answered	41
										Skipped	25

The bar chart above gives a pictorial representation of the responses for this question. The data revealed the following responses for the statement: Work independently: None - 0.00%, A little- 7.32%, Some - 26.83%, A good amount - 58.54%, A lot - 7.32%. Work collaboratively: None - 0.00%, A little - 2.50%, Some - 5.00%, A good amount - 65.00%, A lot - 27.50%. Spend a lot of time with my family and friends: None - 0.00%, A little - 0.00%, Some - 17.07%, A good amount - 48.778%, A lot - 34.15%. Have a social impact: None - 0.00%, A little - 2.44%, Some - 21.95%, A good amount - 51.22%, A lot - 24.39%. Have a flexible work schedule: None - 0.00%,

A little - 0.00%, Some - 19.51%, A good amount - 65.85%, A lot - 14.63%. Be a role model: None - 0.00%, A little - 2.44%, Some - 29.27%, A good amount - 36.59%, A lot - 31.71%. Become well-known in my field: None - 7.32%, A little - 19.51%, Some - 31.71%, A good amount - 26.83%, A lot - 14.63%. Help others: None - 0.00%, A little - 4.88%, Some - 17.07%, A good amount - 34.15%, A lot - 43.90%.

4.2.4 Belonging and Identification

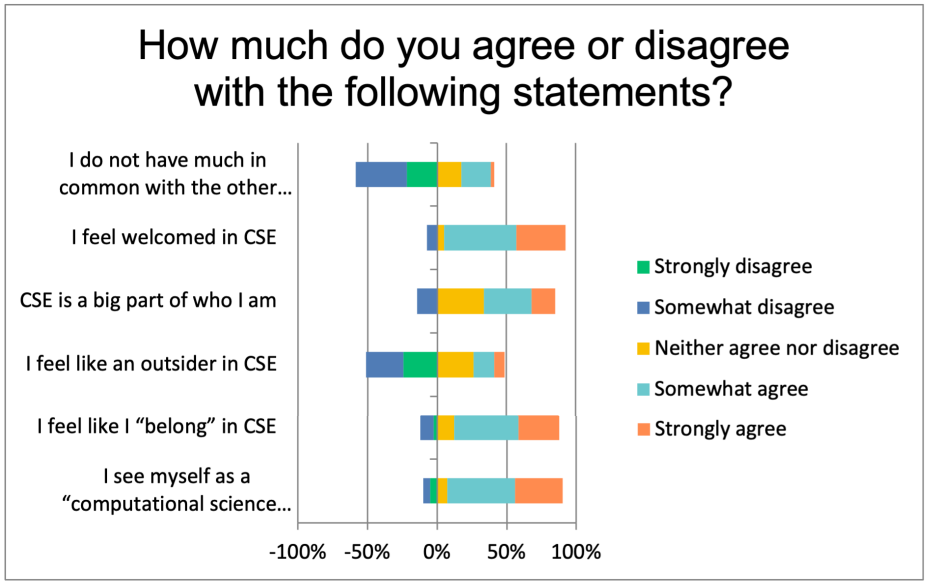

Figure 65: Statement on belonging and identification

Answer Choices	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Total
I see myself as a computational science and engineering (CSE) person"	-4.88%	2	-4.88%	2	7.32%	3	48.78%	20	34.15%	14	41
I feel like I belong in CSE	-2.44%	1	-9.76%	4	12.20%	5	46.34%	19	29.27%	12	41
I feel like an outsider in CSE	-24.39%	10	-26.83%	11	26.83%	11	14.63%	6	7.32%	3	41
CSE is a big part of who I am	0.00%	0	-14.63%	6	34.15%	14	34.15%	14	17.07%	7	41
I feel welcomed in CSE	0.00%	0	-7.50%	3	5.00%	2	52.50%	21	35.00%	14	40
I do not have much in common with the other students in my CSE related classes	-21.95%	9	-36.59%	15	17.07%	7	21.95%	9	2.44%	1	41
										Answered	41
										Skipped	25

The bar chart displays the responses for this question. The data showed the following responses for the statement. Strongly disagree - 22, Somewhat disagree - 41, Neither agree nor disagree - 42, Somewhat agree - 89, Strongly agree - 51.

4.2.5 Mentor Support

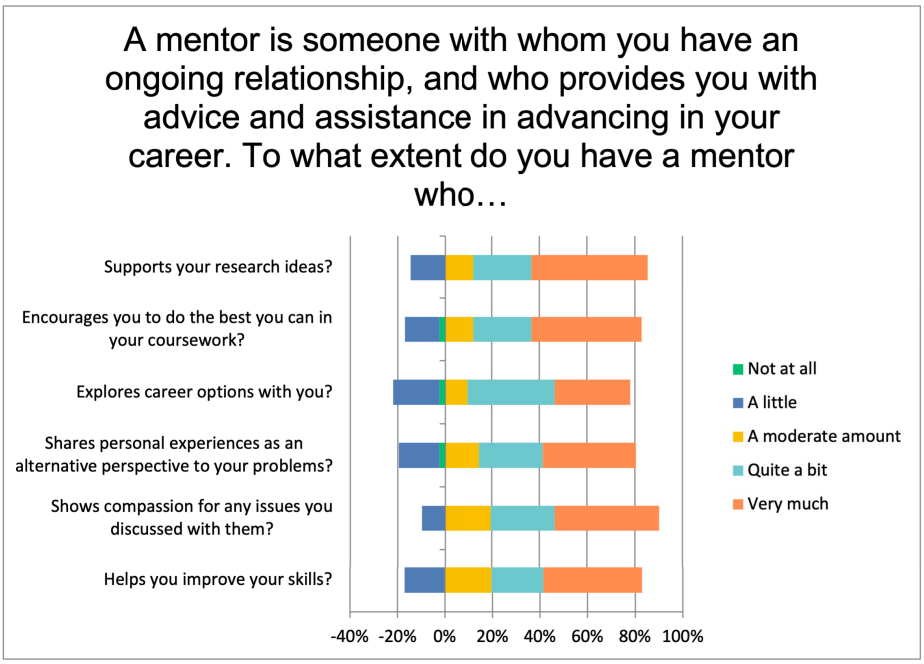

Figure 66: Responses on mentor whom they want to have an ongoing relationship

Answer Choices	None		A little		Some		A good amount		A lot		Total
Helps you improve your skills?	0.00%	0	-17.07%	7	19.51%	8	21.95%	9	41.46%	17	41
Shows compassion for any issues you discussed with them?	0.00%	0	-9.76%	4	19.51%	8	26.83%	11	43.90%	18	41
Shares personal experiences as an alternative perspective to your problems?	-2.44%	1	-17.07%	7	14.63%	6	26.83%	11	39.02%	16	41
Explores career options with you?	-2.44%	1	-19.51%	8	9.76%	4	36.59%	15	31.71%	13	41
Encourages you to do the best you can in your coursework?	-2.44%	1	-14.63%	6	12.20%	5	24.39%	10	46.34%	19	41
Supports your research ideas?	0.00%	0	-14.63%	6	12.20%	5	24.39%	10	48.78%	20	41
										Answered	41
										Skipped	25

The bar chart above gives a pictorial representation of the responses regrading this question. The data showed the following responses for the statements: Helps you improve your skills? Not at all - 0, A little - 17.07%, A moderate amount - 19.51%, Quite a bit - 21.95%, Very much - 41.46%. Shows compassion for any issues you discussed with them? Not at all - 0, A little - 9.76%, A moderate amount - 19.51%, Quite a bit - 26.83%, Very much- 43.90%. Shares personal experiences as an alternative perspective to your problems? Not at all - 2.44%, A little - 17.07%,

A moderate amount - 14.63%, Quite a bit - 26.83%, Very much - 39.02%. Explores career options with you? Not at all - 2.44%, A little - 19.51%, A moderate amount - 9.76%, Quite a bit - 36.59%, Very much - 31.71%. Encourages you to do the best you can in your coursework? Not at all - 2.44%, A little - 14.63%, A moderate amount - 12.20%, Quite a bit - 24.39%, Very much - 46.34%. Supports your research ideas? Not at all - 0, A little - 14.63%, A moderate amount - 12.20%, Quite a bit - 24.39%, Very much - 48.78%.

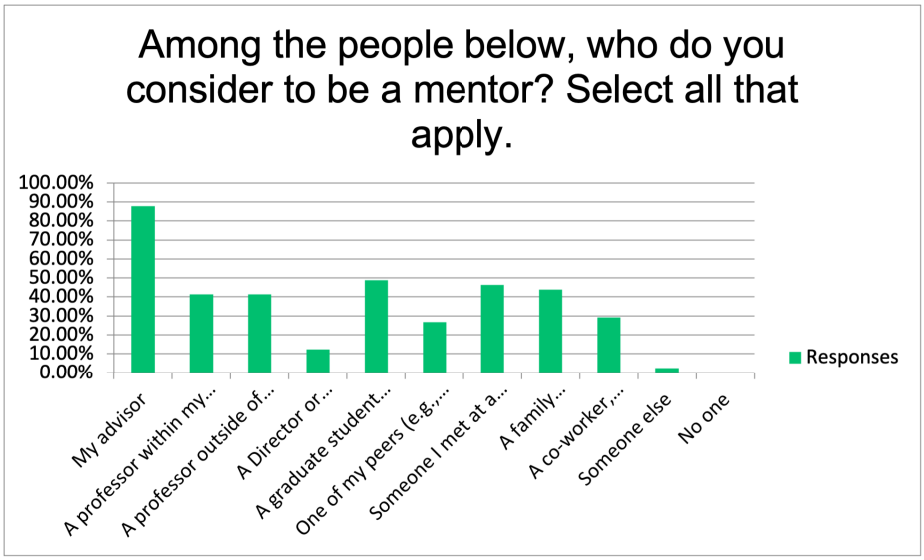

Figure 67: Who do they consider to be a mentor

Answer Choices	Responses	
My advisor	87.80%	36
A professor within my department (not my advisor)	41.46%	17
A professor outside of my department	41.46%	17
A Director or administrative faculty	12.20%	5
A graduate student (e.g., graduate teaching/research assistant, graduate student mentor)	48.78%	20
One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor)	26.83%	11
Someone I met at a conference or mentoring program sponsored (or other professional activity)	46.34%	19
A family member/partner, friend, pastor, or someone else with whom I have a personal relationship	43.90%	18
A co-worker, supervisor, or someone else with whom I have a professional relationship	29.27%	12
Someone else	2.44%	1
No one	0.00%	0
	Answered	41
	Skipped	25

The bar chart above illustrates responses regarding this question. The data showed the following responses for this statement: My advisor - 87.80%, A professor within my department (not my advisor) - 41.46%, A professor outside of my department - 41.46A Director or administrative faculty - 12.20%, A graduate student (e.g., graduate teaching/research assistant, graduate student mentor) - 48.78%, One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor) - 26.83%, Someone I met at a conference or mentoring program sponsored (or other professional activity) - 46.34%, A family member/partner, friend, pastor, or someone else with whom I have a personal relationship - 43.90%, A co - worker, supervisor, or someone else with whom I have a professional relationship - 29.27%, Someone else - 2.44%, No one - 0%.

4.2.6 Academic and Research Skills

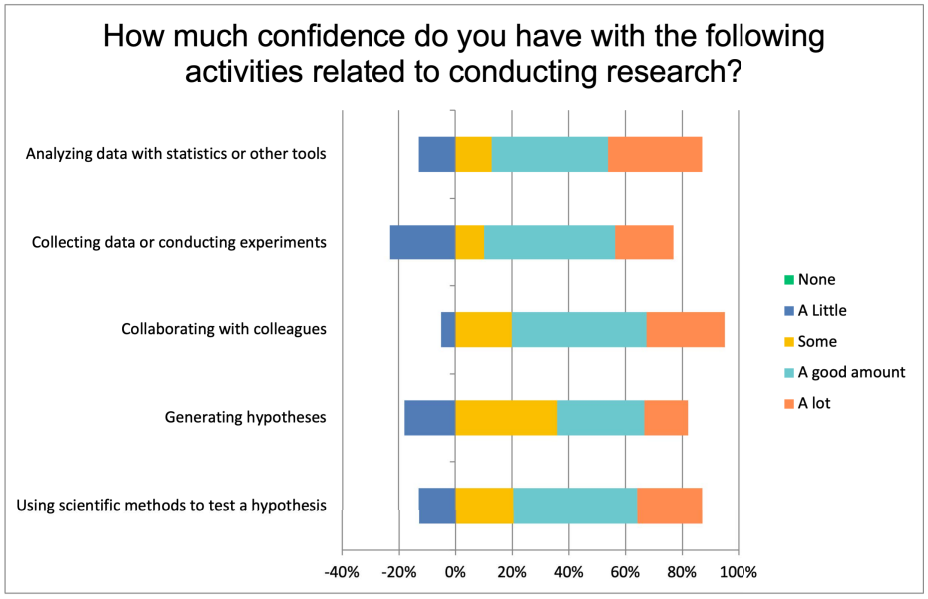

Figure 68: Confidence they have with activities related to conducting research

Answer Choices	None		A little		Some		A good amount		A lot		Total
Using scientific methods to test a hypothesis	0.00%	0	-12.82%	5	20.51%	8	43.59%	17	23.08%	9	39
Generating hypotheses	0.00%	0	-17.95%	7	35.90%	14	30.77%	12	15.38%	6	39
Collaborating with colleagues	0.00%	0	-5.00%	2	20.00%	8	47.50%	19	27.50%	11	40
Collecting data or conducting experiments	0.00%	0	-23.08%	9	10.26%	4	46.15%	18	20.51%	8	39
Analyzing data with statistics or other tools	0.00%	0	-12.82%	5	12.82%	5	41.03%	16	33.33%	13	39
										Answered	40
										Skipped	26

The bar chart above describes responses for this question. The data revealed the following responses for the statement: Using scientific methods to test a hypothesis - 39, Generating hypotheses - 39, Collaborating with colleagues - 40, Collecting data or conducting experiments - 39, Analyzing data with statistics or other tools - 39.

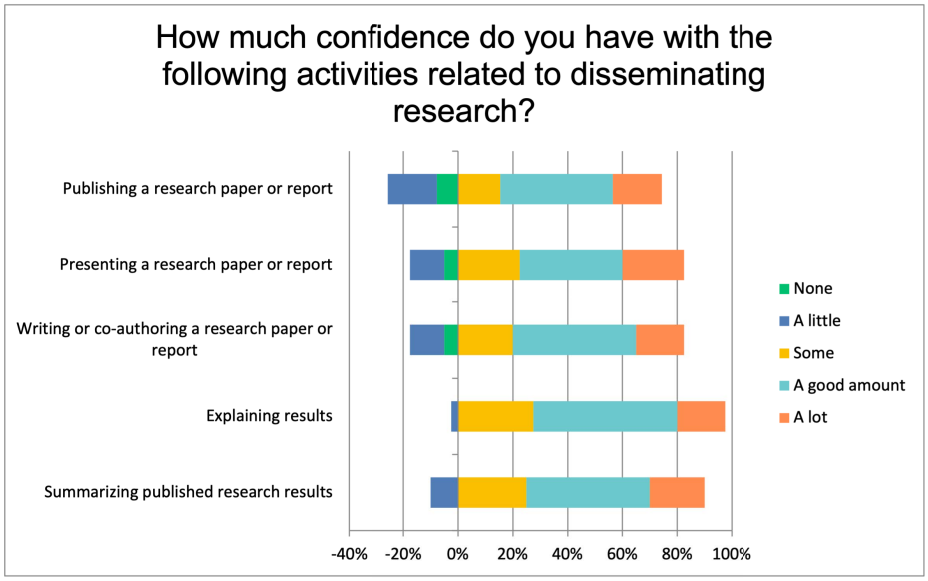

Figure 69: Confidence they have with activities related to disseminating research

Answer Choices	None		A little		Some		A good amount		A lot		Total
Summarizing published research results	0.00%	0	-10.00%	4	25.00%	10	45.00%	18	20.00%	8	40
Explaining results	0.00%	0	-2.50%	1	27.50%	11	52.50%	21	17.50%	7	40
Writing or co-authoring a research paper or report	-5.00%	2	-12.50%	5	20.00%	8	45.00%	18	17.50%	7	40
Presenting a research paper or report	-5.00%	2	-12.50%	5	22.50%	9	37.50%	15	22.50%	9	40
Publishing a research paper or report	-7.69%	3	-17.95%	7	15.38%	6	41.03%	16	17.95%	7	39
										Answered	40
										Skipped	26

The bar chart above represents the responses for this question. The data revealed the following responses for the statement: Summarizing published research results - 40, Explaining results - 40, Writing or co-authoring a research paper or report- 40, Presenting a research paper or report - 40, Publishing a research paper or report - 39.

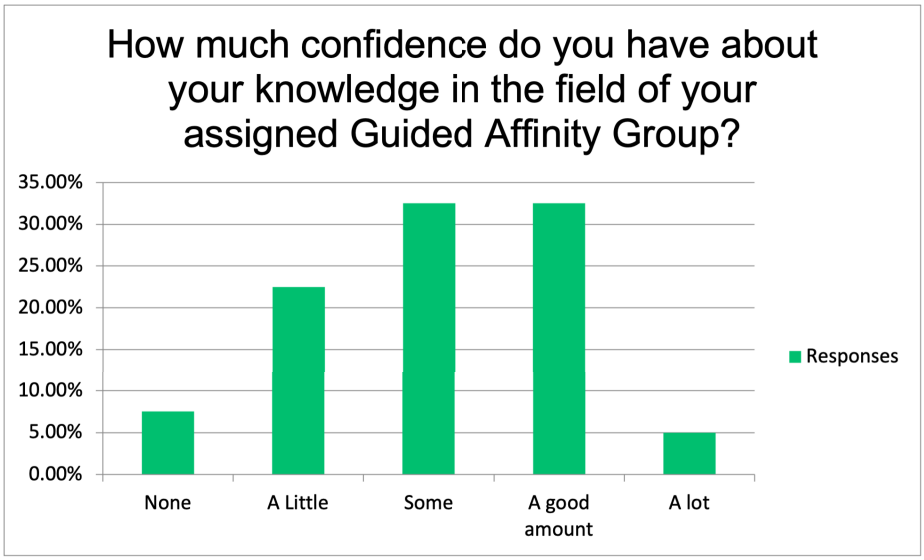

Figure 70: Confidence having about knowledge in the field of assigned guided affinity group

Answer Choices	Responses	
None	7.50%	3
A little	22.50%	9
Some	32.50%	13
A good amount	32.50%	13
A lot	5.00%	2
	Answered	40
	Skipped	26

The bar chart demonstrates the responses for this question. The data revealed the following responses for the statement: None - 7.50%, A Little - 22.50%, Some - 32.50%, A good amount - 32.50%, A lot - 5.00%.

4.3 Program Feedback

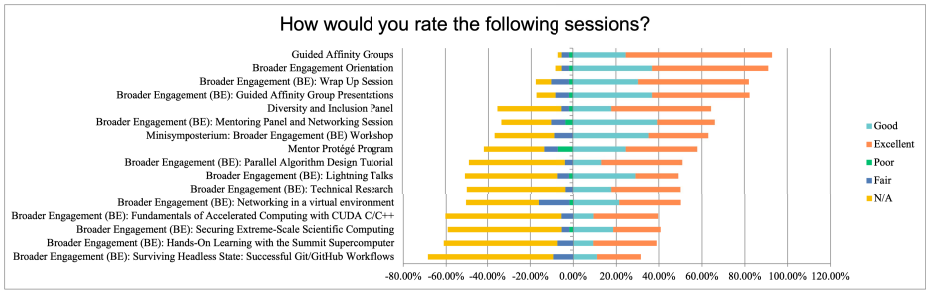

Figure 71: Rate the following Sessions

The bar chart illustrates responses for figure 73. The data revealed the following responses. Broader Engagement Orientation: Poor - 1.75%, Fair - 3.51%, Good - 36.84%, Excellent - 54.39%, N/A - 3.51%. Guided Affinity Groups: Poor - 1.75%, Fair - 3.51%, Good - 24.56%, Excellent - 68.42%, N/A - 1.75%. Mentor Protege Program: Poor - 7.02%, Fair - 7.02%, Good - 24.56%, Excellent - 33.33%, N/A - 28.07%. Broader Engagement (BE): Mentoring Panel and Networking Session: Poor - 3.57%, Fair - 7.14%, Good - 39.29%, Excellent - 26.79%, N/A - 23.21%. Broader Engagement (BE): Securing Extreme - Scale Scientific Computing: Poor - 1.85%, Fair - 3.70%, Good - 18.52%, Excellent - 22.22%, N/A - 53.70%. Broader Engagement (BE): Lightning Talks: Poor - 1.82%, Fair - 5.45%, Good - 29.09%, Excellent - 20.00%, N/A - 43.64%. Diversity and Inclusion Panel: Poor - 1.79%, Fair - 3.57%, Good - 17.86%, Excellent - 46.43%, N/A - 30.36%. Broader Engagement (BE): Parallel Algorithm Design Tutorial: Poor - 0.00%, Fair - 3.77%, Good - 13.21%, Excellent - 37.74%, N/A - 45.28%. Broader Engagement (BE): Technical Research: Poor - 0.00%, Fair - 3.77%, Good - 17.86%, Excellent - 32.14%, N/A - 46.43%. Minisymposterium: Broader Engagement (BE) Workshop: Poor - 0.00%, Fair - 9.26%, Good - 35.19%, Excellent

- 27.78%, N/A - 27.78%. Broader Engagement (BE): Fundamentals of Accelerated Computing with CUDA C/C++: Poor - 0.00%, Fair - 5.66%, Good - 9.43%, Excellent - 30.19%, N/A - 54.72%. Broader Engagement (BE): Surviving Headless State: Successful Git/GitHub Workflows: Poor - 0.00%, Fair - 9.26%, Good - 11.11%, Excellent - 20.37%, N/A - 59.26%. Broader Engagement (BE): Hands-On Learning with the Summit Supercomputer: Poor - 0.00%, Fair - 7.41%, Good - 9.26%, Excellent - 29.63%, N/A - 53.70%. Broader Engagement (BE): Guided Affinity Group Presentations: Poor - 1.75%, Fair - 7.02%, Good - 36.84%, Excellent - 45.61%, N/A - 8.77%. Broader Engagement (BE): Wrap Up Session: Poor - 1.79%, Fair - 8.93%, Good - 30.36%, Excellent - 51.79%, N/A - 7.14%. Broader Engagement (BE): Networking in a virtual environment: Poor - 1.79%, Fair - 14.29%, Good - 21.43%, Excellent - 28.57%, N/A - 33.93%.

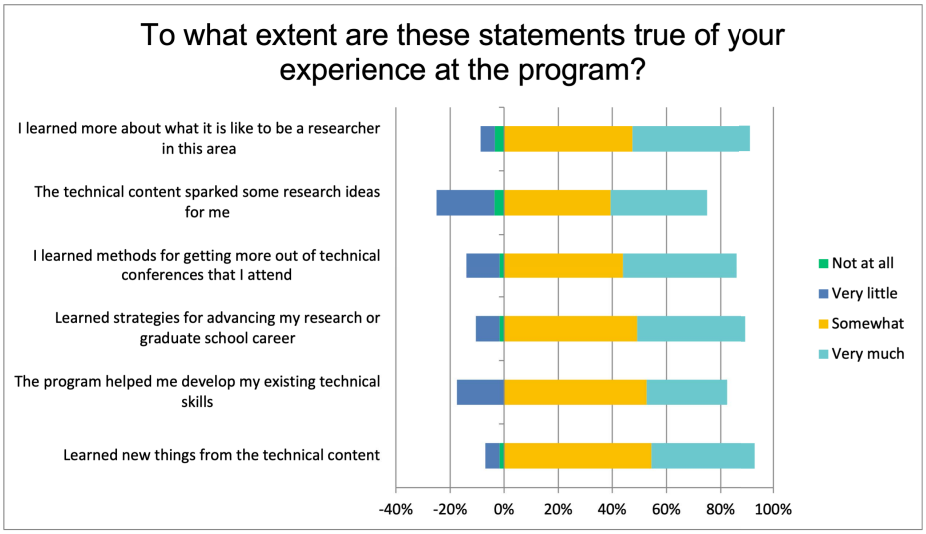

Figure 72: Experience

The bar chart above gives a pictorial representation of the responses for this question. The data revealed the following responses for the statement. Learned new

things from the technical content: Not at all - 1.75%, Very little - 5.26%, Somewhat - 54.39%, Very much - 38.60%. The program helped me develop my existing technical skills: Not at all - 0.00%, Very little - 17.54%, Somewhat - 52.63%, Very much - 29.82%. Learned strategies for advancing my research or graduate school career: Not at all - 1.75%, Very little - 8.77%, Somewhat - 49.12%, Very much - 40.35%. I learned methods for getting more out of technical conferences that I attend: Not at all - 1.75%, Very little - 12.28%, Somewhat - 43.86%, Very much - 42.11%. The technical content sparked some research ideas for me: Not at all - 3.57%, Very little - 21.43%, Somewhat - 39.29%, Very much - 35.71%. I learned more about what it is like to be a researcher in this area: Not at all - 3.51%, Very little - 5.26%, Somewhat - 47.37%, Very much - 43.86%.

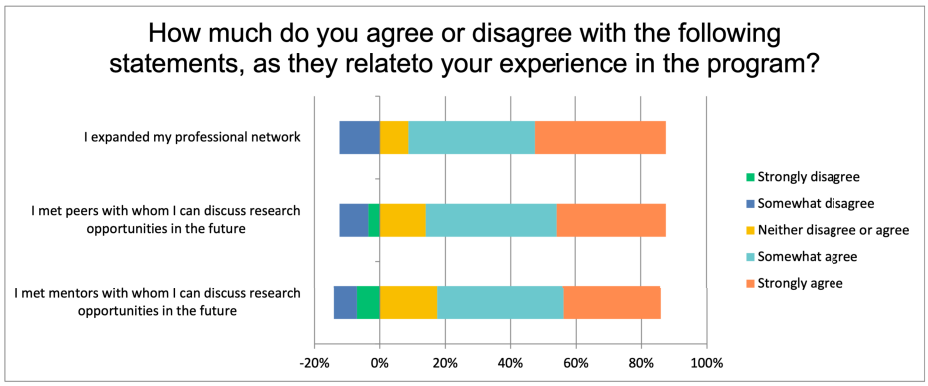

Figure 73: Experience in the program

The bar chart above describes responses for this question. The data revealed the following responses for the statement. I met mentors with whom I can discuss research opportunities in the future: Strongly disagree - 7.02%, Somewhat disagree - 7.02%, Neither disagree nor agree - 17.54%, Somewhat agree - 38.60%, Strongly agree - 29.82%. I met peers with whom I can discuss research opportunities in the

future: Strongly disagree - 3.51%, Somewhat disagree - 8.77%, Neither disagree nor agree - 14.04%, Somewhat agree - 40.35%, Strongly agree - 33.33%. I expanded my professional network: Strongly disagree - 0.00%, Somewhat disagree - 12.28%, Neither disagree nor agree - 8.77%, Somewhat agree - 38.60%, Strongly agree - 40.35%.

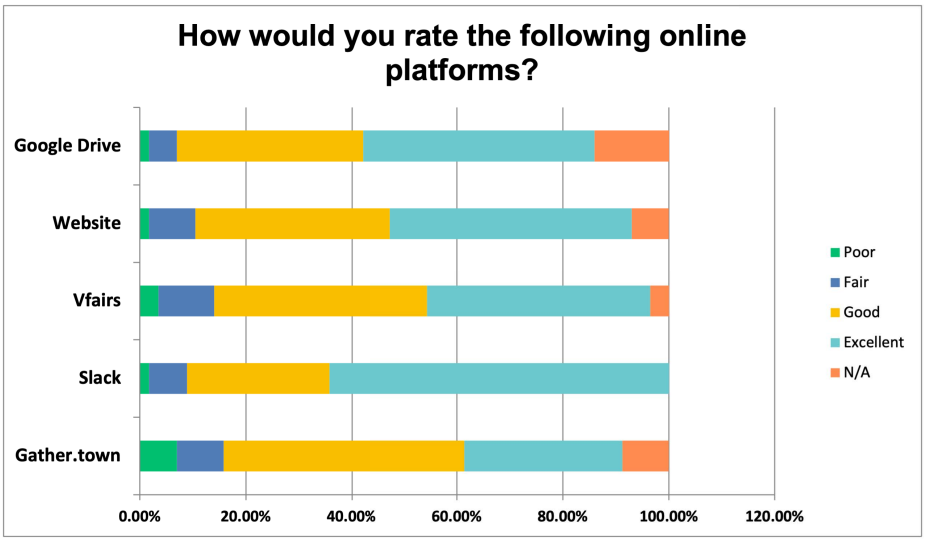

Figure 74: Online platforms rating

The bar chart demonstrates the responses for this question. The data revealed the following responses for the statement. Gather.town: Poor - 7.02%, Fair - 8.77%, Good - 45.61%, Excellent - 29.82%, N/A - 8.77%. Slack: Poor - 1.79%, Fair- 7.14%, Good - 26.79%, Excellent - 64.29%, N/A - 0.00%. Vfairs: Poor - 3.51%, Fair - 10.53%, Good - 40.35%, Excellent - 42.11%, N/A - 3.51%. Website: Poor - 1.75%, Fair - 8.77%, Good - 36.84%, Excellent - 45.61%, N/A - 7.02%. Google Drive: Poor - 1.75%, Fair - 5.26%, Good - 35.09%, Excellent - 43.86%, N/A - 14.04%.

4.4 Demographics

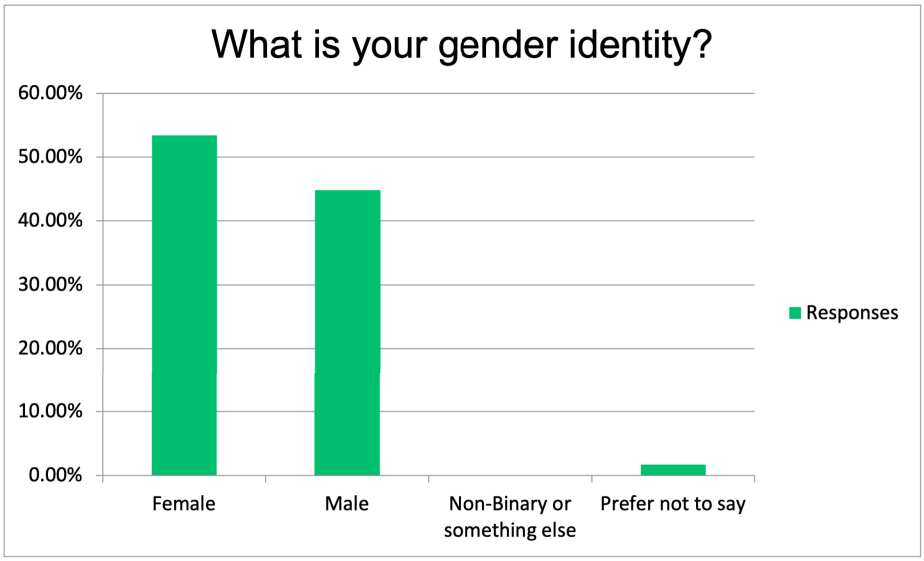

Figure 75: Post Survey Gender Identity

The bar chart above gives a pictorial representation of the responses for this question. The data revealed the following responses for the statement. Female: 53.45%, Male: 44.83%, Non-Binary or Something else: 0.00%, Prefer not to say: 1.72%.

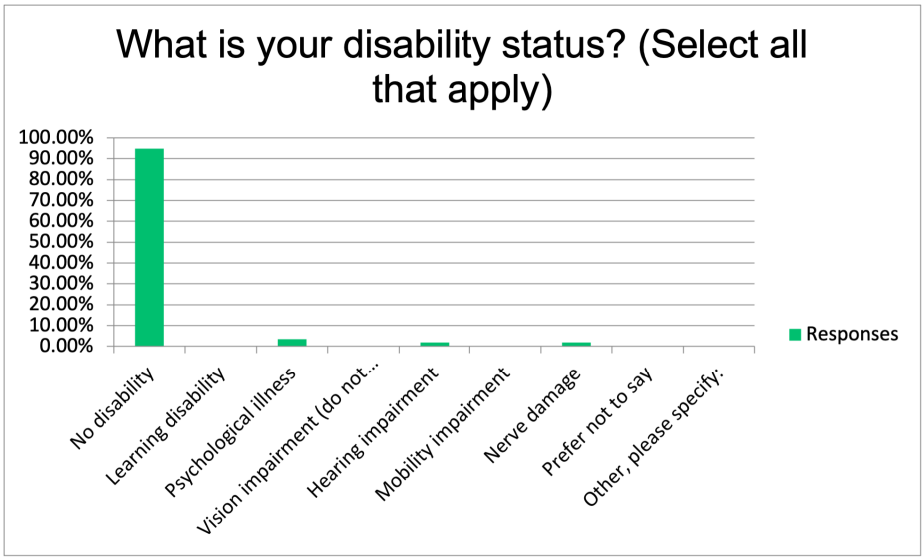

Figure 76: Post Survey disability status

Figure 76 shows around ninety four percent of our respondents identified as no disability and remaining is less than ten percent of our respondents identified as having learning disability, psychological illness, vision impairment, hearing impairment, nerve damage.

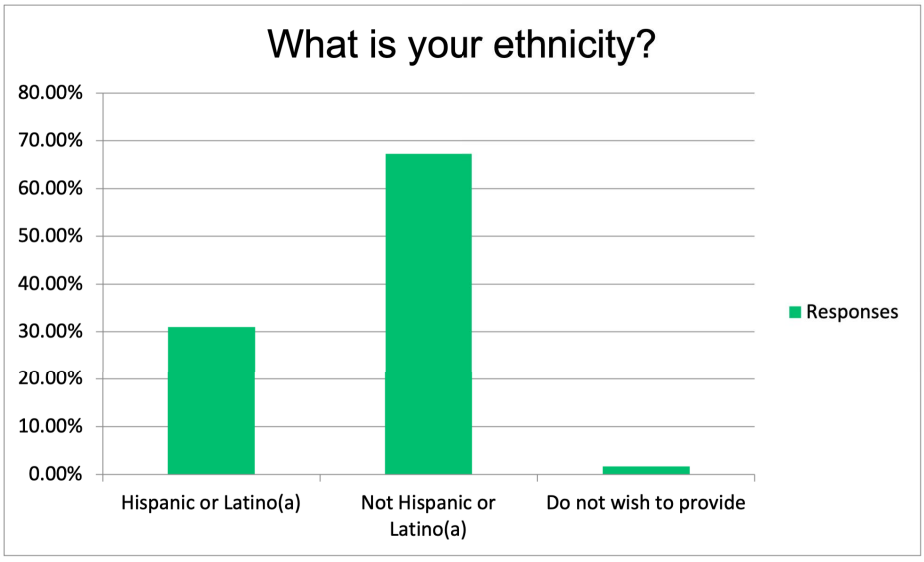

Figure 77: Post Survey ethnicity

Figure 77 shows the percent rate based on the respondents response to a survey question that asked about ethnicity. Not Hispanic or Latino(a) had the largest percentage. While percentage of Hispanic or Latino(a) is more than a half of students of Not Hispanic. And a few responded to do not wish to provide.

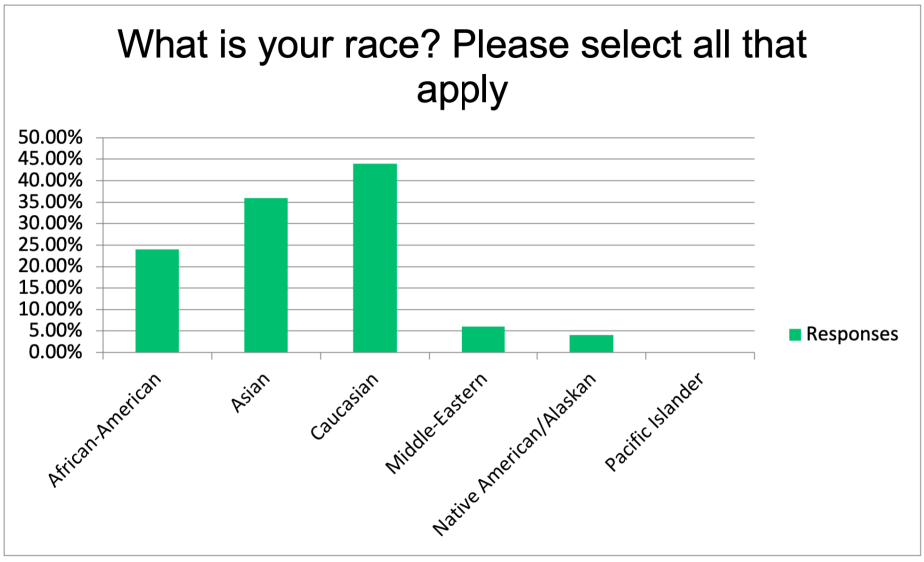

Figure 78: Post Survey race

Figure 78 shows, there are huge variations in the racial group. About 45% said Caucasian, 36% Asian, 24% African American, 6% Middle Eastern, 4% Native American/Alaskan and 0% pacific Islander.

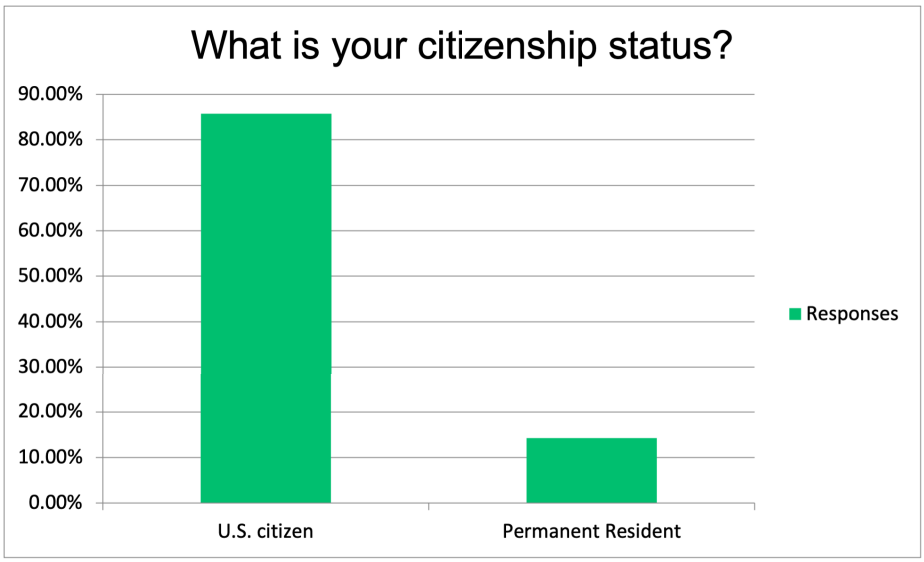

Figure 79: Post Survey Citizenship Status

Figure 79 indicates the participants is either a U.S citizen or a Permanent Resident. Overall, it can be seen that the highest percentage of participants are U.S citizens. However, our findings suggest that less than a quarter of participants were Permanent Residents.

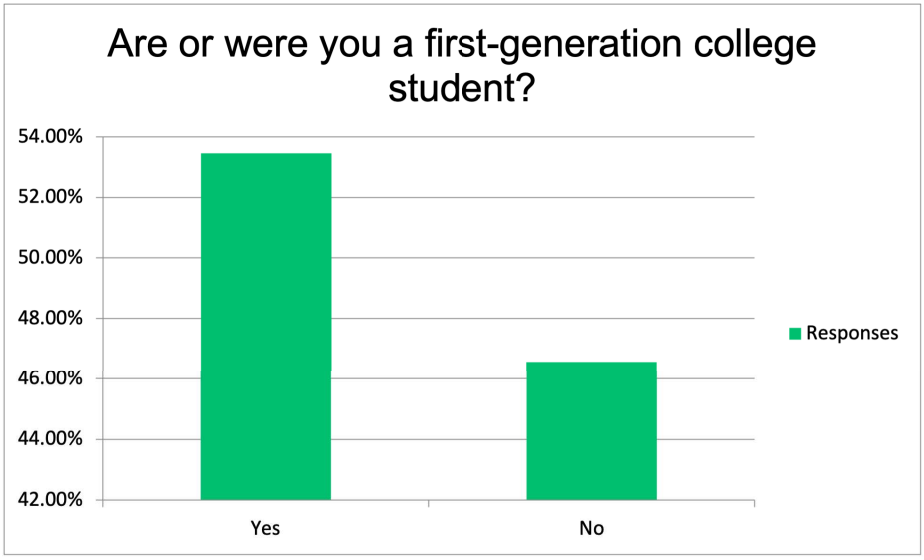

Figure 80: Post Survey First generation college student

Figure 80 shows that out of 66 people surveyed 53.445% were first-generation college students and 46.55% were non-first-generation college students and 10% skipped.

5 Pre and Post Survey Comparison

5.1 Response rates by Demographic Characteristics

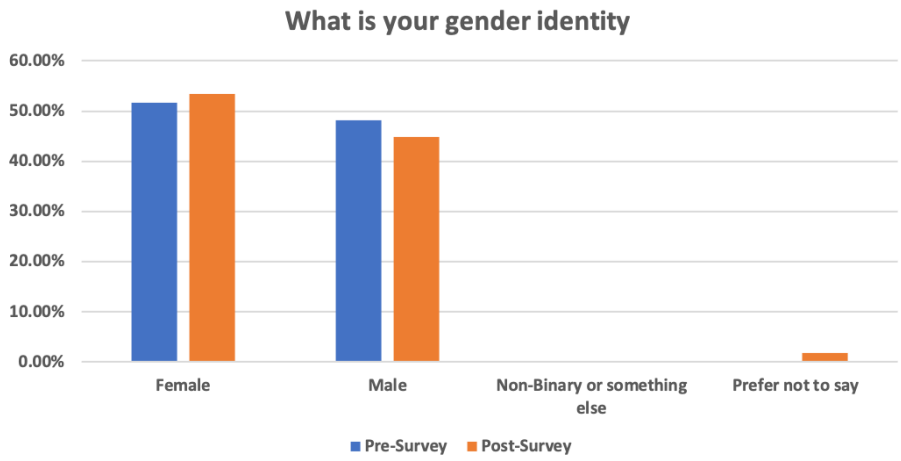

Figure 81: Comparison on gender identity

The bar chart on this figure depicts the gender distribution of respondents. It is shown that in pre-survey 51.76% were female and the other 48.24% are male. In post-Survey the responses are Female: 53.45%, Male: 44.83%, Non-Binary or Something else: 0.00%, Prefer not to say: 1.72%.

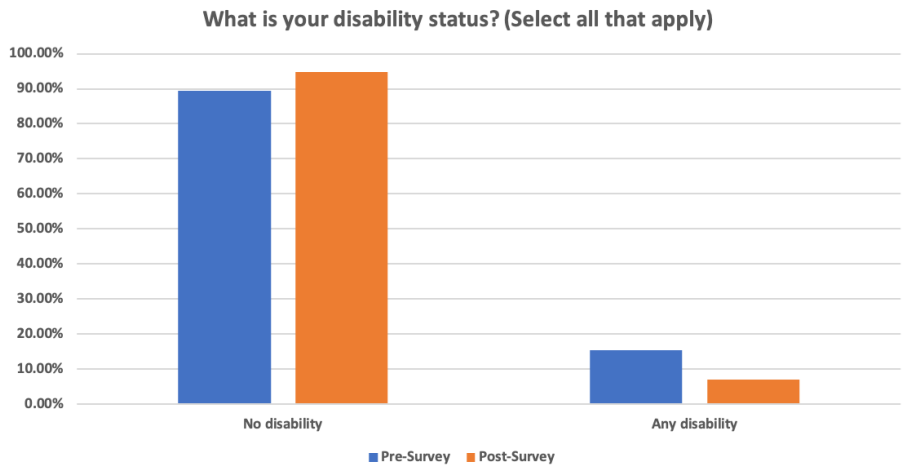

Figure 82: Comparison on disability status

The bar chart on this figure represents the responses on this statement. In pre-survey ninety percent of our respondents identified as no disability and remaining ten percent of our respondents identified as having learning disability, psychological illness, vision impairment, hearing impairment, nerve damage.In post-survey around ninety four percent of our respondents identified as no disability and remaining is less than ten percent of our respondents identified as few disabilities.

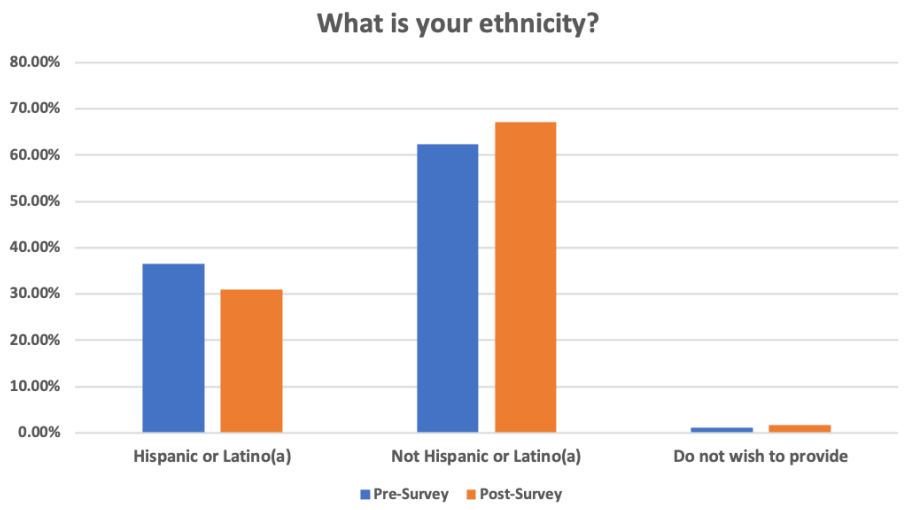

Figure 83: Comparison on ethnicity

In a pre-survey and post-survey, question that asked about ethnicity. Not Hispanic or Latino(a) had the largest percentage. While percentage of Hispanic or Latino(a) is more than a half of students of Not Hispanic. And a few responded to do not wish to provide.

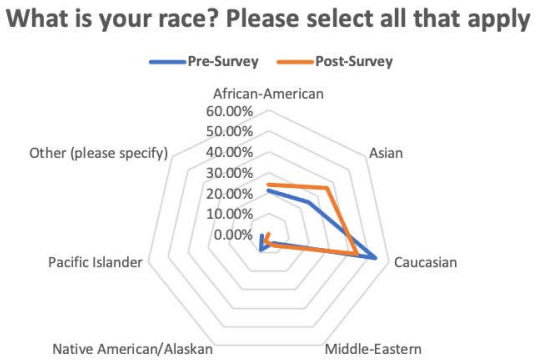

Figure 84: Comparison on race

In pre-survey, there are huge variations in the racial group. About 50% said

Caucasian, 23% Asian, 20% African American, 5% Middle Eastern, 9% Native American/Alaskan and only 3% remained in the pacific Islander. In post-survey, there are slight variations in the racial group. About 45% said Caucasian, 36% Asian, 24% African American, 6% Middle Eastern, 4% Native American/Alaskan and 0% pacific Islander.

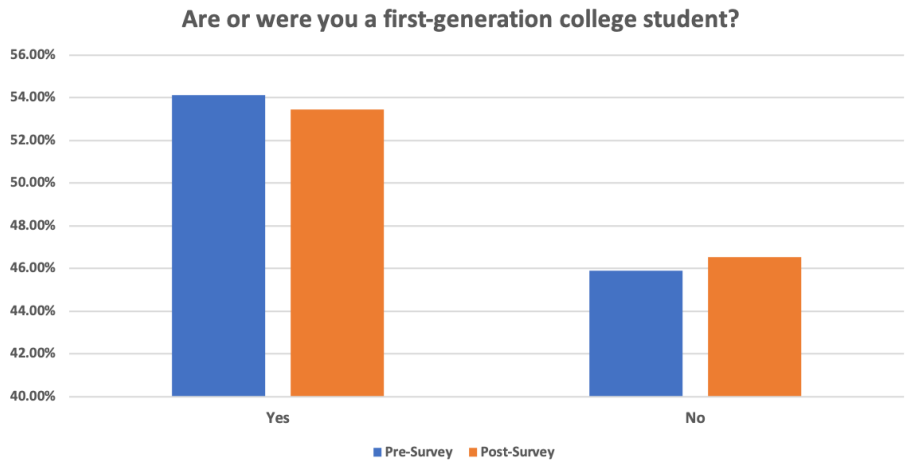

Figure 85: Comparison on are or were they first-generation college student are not

We can see in a pre-survey, it shows that out of 91 people surveyed 54% were first-generation college students and 45% were non-first-generation college students and 4% skipped. In post-survey, out of 66 people surveyed 53.445% were first-generation college students and 46.55% were non-first-generation college students and 10% skipped.

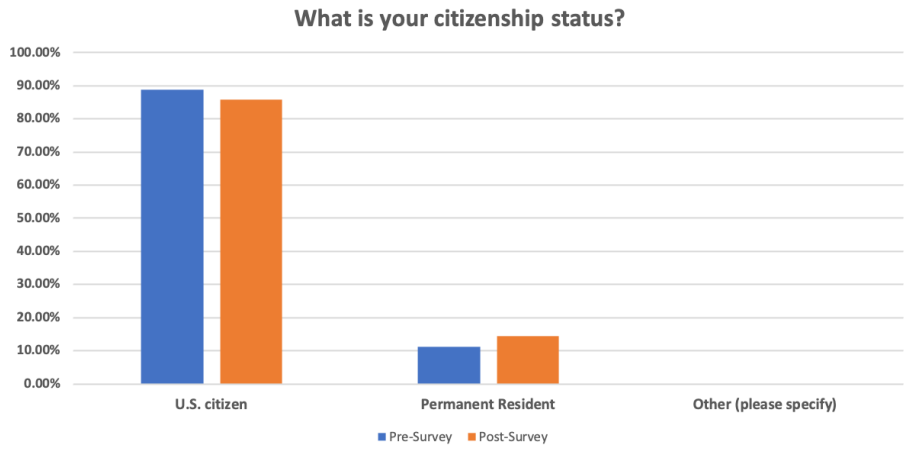

Figure 86: Comparison on citizenship status

Figure 86 indicates the participants is either a U.S citizen or a Permanent Resident. In pre-survey and post-survey: Overall, it can be seen that the highest percentage of participants are U.S citizens. However, our findings suggest that less than a quarter of participants were Permanent Residents.

5.2 Response rates by Academic Characteristics- Undergraduates

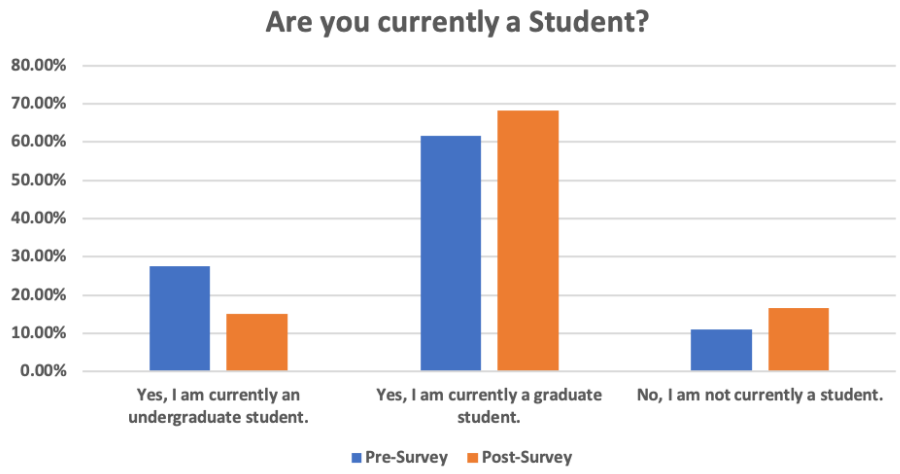

Figure 87: Comparison on current academic position

In a pre-survey, the most frequent categories are students in both levels, undergraduate (27%) and graduate (62%), as well as not student (11%). In a post-Survey, the responses were Yes, I am currently an Undergraduate student - 15.15%, Yes, I am currently a graduate student - 68.18%, No, I am not currently a student - 16.67%.

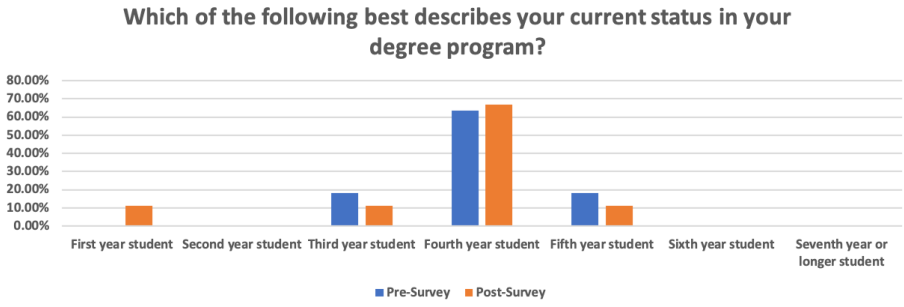

Figure 88: Comparison on current enrolled degree

In pre-survey, It can be seen that 62% of respondents were fourth year students

with the remaining 18.18% of Third year students and 18.18% of fifth year students. In post-survey, responses for the statement are: First year student, Third year student and Fifth year student - 11.11%, fourth year student - 66.67%, Second, Sixth and seventh years or longer students - 0%.

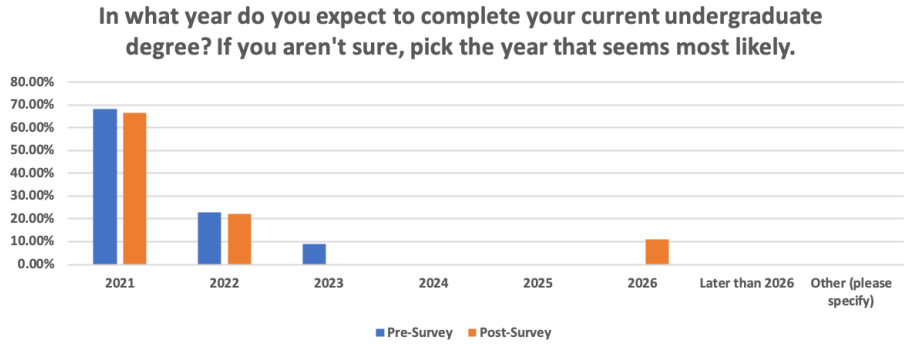

Figure 89: Comparison on expectation to complete degree

In pre-survey: Overall, it can be seen that in the year 2021, the highest percentage (68%) of undergraduate students expect to complete their degree while 22% of students expect to graduate in the year 2022 and 8% of students in 2023. In post-survey,the data showed the following responses for the statement: 2021 - 66.67%, 2022 - 22.22%, 2026- 11.11%, 2023,2024, 2025 and later than 2026 - 0%.

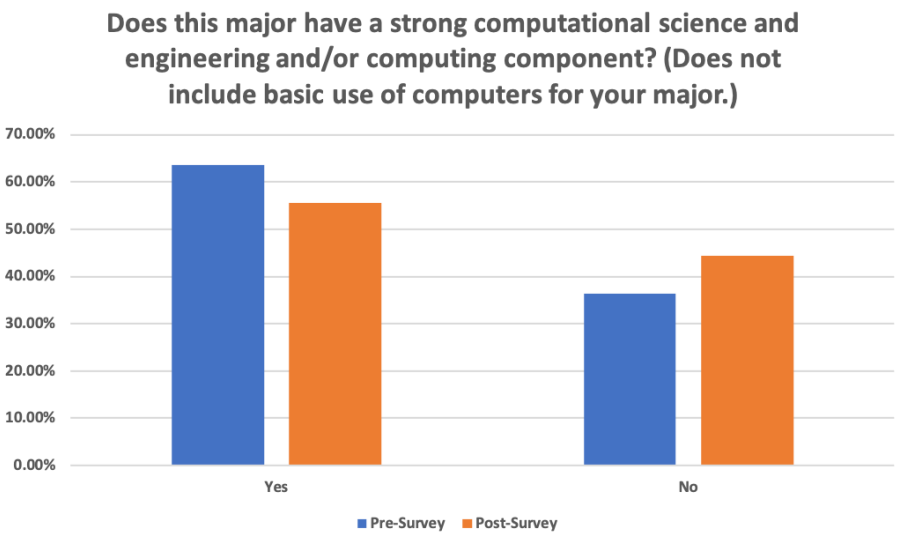

Figure 90: Comparison on major having a strong CSE component

In pre-survey, when asked about does the major you selected has a strong computational science and engineering and/or computing component, 64% responded to Yes and 36% responded to No. In post-survey, the data revealed the following responses for the statement: Yes - 55.56%, No - 44.44%.

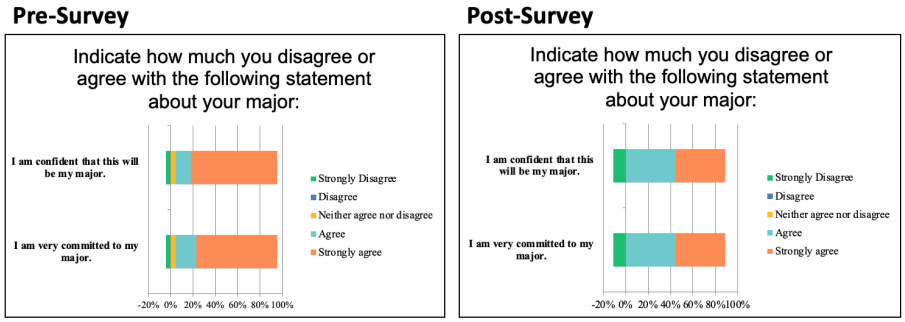

Figure 91: Comparison on commitment to major

In pre-survey, the data showed the following responses for the statements, I am very committed to my major: Disagree - 0, Strongly Disagree - 4.55%, Neither

agree nor disagree - 4.55%, Agree - 18.18%, Strongly agree - 72.73%. I am confident that this will be my major: Disagree -0, Strongly Disagree - 4.55%, Neither agree nor disagree - 4.55%, Agree - 13.64%, Strongly agree - 77.27%. In post-survey, The data revealed the following responses for this statement. I am very committed to my major: Strongly Disagree - 11.11%, Agree - 44.44%, Strongly agree - 44.44%. I am confident that this will be my major: Strongly Disagree - 11.11%, Agree - 44.44%, Strongly agree - 44.44%.

5.3 Response rates by Academic Characteristics- Graduates

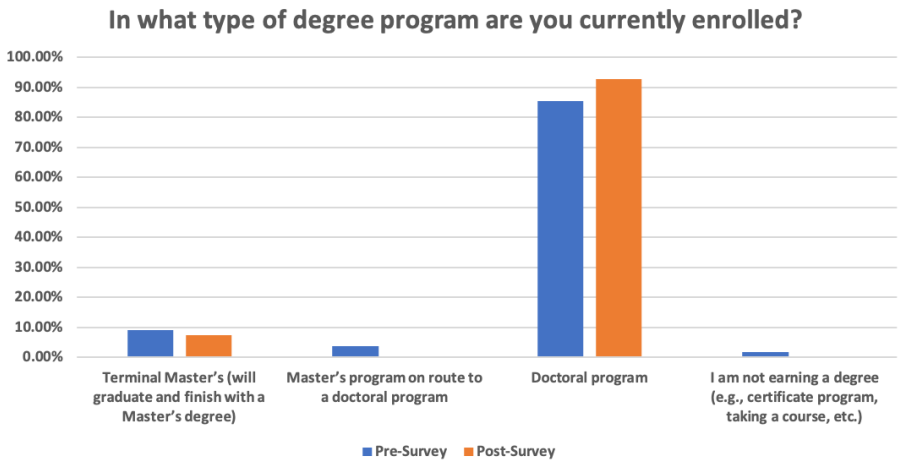

Figure 92: Comparison on degree program currently graduates enrolled

In pre-survey, the data showed the following responses for the statement: Terminal Masters (will graduate and finish with a masters degree) - 5 (9.09%), Masters program on route to a doctoral program - 2 (3.64%), Doctoral Program - 47 (85.45%), I am not earning a degree (e.g., certificate program, taking a course, etc.) - 1 (1.82%). In post-survey, the data showed the following responses for the statement: Terminal

masters (will graduate and finish with a masters degree) - 7.32%, Doctoral Program - 92.68%.

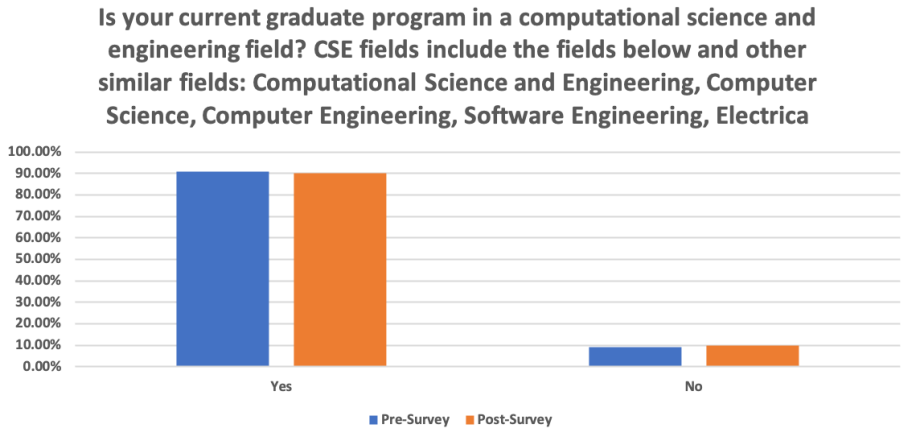

Figure 93: Comparison on current graduate program in CSE field

In pre-survey, the data showed the following responses for the statement: Yes - 50 (90.91%), No - 5 (9.09%). In post-survey, the data revealed the following responses for the statement: Yes - 90.24%, No - 9.76%.

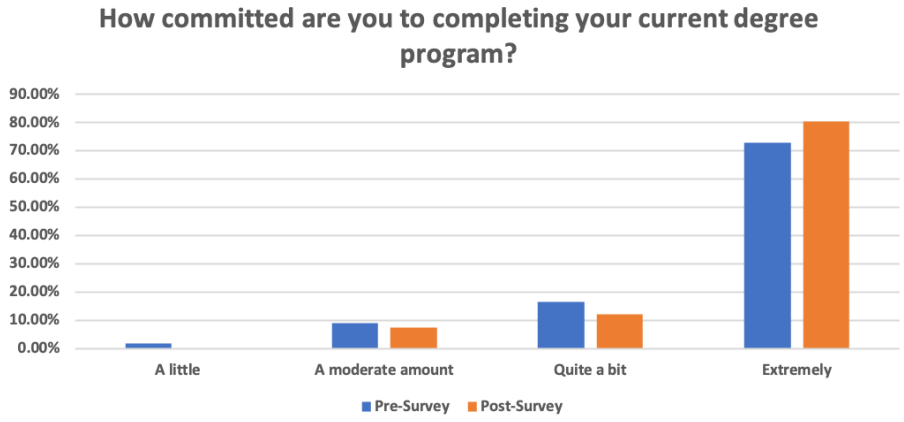

Figure 94: Comparison of graduate students on completion of degree program

In pre-survey, the data revealed the following responses for the statement:

A little - 1.82%, A moderate amount - 9.09%, Quite a bit - 16.36%, Extremely - 72.73%. In post-survey, the data revealed the following responses for the statement: A moderate amount - 7.32%, Quite a bit - 12.20%, Extremely - 80.49%.

5.4 Undergraduates Response rates by Highest Degree Intentions/Aspirations

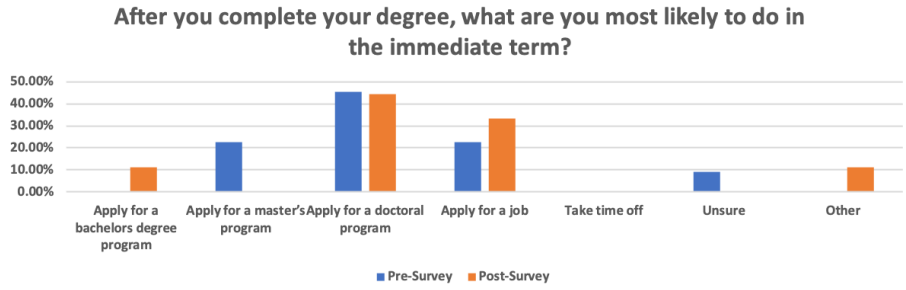

Figure 95: Comparison on most likely to do in immediate program

In pre-survey, the data revealed the following responses for the statement. Apply for a bachelors degree program - 0%, Apply for a masters program - 22.73%, Apply for a doctoral program - 45.45%, Apply for a job - 22.73%, Take time off - 0%, Unsure - 9.09%, Other - 0%. In post-survey, the data showed the following responses for the statement: Apply a bachelors degree program - 11.11%, Apply doctoral program - 44.44%, Apply for a job - 33.33%, Other - 11.11%.

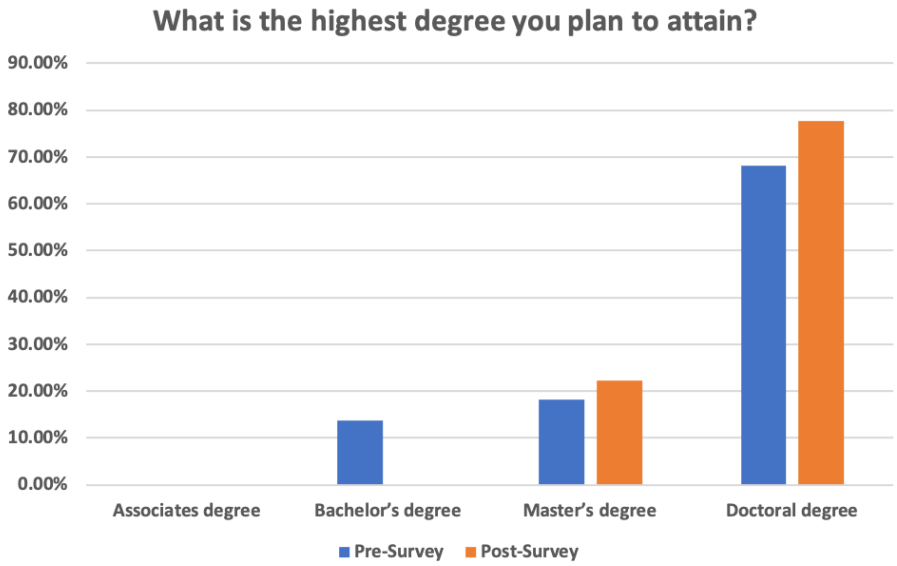

Figure 96: Comparison on highest degree plan to attain

In pre-survey, the data revealed the following responses for the statement: Associates Degree - (0), Bachelors Degree -3 (13.64%), Masters Degree - 4 (18.18%), Doctoral Degree - 15 (68.18%). In post-survey, the data showed the following responses for the statement: Associates Degree, Bachelors Degree - 0%, Masers Degree - 22.22%, Doctoral Degree - 77.78%.

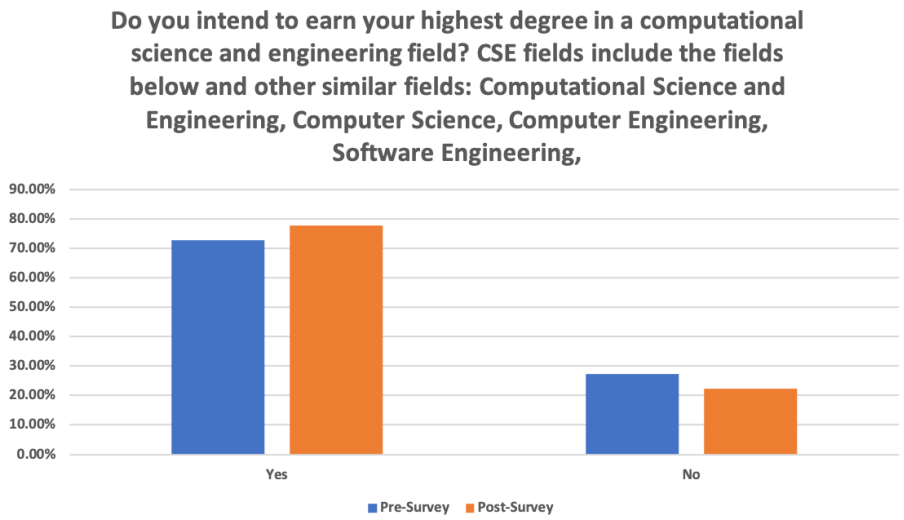

Figure 97: Comparison on intention to earn degree in CSE field

In pre-survey, the data revealed the following responses for the statement: Yes (72.73%), No (27.27%). In post-survey, the data showed the following responses for the statement: Yes - 77.78%, No - 22.22%.

5.5 Graduates Response rates by Highest Degree Intentions/Aspirations

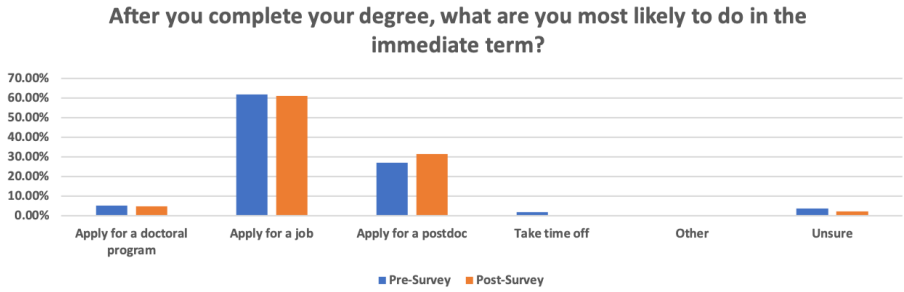

Figure 98: Comparison on most likely to do in immediate program

In pre-survey, the data revealed the following responses for the statement: Apply for a doctoral program - 5.45%, Apply for a job - 61.82%, Apply for a postdoc - 27.27%, Take time off - 1.82%, Other - 0, Unsure - 3.64%. In post-survey, the data revealed the following responses for the statement: Apply for a doctoral program - 4.88%, Apply for a job - 60.98%, Apply for a postdoc - 31.71%, Unsure - 2.44%.

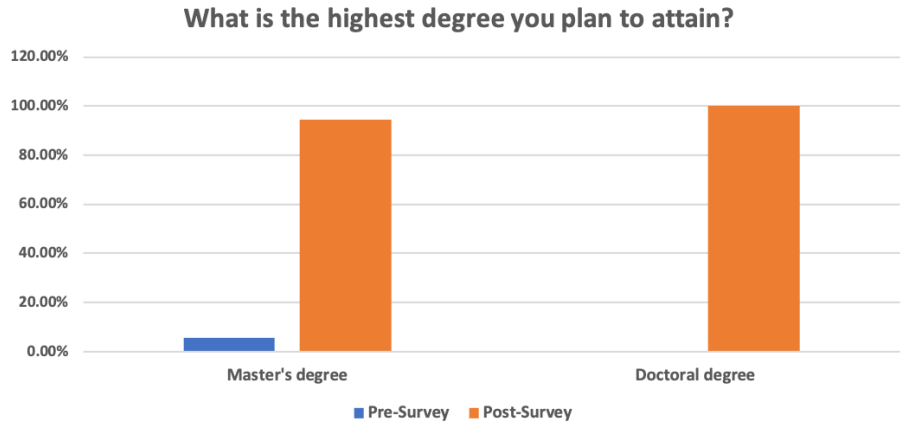

Figure 99: Comparison on highest degree plan to attain

In pre-survey, the data revealed the following responses for the statement: Masters degree - 5.45%, Doctoral degree -94.55%. In post-survey, the data revealed the following responses for the statement: Masters degree - 0%, Doctoral degree - 100%.

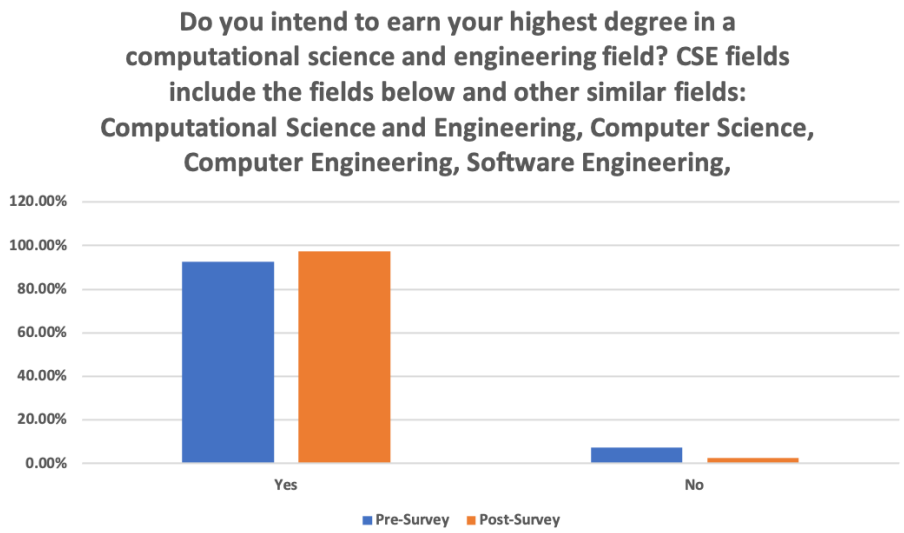

Figure 100: Comparison on intention to earn degree in CSE field

In pre-survey, the data revealed the following responses for the statement: Yes - 92.73%, No - 7.27%. In post-survey, the data resulted in the following responses for the statement: Yes - 97.50%, No - 2.50%.

5.6 Response rates by Career Values

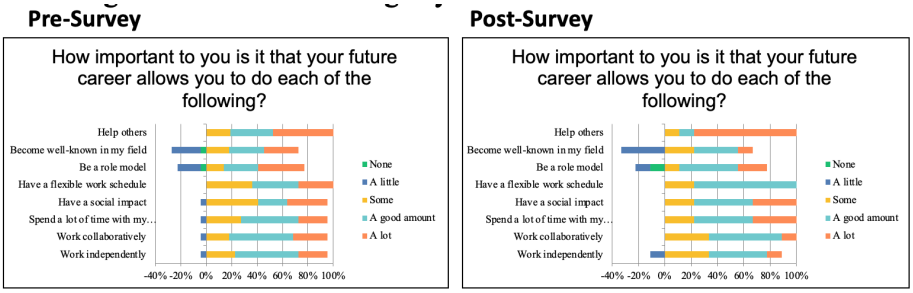

Figure 101: Comparison on undergraduates future career

In pre-survey, the data revealed the following responses for the statement: Work independently: None - 0.00%, A little - 4.55%, Some - 22.73%, A good amount

- 50.00%, A lot - 22.73%. Work collaboratively: None - 0.00%, A little - 4.55%, Some - 18.18%, A good amount - 50.00%, A lot - 27.27%. Spend a lot of time with my family and friends: None - 0.00%, A little - 4.55%, Some - 27.27%, A good amount - 45.45%, A lot - 22.73%. Have a social impact: None - 0.00%, A little - 4.55%, Some - 40.91%, A good amount - 22.73%, A lot - 31.82%. Have a flexible work schedule: None - 0.00%, A little - 0.00%, Some - 36.36%, A good amount - 50.00%, A lot - 22.73%. Be a role model: None - 0.00%, A little - 4.55%, Some - 36.36%, A good amount - 36.36%, A lot - 27.27%. Become well-known in my field: None - 4.55%, A little - 18.18%, Some - 13.64%, A good amount- 27.27%, A lot - 36.36%. Help others: None - 4.55%, A little - 4.55%, Some - 22.73%, A good amount - 50.00%, A lot - 22.73%. In post-survey, the data revealed the following responses for the statement: Work independently: None - 0.00%, A little - 11.11%, Some - 33.33%, A good amount - 44.44%, A lot - 11.11%. Work collaboratively: None - 0.00%, A little - 0.00%, Some - 33.33%, A good amount - 55.56%, A lot - 27.27%. Spend a lot of time with my family and friends: None - 0.00%, A little - 0.00%, Some - 22.22%, A good amount - 55.56%, A lot - 33.33%. Have a social impact: None - 0.00%, A little - 0.00%, Some - 22.22%, A good amount - 44.44%, A lot - 33.33%. Have a flexible work schedule: None - 0.00%, A little - 0.00%, Some - 22.22%, A good amount - 77.78%, A lot - 0.00%. Be a role model: None - 11.11%, A little - 11.11%, Some - 0.00%, A good amount - 44.44%, A lot - 22.22%. Become well-known in my field: None - 0.00%, A little - 33.33%, Some - 22.22%, A good amount - 33.33%, A lot - 11.11%. Help others: None - 0.00%, A little - 0.00%, Some - 11.11%, A good amount - 11.11%, A lot - 77.78%.

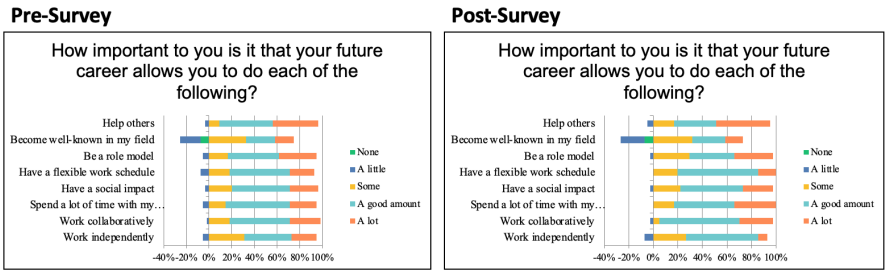

Figure 102: Comparison on graduate students future career

In pre-survey, the data revealed the following responses for the statement: Work independently: None - 0.00%, A little - 5.45%, Some - 30.91%, A good amount - 41.82%, A lot - 21.82%. Work collaboratively: None - 0.00%, A little - 1.82%, Some - 18.18%, A good amount - 52.73%, A lot - 27.27%. Spend a lot of time with my family and friends: None - 0.00%, A little - 5.45%, Some - 14.55%, A good amount - 56.36%, A lot - 23.64%. Have a social impact: None - 0.00%, A little - 3.64%, Some - 20.00%, A good amount - 50.91%, A lot - 25.45%. Have a flexible work schedule: None - 0.00%, A little - 7.27%, Some - 18.18%, A good amount - 52.73%, A lot - 21.82%. Be a role model: None - 0.00%, A little - 5.45%, Some - 16.36%, A good amount - 45.45%, A lot - 32.73%. Become well-known in my field: None - 7.27%, A little - 18.18%, Some - 32.73%, A good amount - 25.45%, A lot - 16.36%. Help others: None - 0.00%, A little - 3.64%, Some - 9.09%, A good amount - 47.27%, A lot - 40.00%.In post-survey, the data revealed the following responses for the statement: Work independently: None - 0.00%, A little - 7.32%, Some - 26.83%, A good amount - 58.54%, A lot - 7.32%. Work collaboratively: None - 0.00%, A little - 2.50%, Some - 5.00%, A good amount - 65.00%, A lot - 27.50%. Spend a lot of time with my family and friends: None - 0.00%, A little - 0.00%, Some - 17.07%, A good amount - 48.778%, A lot - 34.15%. Have a social impact: None - 0.00%, A little - 2.44%, Some

- 21.95%, A good amount - 51.22%, A lot - 24.39%. Have a flexible work schedule: None - 0.00%, A little - 0.00%, Some - 19.51%, A good amount - 65.85%, A lot - 14.63%. Be a role model: None - 0.00%, A little - 2.44%, Some - 29.27%, A good amount - 36.59%, A lot - 31.71%. Become well-known in my field: None - 7.32%, A little - 19.51%, Some - 31.71%, A good amount - 26.83%, A lot - 14.63%. Help others: None - 0.00%, A little - 4.88%, Some - 17.07%, A good amount - 34.15%, A lot - 43.90%.

5.7 Response rates by Belonging and Identification

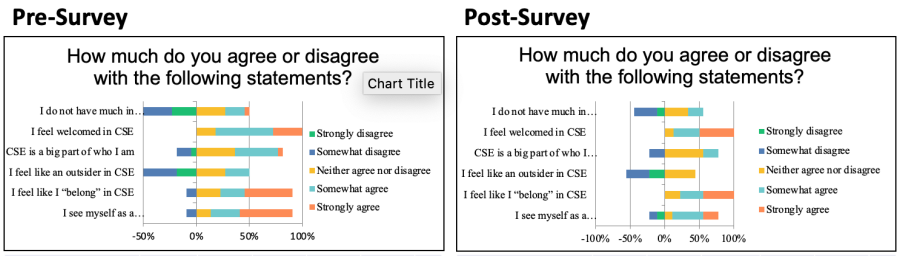

Figure 103: Comparison on undergraduates self efficacy

In pre-survey, the data showed the following responses for the statement. Strongly disagree - 10, Somewhat disagree - 20, Neither agree nor disagree - 32, Somewhat agree - 41, Strongly agree - 29. In post-survey, the data showed the following responses for the statement. Strongly disagree - 22, Somewhat disagree - 41, Neither agree nor disagree - 42, Somewhat agree - 89, Strongly agree - 51.

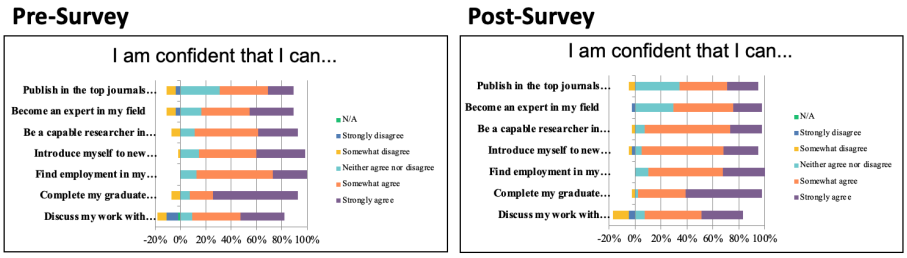

Figure 104: Comparison on Graduates self efficacy

In pre-survey, the data showed the following responses for the statement. Strongly disagree - 17, Somewhat disagree- 55, Neither agree nor disagree - 90, Somewhat agree - 124, Strongly agree - 43. In post-survey, the data showed the following responses for the statement. Strongly disagree - 22, Somewhat disagree - 41, Neither agree nor disagree - 42, Somewhat agree - 89, Strongly agree - 51.

5.8 Response rates by Mentor Support

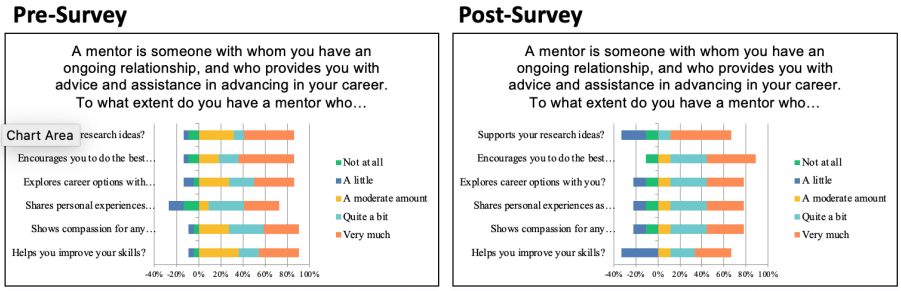

Figure 105: Comparison of undergraduates on Mentor Support

In pre-survey, the data showed the following responses for the statements: Helps you improve your skills? Not at all - 4.55%, A little - 4.55%, A moderate amount - 36.36%, Quite a bit - 18.18%, Very much - 36.36%. Shows compassion for any issues you discussed with them? Not at all - 4.55%, A little - 4.55%, A moderate amount

- 27.27%, Quite a bit - 31.82%, Very much - 31.82%. Shares personal experiences as an alternative perspective to your problems? Not at all - 13.64%, A little - 13.64%, A moderate amount - 9.09%, Quite a bit - 31.82%, Very much - 31.82%. Explores career options with you? Not at all - 4.55%, A little - 9.09%, A moderate amount - 27.27%, Quite a bit - 22.73%, Very much - 36.36%. Encourages you to do the best you can in your coursework? Not at all - 9.09%, A little - 4.55%, A moderate amount - 18.18%, Quite a bit - 18.18%, Very much - 50.00%. Supports your research ideas? Not at all - 9.09%, A little - 4.55%, A moderate amount - 31.82%, Quite a bit - 9.09%, Very much - 45.45%. In post-survey, the data showed the following responses for the statements: Helps you improve your skills? Not at all - 0, A little - 12.50%, A moderate amount - 0, Quite a bit - 37.50%, Very much - 50.00%. Shows compassion for any issues you discussed with them? Not at all - 0, A little - 25.00%, A moderate amount - 12.50%, Quite a bit - 25.00%, Very much - 37.50%. Shares personal experiences as an alternative perspective to your problems? Not at all - 12.50%, A little - 0, A moderate amount - 25.00%, Quite a bit - 25.00%, Very much - 37.50%. Explores career options with you? Not at all - 0, A little - 12.50%, A moderate amount - 0, Quite a bit - 37.50%, Very much - 25.00%. Encourages you to do the best you can in your coursework? Not at all - 12.50%, A little - 0%, A moderate amount - 12.50%, Quite a bit - 37.50%, Very much - 37.50%. Supports your research ideas? Not at all - 0%, A little - 12.50%, A moderate amount - 12.50%, Quite a bit - 37.50%, Very much - 37.50%.

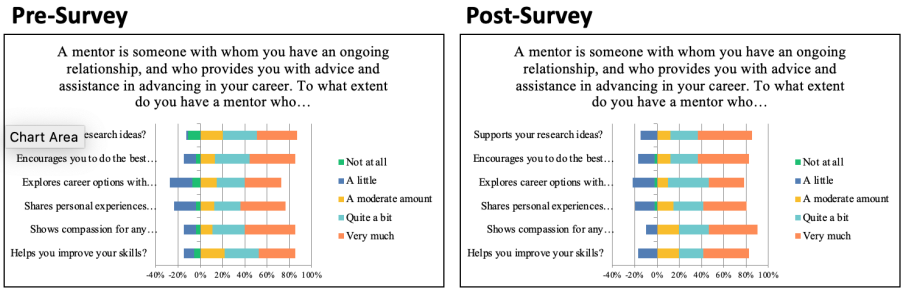

Figure 106: Comparison of Graduates on Mentor Support

In pre-survey, the data showed the following responses for the statements: Helps you improve your skills? Not at all - 0%, A little - 12.50%, A moderate amount - 0, Quite a bit - 37.50%, Very much - 50.00%. Shows compassion for any issues you discussed with them? Not at all - 0, A little - 25.00%, A moderate amount - 12.50%, Quite a bit - 25.00%, Very much - 37.50%. Shares personal experiences as an alternative perspective to your problems? Not at all - 12.50%, A little - 0%, A moderate amount - 25.00%, Quite a bit - 25.00%, Very much - 37.50%. Explores career options with you? Not at all - 0, A little - 12.50%, A moderate amount - 0%, Quite a bit - 37.50%, Very much - 25.00%. Encourages you to do the best you can in your coursework? Not at all - 12.50%, A little - 0%, A moderate amount - 12.50%, Quite a bit - 37.50%, Very much - 37.50%. Supports your research ideas? Not at all - 0%, A little - 12.50%, A moderate amount - 12.50%, Quite a bit - 37.50%, Very much - 37.50%. In post-survey, the data showed the following responses for the statements: Helps you improve your skills? Not at all - 0, A little - 17.07%, A moderate amount - 19.51%, Quite a bit - 21.95%, Very much - 41.46%. Shows compassion for any issues you discussed with them? Not at all - 0, A little - 9.76%, A moderate amount - 19.51%, Quite a bit - 26.83%, Very much - 43.90%. Shares personal experiences as an alternative perspective to your problems? Not at all - 2.44%, A little - 17.07%,

A moderate amount - 14.63%, Quite a bit - 26.83%, Very much - 39.02%. Explores career options with you? Not at all - 2.44%, A little - 19.51%, A moderate amount - 9.76%, Quite a bit - 36.59%, Very much - 31.71%. Encourages you to do the best you can in your coursework? Not at all - 2.44%, A little - 14.63%, A moderate amount - 12.20%, Quite a bit - 24.39%, Very much - 46.34%. Supports your research ideas? Not at all - 0, A little - 14.63%, A moderate amount - 12.20%, Quite a bit - 24.39%, Very much - 48.78%.

5.9 Response rates by Mentor Advising

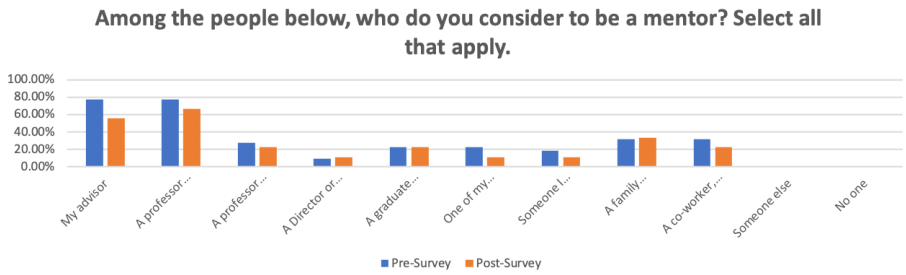

Figure 107: Comparison of undergraduates on Mentor Advising

In pre-survey, the data showed the following responses for this statement: My advisor - 77.27%, A professor within my department (not my advisor) - 77.27%, A professor outside of my department - 27.27%,A Director or administrative faculty - 9.09%, A graduate student (e.g., graduate teaching/research assistant, graduate student mentor) - 22.73%, One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor) - 22.73%, Someone I met at a conference or mentoring program sponsored (or other professional activity) - 18.18%, A family member/partner, friend, pastor, or someone else with

whom I have a personal relationship - 31.82%, A co-worker, supervisor, or someone else with whom I have a professional relationship - 31.82%, Someone else - 0%, No one - 0%. In post-survey, the data showed the following responses for this statement: My advisor - 50.00%, A professor within my department (not my advisor) - 62.50%, A professor outside of my department - 25.00%, A Director or administrative faculty - 25.00%, A graduate student (e.g., graduate teaching/research assistant, graduate student mentor) - 25.00%, One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor) - 25.00%, Someone I met at a conference or mentoring program sponsored (or other professional activity) - 37.50%, A family member/partner, friend, pastor, or someone else with whom I have a personal relationship - 0%, A co-worker, supervisor, or someone else with whom I have a professional relationship - 37.50%, Someone else - 0%, No one - 0%.

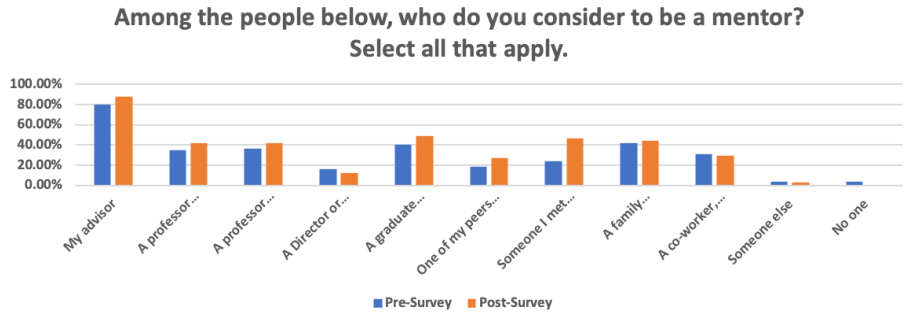

Figure 108: Comparison of Graduates on Mentor Advising

In pre-survey, the data revealed the following responses for the statement. Learned new things from the technical content: Not at all - 1.75%, Very little - 5.26%, Somewhat - 54.39%, Very much - 38.60%. The program helped me develop my existing technical skills: Not at all - 0.00%, Very little - 17.54%, Somewhat -

52.63%, Very much - 29.82%. Learned strategies for advancing my research or graduate school career: Not at all - 1.75%, Very little - 8.77%, Somewhat - 49.12%, Very much - 40.35%. I learned methods for getting more out of technical conferences that I attend: Not at all - 1.75%, Very little - 12.28%, Somewhat - 43.86%, Very much - 42.11%. The technical content sparked some research ideas for me: Not at all - 3.57%, Very little - 21.43%, Somewhat - 39.29%, Very much - 35.71%. I learned more about what it is like to be a researcher in this area: Not at all - 3.51%, Very little - 5.26%, Somewhat - 47.37%, Very much - 43.86%. In post-survey, the data showed the following responses for this statement: My advisor - 87.80%, A professor within my department (not my advisor) - 41.46%, A professor outside of my department - 41.46%,A Director or administrative faculty - 12.20%, A graduate student (e.g., graduate teaching/research assistant, graduate student mentor) - 48.78%, One of my peers (e.g., another undergraduate student, undergraduate teaching/research assistant, undergraduate student mentor) - 26.83%, Someone I met at a conference or mentoring program sponsored (or other professional activity) - 46.34%, A family member/partner, friend, pastor, or someone else with whom I have a personal relationship - 43.90%, A co-worker, supervisor, or someone else with whom I have a professional relationship - 29.27%, Someone else - 2.44%, No one - 0%.

5.10 Undergraduates Response rates by Academic and Research Skills

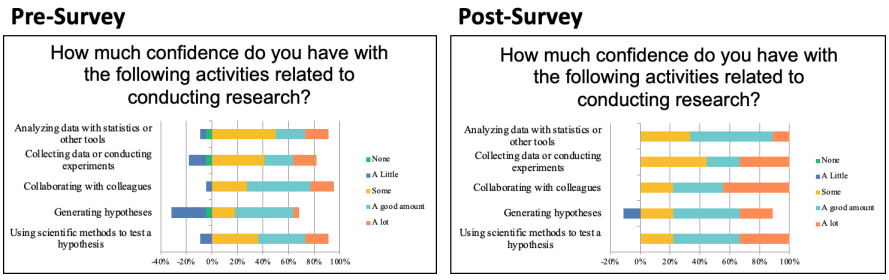

Figure 109: Comparison in confidence related to conducting research

In pre-survey, the data revealed the following responses for the statement: Using scientific methods to test a hypothesis - 22, Generating hypotheses - 22, Collaborating with colleagues - 22, Collecting data or conducting experiments - 22, Analyzing data with statistics or other tools - 22. In post-survey, the data revealed the following responses for the statement: Using scientific methods to test a hypothesis - 9, Generating hypotheses - 9 Collaborating with colleagues - 9, Collecting data or conducting experiments - 9, Analyzing data with statistics or other tools - 9.

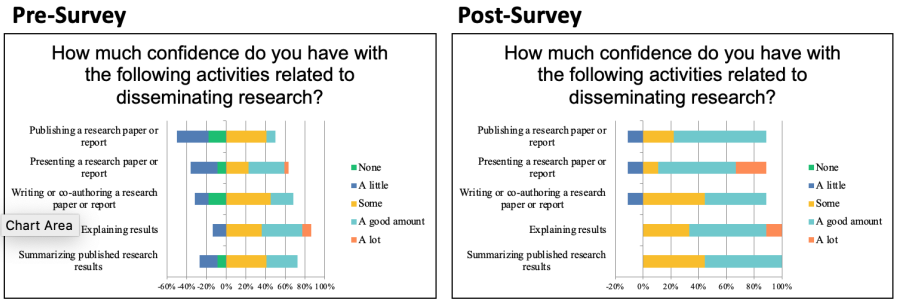

Figure 110: Comparison in confidence related to disseminating research

In pre-survey, the data revealed the following responses for the statement:

Summarizing published research results - 22, Explaining results - 22, Writing or co-authoring a research paper or report - 22, Presenting a research paper or report - 22, Publishing a research paper or report - 22. In post-survey, the data revealed the following responses for the statement: Summarizing published research results - 9, Explaining results - 9, Writing or co-authoring a research paper or report - 9, Presenting a research paper or report - 9, Publishing a research paper or report - 9.

5.11 Graduates Response rates by Academic and Research Skills

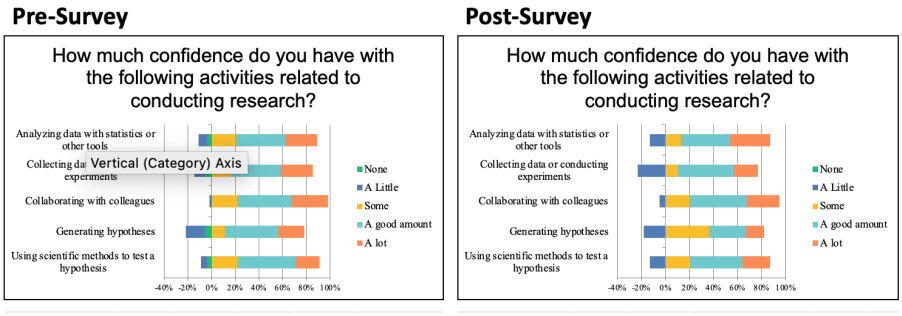

Figure 111: Comparison in confidence related to conducting research

In pre-survey, the data revealed the following responses for the statement: Using scientific methods to test a hypothesis - 8, Generating hypotheses - 8, Collaborating with colleagues- 7, Collecting data or conducting experiments - 8, Analyzing data with statistics or other tools - 8. In post-survey, the data revealed the following responses for the statement: Using scientific methods to test a hypothesis - 39, Generating hypotheses - 39, Collaborating with colleagues - 40, Collecting data or conducting experiments - 39, Analyzing data with statistics or other tools - 39.

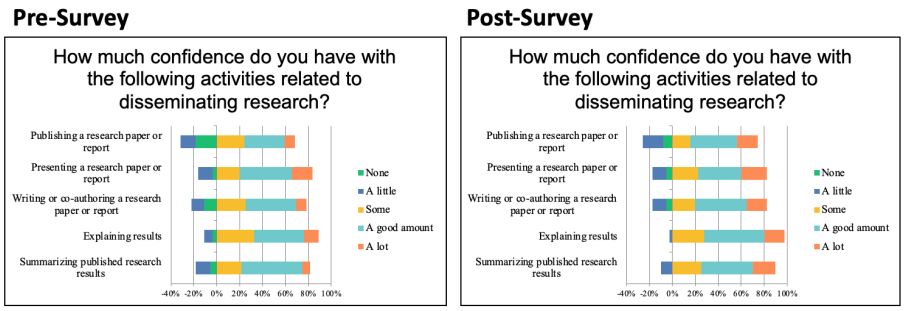

Figure 112: Comparison in confidence related to disseminating research

In pre-survey, the data revealed the following responses for the statement: Summarizing published research results - 8, Explaining results - 8, Writing or co-authoring a research paper or report- 8, Presenting a research paper or report - 8, Publishing a research paper or report - 8. In post-survey, the data revealed the following responses for the statement: Summarizing published research results - 40, Explaining results - 40, Writing or co-authoring a research paper or report - 40, Presenting a research paper or report - 40, Publishing a research paper or report - 39.

6 Sentiment Analysis

6.1 Sentiment Analysis

1. What were your favourite aspects of the program?

1. Virtual Roommate, Networking, Morning meetings
2. Tutorials and mentor program
3. The networking
4. The guided affinity groups and the various virtual networking events
5. The guided affinity groups allowing for a low-key environment to discuss the conference; especially being remote, it was nice to have the GAG meetings
6. The Guided Affinity Groups, The tutorials offered by BE
7. The Guided Affinity group meetings
8.The Guided Affinity Group and the Mentor Protege Program
9. The Gag meeting
10. The GAG and mentor program
11. Technical Skill development
12. Talks during GAGs
13. Talks
14. Panel discussion. Unfortunately, I missed many interesting talks I would have loved to attend. I hope to be able to listen some videos if they are shared.
15. Networking during the mentor-protege mixer
16. Networking
17. My guided affinity group was highly correlated with my doctoral research area but I also had the opportunity for the area to become human for me. I interacted with professionals in my field about their research but also about their journey to becoming the researcher they are today. This shattered my preconceptions about successful mathematicians being the people without doubt, the people who knew that they belonged from the first time they saw an equation. This evolution in the way that I viewed successful mathematicians was further supported by my mentoring experience. The discussions I had with my mentor about how to approach the post graduate career period helped to dispel notions that I had about my worth being tied to my ability to graduate with a job offer in hand
18. My guided affinity group was by far the best part for me. Ann Almgren was an amazing group leader
19. My GAG (open science) and the emphasis on helping people gain knowledge and grow their careers
20. Mentorship
21. Mentoring program, Guided Affinity Groups and the final presentation (collaborations and discussions)
22. Mentoring program
23. Meetings with a field expert. Hands-on tutorials
24. I really love the Opportunity to attend the conference. SIAM conferences are an incredible experience

25. I really enjoyed the GAG meetings. Especially for a virtual conference, these meetings kept me engaged and involved in the conference. It really helped me combat imposter syndrome and learn rather than focusing on what I don't know
26. I enjoyed the Networking Game night and the use if the gather town to give a more personable experience. I wish the lectures started later due to my being in PST and the first presentations were at 8AM CST
27. I enjoyed the GAG meetings, the hpc tutorials (parallel design and hands on with CUDA), and my connecting with my assigned mentor!
28. I appreciate the effort that was put in to assign us virtual roommates, mentors, the GAGs. I think those aspects that mimic an in-person conference helped it feel less distant
29. Hands-On Workshops teaching technical skills that younger students on the undergrad or new graduate students can showcase or illustrate their experience on their resume/linkedIn to land another opportunity in the future for their intended field/career
30. Guided Affinity Group Discussion
31. Guided Affinity Group
32. Gather town to provide a virtual platform to meet people during the conference and also virtual roommate
33. GAG meeting
34. GAG groups!!!!
35. GAG groups
36. GAG
37. GAG
38. Everything
39. Diversity and helping nature of all
40. Daily GAG meetings
41. Conference talks, GAGs meetings, networking
42. Broadening my horizons on what is out there in the CSE field and areas that I personally want to pursue
43. Bringing Experts in the Field to Talk to Us
44. Affinity groups
45. Tutorials, Mentor/Mentee, GAGroups

Table 1: Responses on favorite aspects of the program

Row Labels	Count of feedback_text	Average of Score
negative	5	0.160541513
neutral	3	0.57212619
positive	37	0.710805692
Grand Total	**45**	**0.640419927**

Figure 113: Sentiment scores on favorite aspects of program

Figure 114: Word cloud on favorite aspects of the program

2. Do you have any suggestions to improve?

1. NA
2. None
3. I was not very productive with virtual may be in the future if there are more interactive ways that would benefit a lot
4. I think there was miscommunication or confusion in the poster session. Not SHI fault, they did their best, but somehow the platform was non intuitive or didn't allow for people to attend multiple poster sessions. Perhaps break down the session into multiple poster sessions, while improving the video chat tools seems like another good idea
5. Not at this time
6. N/A
7. Gather town poster sessions
8. N/A
9. Poster presentations should have had a zoom link to speak with presenters
10. N/A
11. Much smaller group of doing activities together helped a lot
12. I think the poster session could have been done in a different format. It was difficult to ask questions and it felt really impersonal, especially because poster presenters did not know if anyone went to visit their poster (if no questions were asked)
13. Begin Sessions at 8AM PST
14. Ensure mentors for all signed participants
15. N/A
16. I personally thought gather.town was awkward, but that could just be me
17. Gather.town was so stress full that I basically opted out of using it
18. No
19. I would prefer to use Zoom call for poster presentation over Vfairs. Vfairs made things hard to recognize multiple customers while I present my work
20. N/A
21. None

22. For the mentoring program I think it would be useful to have a form that really forces the mentee to consider what they want from the mentoring experience before our first meetings. I know that the mentoring pairing was difficult this year but getting the information that I did have a mentor a few hours before meeting them made me feel unprepared. Considering the format of the program was so short it was unfortunate to spend the first day feeling a little confused and disjointed about how I wanted to shape my mentoring experience
23. This is an incredible program. You mentioned keeping the alumni involved in the wrap up session; I think that is a great idea! The Goldwater scholarship program has a slack for all of the award recipients and that has worked very well. I have gained a lot out of that slack channel. There are different threads for each field, fellowship, hobby, or anything else with interest
24. The career fair wasn't time effective
25. I think GAG can be more inclusive for students with less expertise in the field. My group had quite a few students who are advanced in their study of the topic of the group and hence participated/contributed the most to discussions and presentations. I feel the leader of the group could be more intentional to include students who are silent because of lack of domain
26. Find solutions dealing with students who do not show up in the GAG meetings. Provide a possible plan for each GAG meeting
27. Poster presentations could have gone better were they somehow done through zoom, with each participant's link listed on the vfairs website
28. N/A
29. No
30. N/A
31. It was difficult to connect with people during the poster session. Maybe shorter wrap up meetings but then some similar activities such as the active surveys in orientation would be nice
32. No
33. No
34. Better prepare the students for the Vfairs poster platforms and (video)chat features
35. No
36. knowledge/experiences

Table 2: Responses on any suggestions to improve

Row Labels	Count of feedback_text	Average of Score
negative	9	0.240905104
neutral	5	0.538721532
positive	21	0.673378621
Grand Total	**35**	**0.542934418**

Figure 115: Sentiment scores on improvement

Figure 116: Word cloud on any suggestions to improve

3. Anything else you want to share with us?

Row Labels	Count of feedback_text	Average of Score
negative	1	0.245046884
neutral	1	0.547044158
positive	19	0.75257504
Grand Total	**21**	**0.718619848**

Figure 117: Sentiment scores on comments

1. NA
2. No thanks. It was all good
3. She did an amazing job in this conference. Jasmine help was instrumental. I enjoyed each of the GAG meetings with Dan Martin and the group. Thanks for this experience :)
4. I hope to be part of this next time and hopefully learn more and more in the CSE
5. Virtual conference very less engaging
6. easier navigation and transparency on event updates and the use of a phone app that emails, texts, or pings you notifications of your upcoming session (i.e: workshops) with a dedicated Zoom link for you to easily access and not have to log-into several different just to find your activity and end up missing crucial beginning minutes of a presentation :)
7. Being a part of a GAG was the highlight of the conference for me.
8. N/A
9. Thank you so much for your effort and time! It made a difference!!
10. N/A
11. N/A
12. N/A
13. Keep up the good work
14. I think the whole leadership team did a great job to engage participants during this conference through games, panels, presentations and mentoring program
15. The experience was awesome, and I particularly enjoyed the morning emails suggesting sessions to check out
16. N/A
17. Thank you for the opportunity to participate in BE!
18. No
19. No
20. Excellent conference and program!
21. No.

Table 3: Responses on anything else they want to share with us

Figure 118: Word cloud on anything else you want to share with

7 Conclusion

Surveys are useful in describing the characteristics and structure of the respondents. No other research method can provide the broad capability to ensure accurate sample to gather targeted results, draw conclusions and make important decisions. The major factors like statistical data and its deviation at regular intervals furnishes a visual graphical representation. This type of contemplation helps us to showcase the sponsors to see the statistical view. The broader engagement (BE) program contributes to change the participant's view in terms of academic characteristics, career values, self-efficacy and belonging and identification, research and academic skills and mentor support. Feedback comments can potentially do much more than validating or verifying the quantitative findings.

A Appendix

Date: 5-10-2021

IRB #: 2021-119
Title: Understanding Participants' Feedback from Workshop Promoting Diversity and Inclusion in Computational Science and Engineering
Creation Date: 5-5-2021
End Date:
Status: Approved
Principal Investigator: Alina Lazar
Review Board: YSU IRB Board
Sponsor:

Study History

Submission Type	Review Type	Decision
Initial	Exempt	Exempt

Key Study Contacts

Member Bhavya Sree Yadala	Role Co-Principal Investigator	Contact byadala@student.ysu.edu
Member Alina Lazar	Role Principal Investigator	Contact alazar@ysu.edu
Member Alina Lazar	Role Primary Contact	Contact alazar@ysu.edu

Initial Submission

Getting Started

About Youngstown State University IRB and Cayuse IRB

All research projects conducted under the auspices of Youngstown State University that involve the use of living human subjects, samples or data obtained from them, directly or indirectly, with or without direct consent, must receive approval from the Institutional Review Board **before** the project can begin.

Cayuse IRB is an interactive web application. As you answer questions, new sections relevant to the type of research being conducted will appear on the left-hand side. Therefore not all numbered sections may appear. You do not have to finish the application in one sitting. All information can be saved.

For more information about the IRB regulations and procedures, please refer to the IRB Handbook.

Getting Started

All YSU faculty, students, and staff who are involved with human subjects research must complete training through the CITI Program (INSTRUCTIONS for registering and completing training).
New investigators should consider beginning the online training course up to two weeks prior to the submission of an IRB Protocol or grant application, and prior to beginning the planned research project

Throughout the submission, you will be required to provide the following:

- Research instruments (surveys, questionnaires, or other instruments)
- Detailed Study Information
- Informed Consent Forms, if applicable
- Waiver of Informed Consent Form, if applicable
- Study Recruitment Information

- Approval letters from other sites where research will be conducted, if applicable

Youngstown State University IRB

- You may not begin your research project and recruitment of subjects until a formal approval letter from the chair of the IRB has been received.
- The IRB meets as needed during the regular academic year. Please submit the application as soon as possible.

*required

I have read the information above and I am ready to begin my submission.

✓ Yes

Study Information

*required

Is this a student-conducted study /project?

All students conducting a study/project are required to list their faculty advisor(s)/Principal Investigator (PI) in the YSU study personnel section.

- Yes
- ✓ No

*required

What is your status at Youngstown State University?

- ✓ Faculty
- Student
- Staff

Youngstown State University Study Personnel

List all YSU study personnel involved in the conduct of this study.
If you cannot find a person in the people finder, please contact the IRB Office immediately at YSUIRB@ysu.edu

*required

Principal Investigator or Faculty Advisor

Provide the name of the Principal Investigator or the Faculty Advisor for student-conducted studies.

Name: Alina Lazar
Organization: CSci, Info and Eng Tech 140710
Address: One University Plaza , Youngstown, OH 44555-0001
Phone:
Email: alazar@ysu.edu

*required

Primary Contact

Provide the name of the Primary Contact of this study.
Name: Alina Lazar
Organization: CSci, Info and Eng Tech 140710
Address: One University Plaza , Youngstown, OH 44555-0001
Phone:
Email: alazar@ysu.edu

Co-Investigator(s)

Provide the name(s) of Co-Investigator(s) for this study.
Name: Bhavya Sree Yadala
Organization: CSci, Info and Eng Tech 140710
Address: , Youngstown, OH 44555-0001
Phone:
Email: byadala@student.ysu.edu

*required

Non-Youngstown State University Personnel

Yes

✓ No

*required

Sponsor

Will this study be supported by an external agency?

✓ Yes

*required

Agency

Provide the name of the Agency.

Sustainable Horizons Institute

*required

Contact Person

Provide the name of the Contact Person at the Agency.

Mary Ann Leung

*required

Phone Number

Provide a Phone Number for the above Contact Person.

760-469-9488

*required

Email

Provide an Email Address for the above Contact Person.

mleung@shinstitute.org

No

Study Dates

Provide the anticipated study start and end dates.

*required

Start Date

02/15/2021

*required

End Date

03/12/2021

Submission Information

*required

Where will this study/project take place?

Location of research

Youngstown State University

✓ Other facility

*required

Attach a Letter of Cooperation

The Letter of Cooperation should be on the letterhead of the facility.

BE@CSE21_Survey_Analysis_letter of support.pdf

*required

Name of the facility

SIAM CSE 21

*required

Name of the contact person

Mary Ann Leung

*required

Phone Number of the contact person

760-469-9488

*required

Email of the contact person

mleung@shinstitute.org

Multiple other facilities

*required

What type of study/project is this submission ?

Type of research

✓ Research Study/Creative Investigation

A research study or creative investigation is a project that uses systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge (45 CFR 46.102(d)).

Clinical Trial

Single Patient, Treatment Use, Continued Access Drug/Device Study

Emergency (or Compassionate) Use of Investigational Drug or Device

*required

Will this study/project ONLY use pre-existing data?

Pre-existing data means the data existed before or was collected prior to the study/project was proposed for a purpose other than the proposed study/project. (For purposes of a grant, this refers to data collected prior to the time the study/project was proposed.)

Select **no** if the study includes a combination of pre-existing and new data.

✓ Yes

*required

Is the pre-existing data publicly available

Yes

✓ No

*required

How and when was the data originally collected?

Is there permission of the owner of the data?

The data was collected previous to the study using Survey Monkey.
Yes, see attached letter.

No

*required

Provide a short description of the study/project

A pre- and post-survey where administer to all participants at the Broader Engagement Program at SIAM CSE 21. The main objective was to investigate if there is any change in participants' perception about the CSE field before and after the workshop.

Informed Consent

*required

Informed Consent procedures/methods and forms

Identify the procedures/methods and consent forms to be used in your study:

Written consent/assent form which contains all elements of the informed consent

A short form written consent/assent form summarizing orally presented consent information

Written consent document but waiver of study participant or legal guardian?s signature

✓ Not applicable
*required

Explain why no consent document is required.
We did not collect the data.

Conflict of Interest

*required

Do you or any investigator(s) participating in this study have a financial interest related to this research project?

Yes

✓ No

Attachments (Optional)

This section is an overview of all the attachments in your application.

Attach outside IRB records in this section under **Outside IRB of Record**.

Other Facility

If applicable, include the Letter of Cooperation.
BE@CSE21_Survey_Analysis_letter of support.pdf

Other facilities

If applicable, include all the Letters of Cooperation.
BE@CSE21_Survey_Analysis_letter of support.pdf

Study Procedures

If applicable, attach the following documenttion

Study Documents

If applicable, this includes flyers used for recruitment.

Study Instruments

If applicable, attach all instruments (i.e. surveys, questionnaires, evaluation blanks, etc) to be used in the study.
BE_PreSurvey_FINAL.pdf

BE_PostSurvey_FINAL.pdf

Existing data (archives/databases,..)

If applicable, include permission to access.

FDA Letter

If applicable, attach FDA Letter.

Participant Protection

Attach applicable forms

Written consent/assent form

Short form written consent/ ascent form

Outside IRB of Record

If applicable, attach outside IRB records

Study Protocol

Attach the protocol for this study that was reviewed by the Outside IRB.

Outside IRB Approval

Attach the IRB Approval from the Outside IRB.

Outside IRB Review Meeting Minutes

Attach the minutes from the outside IRB meeting(s) for the review of this study.

Outside IRB Correspondence

Attach all correspondence concerning the review of this study by the Outside IRB.

B References

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