CRA-E/CRA-WP CSGrad4US Mentoring Program:

Cohort Two Year One Immediate Impact Evaluation Report

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Evaluation

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To learn more about CRA's Center for Evaluating the Research Pipeline, please visit our website: http://cra.org/cerp. Questions regarding this report and/or requests for other related documents please contact: cerp@cra.org.

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About CERP & Acknowledgements

The Computing Research Association's (CRA) Center for Evaluating the Research Pipeline (CERP) is a research and evaluation center whose mission is to promote diversity in computing. CERP serves as a resource for the computing community by supporting efforts to recruit and retain individuals considered underrepresented in computing or historically marginalized (i.e., women; people who are Black/African American, Hispanic/Latinx, Indigenous and First Nations, Native Americans, Alaska Natives, Native Hawaiians, and Pacific Islanders; persons with disabilities; persons from low-income backgrounds; first generation college students; LGBTQIA+ individuals; and veterans). More generally, CERP strives to inform the computing community about patterns of entry, subjective experiences, persistence, and success among individuals involved in academic programs and careers related to computing.

CERP was created by the Committee on the Status of Women in Computing Research (CRA-W)/Coalition to Diversify Computing (CDC) Alliance through a National Science Foundation grant to the Computing Research Association (CNS-1246649). The current research was supported by NSF grant CNS-2123180. Any opinions, findings, conclusions, and recommendations are the authors' and do not necessarily reflect the views of the National Science Foundation.

For more information about CERP, visit http://cra.org/cerp/.

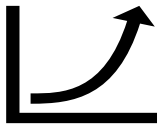
Executive Summary

The Computing Research Association's (CRA) Center for Evaluating the Research Pipeline (CERP) provided evaluation for the CSGrad4US Mentoring Program by assessing the impact of the program on the fellows' experiences applying to graduate school and their first-year graduate school experiences. CERP employed a pretest-posttest framework in each of the two years of the program. In this report, evaluation findings will focus on cohort two mentees' experiences in the program in the first year, where CERP examined the cohort's experiences and impacts in applying to graduate school at program entry (Time 1) and after applying to graduate programs (Time 2). Evaluation results suggest that the program had a positive immediate impact on some fellows' graduate school preparation and professional outcomes. In addition, cohort two participants provided feedback to improve the program for future cohorts.

YEAR ONE KEY FINDINGS #1: IMMEDIATE IMPACTS

After year one in CSGrad4US Mentoring Program, cohort two participants who completed both Time 1 and Time 2 program surveys showed:

- Significant increases in the following outcomes:



Perceived Mentorship support
Perceived Professional Network
Knowledge in Graduate School Application

- No Observed Changes in The Following Outcomes:

Identification in computing
Sense of belonging
Self-efficacy in graduate school application
Future career and employment preferences

YEAR ONE KEY FINDINGS #2: PROGRAM-SPECIFIC FEEDBACK

Overall Rating on the Quality of CSGrad4US Mentoring Program

On average, mentees rated and appreciated the quality of the CSGrad4US individual coaching supporting their graduate school application.

Overall Rating on CSGrad4US Mentoring Program Structure

On average, mentees found the information they received about the graduate application process and the coaching they received for graduate school application support as very helpful during the first year in the program.

Overall Feedback on Program's Mentoring and Coaching Activities

Positive Feedback

- Mentees appreciated the effective coaching and their coach's involvement in their graduate school applications.
- Mentees appreciated the mentoring and program design helping them to achieve their educational and career goals.
- Few mentees were satisfied with networking opportunities, especially using Discord for the cohort-based networking and social activities.

Suggestions and Recommendations

- Some mentees recommended for the program organizers to address mental health topics in the sessions, providing better assistance for applicants dealing with mental health issues.
- Mentees advocated for more clarification and information on stipends and financial assistance from participating in the program.
- Few mentees recommended for better mentor-mentee matching based on similar research interests.
- Suggestions for coaches to maintain post-application support, especially for those transitioning from industry to academia.

Overall Feedback on Mentees' Concerns Related to their Participation.

Funding Concerns

- Mentees expressed concerns about how funds will be disbursed once they begin their first semester in their graduate program.

- Some mentees were unclear about the structure of funding and express a desire to see more details understand its utilization better.
- Mentees mentioned confusion about how fellowships work, particularly about potential interactions with other internal school scholarships.
- Few mentees were concerned about getting significant pay cut when they transition into their PhD programs.

Compliance/Program Eligibility with CISE Discipline

- Mentees expressed more guidance from coaches on what program is acceptable regarding CISE discipline.
- Emphasis on the need from coaches to clarify and review every part of the application, ensuring that the participant fulfills the program's requirements.

Future Admissions & Professional Goals

- Some mentees addressed dealing with health problems and uncertain about enrolling in their program by Fall 2024.
- Suggestions for more clarification on policies regarding deferment or potential rea-application.

Overall Feedback on Valuable Aspects of Program

Mentoring & Coaching Appreciation

- Mentees appreciated their coaches helping them improve their application materials and discuss their academic goals.
- One-on-one coaching sessions were highlighted as invaluable to providing personalized experiences, and helping participants gain confidence in navigating their options.
- Networking with professors is mentioned as a valuable aspect, providing insights into academia and helping participants understand what life inside academia is like.

Community & Peer Support

- Some mentees appreciated the peer support created during the application process, maintaining Discord as a platform to hold space for resource sharing and accountability.
- Appreciation for insights gained from panel presenters and former CSGrad4US cohort members. Also, some mentees appreciated the support from various professors when it involved their application materials.

Comprehensive Program Structure

- Some mentees recognized the program's effectiveness in guiding their peers through all aspects of the application process.
- Appreciation for the organized and helpful structure of the group mentoring sessions.

Encouragement & Confidence Building

- The program and mentorship were appreciated by the participants to have the confidence to believe that attending graduate school was within their aspirations.
- The program's impact on the participant to envision themselves as a Ph.D. student was valuable, contributing to participants' understanding of the graduate school life.
- Some mentees mentioned that the impact of the program re-ignited their interest in research and academia, especially for those returning to school.

Additional Program-Specific Feedback

Overall Appreciation

- Mentees were highly satisfied with the program's impact on their educational aspirations overall.
- Provided positive feedback on the coaching and mentoring support during the application process.
- Appreciation for the program structure and the opportunity to seek support from former CSGrad4US peers and coaches.
- Some mentees were happy with opportunity to connect with their fellow peers.

Overall Recommendations

- Mentees consider including GRE prep as an optional benefit to enhance cohort preparation. Also, some feedback mentioned to consider in supporting participants in part-time doctoral programs with tuition assistance.
- Program organizers should consider including an earlier mentoring session on the GRE, like covering its structure and content.
- Mentees recommended for their coaches to address any financial challenges of leaving their jobs and relocating for full-time graduate programs.

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1. Introduction

The Computing Research Association's Committees on Education (CRA-E) and Widening Participation (CRA-WP) collaboratively implemented the CSGrad4US Mentoring program for recipients of the National Science Foundation's (NSF) CSGrad4US Graduate Fellowships. The program targets individuals currently in the workforce who are planning to return to computing-related graduate programs. The goals of the CSGrad4US Mentoring Program are (1) to guide returning students through the application process towards a successful graduate admission and school selection, (2) mentor them through the transition to graduate study in the first year towards high retention, and (3) increase the domestic pipeline of students earning graduate degrees in computing.

The CSGrad4US Mentoring Program offered for the CSGrad4US Fellows to address the unique needs and situations of those in the workforce who want to return to school. Through this program, fellows will receive both group mentoring and individual coaching over the course of two years. In the first year, mentees were d advised on the graduate school application and selection process. In the second year, mentees were advised on having a successful first year of their doctoral program.

Report Overview

Employing a quasi-experimental research approach with a comparative pre-test-posttest framework, the CRA Center for Evaluating the Research Pipeline (CERP) conducted an evaluation of the year one of CSGrad4US Mentoring Program. CERP used an online survey to distribute to mentees at program entry (Time 1) and program exit (Time 2). In the first year, CERP examined cohort one participants' goals, aspirations, and experiences with their graduate school applications. The surveys also aimed to assess the immediate impact of the mentoring provided in the first year on the fellows. The Time 2 survey included open-ended feedback questions, allowing participants to provide insights into the impacts of the mentoring received during the first year. This report focuses on the analysis of 68 cohort two participants, discussing the results and assessing any immediate impacts on the mentees' outcomes, such as social support and graduate school preparation, in relation to the program's goals.

2. Evaluation Methodology

Data Collection Activities

CERP employed a pretest/posttest framework to assess the impact of the CSGrad4US Mentoring Program. The evaluation involved administering surveys at two distinct time points: program entry (Time 1) and immediately upon program completion (Time 2). At program entry, CERP distributed a pre-program survey to gather information on participants' demographics, past educational history, and initial perceptions of career interests, social support, and motivations for pursuing graduate school. The post-program survey was administered after program completion, which measured changes in participants' perceptions across various measures outlined in the Program Measures section. Additionally, this survey included questions seeking participants' feedback and evaluation of the program's impact on their graduate school experiences.

Program Measures

For the evaluation of the CSGrad4US Mentoring Program, CERP examined the impacts during the first year of the program using the following self-reported quantitative outcomes: identification with computing, sense of belonging, graduate school knowledge/preparedness, perceived mentorship support, perceived professional network, and career interests.

Analyses

Pre/post comparisons of CSGrad4US Cohort 2 fellows were analyzed using a paired samples t -test on each Likert-scale outcome measure (e.g., measures rated on a scale from 1 to 5 to create a mean score). Two-proportions z -tests were used to test differences between proportions of groups (e.g., measures with only one response option thus creating the percentage of participants who selected a particular option). For each statistical test, we indicate whether differences in means or proportions from Time 1 to Time 2 are statistically significant using the conventional, $p \leq .05$ thresholds for inferential statistics.

It is important to note that positive changes between Time 1 and Time 2 responses suggest, but do not prove, the positive impact of the fellowship. Due to limitations inherent in pretest/posttest self-reported data, changes between Time 1 and Time 2 could be due to response bias, demand characteristics, or may be fleeting and not sustained over time.

Qualitative data (i.e., open-ended comments) were analyzed using a thematic coding scheme, wherein patterns among open-ended comments were grouped together and summarized as an over-arching theme or ideas.

3. Participant Characteristics

SECTION OVERVIEW

This and the following sections report the participant characteristics for Cohort 2 CSGrad4US program participants, based on the cohorts' responses on the Time 1 (pre-program) survey. The sections tables highlight the cohort on the following characteristics:

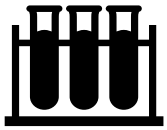
- Demographics
- Post Undergraduate Activities and Research Experiences

SECTION KEY FINDINGS

DEMOGRAPHICS

Most participants identified as White/Caucasian (49%), having attention-deficit or health related disability (28%), and male (49%) (Tables 3.1, 3.4, and 3.5).

POST-UNDERGRADUATE ACTIVITIES AND RESEARCH EXPERIENCES



At program entry, majority of Cohort 2 fellows were involved in course-based research projects and internships in their undergraduate programs (Table 3.6).

Cohort 1 participant had a lot of experience in collaborating with colleagues on research projects before starting CSGrad4US Mentoring Program (Table 3.8).

Table 3.1. What is your race/ethnicity?

	CSGrad4US Participants
	Percentage
Black or African American	10%
Native Alaskan or American Indian	0%
Native Hawaiian or Pacific Islander	0%
White or Caucasian	47%
Asian/Southeast Asian	29%
Other	0%
Latinx	14%
n	70
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. Select all that apply.	

Table 3.2 Participant veteran status.

	CSGrad4US Participants
	Percentage
No	99%
Yes	1%
n	68
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met.	

Table 3.3. Participant gender.

	CSGrad4US Participants
	Percentage
Female	46%
Male	49%

	CSGrad4US Participants
Gender fluid	1%
Non-binary	3%
n	67
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met.	

Table 3.4 What type of disability do you have?

	CSGrad4US Participants
	Percentage
None	0%
Attention deficit or ADD/ADHD	14%
Deaf or hard of hearing	1%
Autism spectrum disorder or ASD	4%
Health related	14%
Learning or other invisible	0%
Mental health	0%
Mobility	1%
n	71
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. Please check all that apply.	

Table 3.5 In what year did you complete your most recent undergraduate degree?

	CSGrad4US Participants
	Percentage
2016	6%
2017	8%
2018	6%

	CSGrad4US Participants
2019	26%
2020	30%
2021	24%
n	50
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met.	

Table 3.6. Up to this point in your undergraduate program, which of the following experiences were you involved in that were NOT part of a formal REU?

	CSGrad4US Participants
	Percentage
Independent research projects	41%
Course-based research projects	62%
Internships or co-ops	53%
Research Assistant	39%
Teaching Assistant	32%
K-12 outreach	21%
None of the above	6%
n	66
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. Select all that apply.	

Table 3.7. What experiences were you involved in during your undergraduate program that were NOT part of a formal REU?

	CSGrad4US Participants
	Percentage
Entrepreneurial or consulting projects	9%

	CSGrad4US Participants
Computing-related student groups	30%
n	66
(*) p ≤ .05; (N/A) n<5 or test criteria were not met. Select all that apply.	

Table 3.8. How much experience have you had with

	CSGrad4US Participants
	Mean (SD)
Generating hypotheses	2.69 (1.01)
Using scientific methods to test a hypothesis	3.05 (1.24)
Collaborating with colleagues	**3.62 (1.13)**
Collecting data or conducting experiments	3.44 (1.37)
Analyzing data with statistics or other tools	3.41 (1.37)
Summarizing published research results	2.94 (1.26)
Explaining research results	3.20 (1.25)
Writing or co-authoring a research paper or report	2.70 (1.11)
Presenting a research paper or report	2.77 (1.17)
Publishing a research paper or report	1.88 (1.01)
n	66
(*) p ≤ .05; (N/A) n<5 or test criteria were not met. (1) None - (5) A lot	

4. Cohort Two Pre-Post Program Findings

Self-Perceptions and Self-Efficacy in Graduate School Preparation

SECTION OVERVIEW

This section summarizes cohort two participants' attitudes, sense of belonging, and confidence in applying to graduate school programs at program entry and after applying for graduate school (Time 2) that relate to their future and current educational paths including:

- Identification and belonging in computing.
- Perceived scientific identity.
- Self-efficacy in the graduate school application.

SECTION KEY FINDINGS

IDENTIFICATION WITH COMPUTING

There were no significant differences over time in Cohort 1's participants' computing identity. However, there was little movement in the scores over time in the following statements: "I see myself as a computing person" and "I feel welcomed in computing" (Table 4.1).

PERCEIVED SCIENTIFIC IDENTITY

There were no significant differences over time in Cohort 1's participants' computing identity. However, there was little movement in the scores over time in having a strong sense of belonging to the community of scientists (Table 4.2)

SELF-EFFICACY IN GRADUATE SCHOOL APPLICATIONS

There were no significant differences over time in Cohort 1's participants' confidence in applying to graduate school and achieve in the careers. However, there was little movement in the scores over time in completing a graduate degree program and finding employment in area of computing interests. (Table 4.3).

Table 4.1. Please indicate the extent to which you disagree or agree with the following statements.

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
I see myself as a computing person.	4.36 (0.88)	4.29 (0.85)	
I feel like I belong in computing.	3.97 (1.07)	4.09 (0.99)	
I feel like an outsider in computing.	2.76 (1.27)	2.65 (1.27)	
Computing is a big part of who I am.	3.99 (1.05)	4.15 (0.86)	
I feel welcomed in computing.	3.81 (1.09)	4.09 (0.84)	
n	67	55	
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Strongly disagree - (5) Strongly agree			

Table 4.2 Please indicate the extent to which you agree with each statement.

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
In general, being a scientist is an important part of my self-image.	3.85 (1.17)	3.98 (1.21)	
I have a strong sense of belonging to the community of scientists.	3.45 (1.16)	3.66 (1.15)	

	Time 1	Time 2	
Being a scientist is an important reflection of who I am.	3.78 (1.18)	3.91 (1.23)	
I have come to think of myself as a scientist.	3.76 (1.16)	3.88 (1.25)	
n	67	56	
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Strongly disagree - (5) Strongly agree			

Table 4.3. I am confident that I can:

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
Choose graduate programs that are well-suited to my goals.	3.88 (0.84)	4.30 (0.82)	
Prepare a strong graduate application package.	3.89 (0.90)	4.40 (0.70)	
Get admitted to a graduate computing program.	3.92 (0.83)	4.10 (0.99)	
Be successful in a graduate computing program.	4.30 (0.82)	4.54 (0.74)	
Complete a graduate degree program	4.61 (0.65)	4.64 (0.59)	
Be a capable researcher in computing.	4.37 (0.74)	4.48 (0.76)	
Find employment in an area of computing interest.	4.52 (0.61)	4.52 (0.63)	
n	67	56	
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Strongly disagree - (5) Strongly agree			

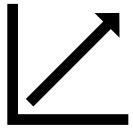
SECTION OVERVIEW

This section shows the changes in their social support structures among cohort two program participants, based on their responses on the program surveys. The sections tables highlight the following measures:

- Mentor Support
- Professional Network

SECTION KEY FINDINGS

MENTOR SUPPORT

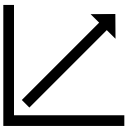


Cohort 2 participants reported stronger mentorship, wherein they were more likely than at program entry to have access to **mentors who can talk about challenges of going back to graduate school after working, provide information on the graduate school process, and discuss about balancing professional/personal responsibilities.** (Table 4.4).

The most responses for Cohort 2 participants to consider someone as a mentor were **coworker, supervisor, or someone else with whom they have a professional relationship** and **family member, partner, friend, religious leader, or someone else with whom they have a personal relationship** (Table 4.6).

Cohort 2 participants reported that they have a mentor who helped them in most of the composite measures, **except helping them improving their computing skills and showing compassions for any issues that they discussed.** (Table 4.7).

PROFESSIONAL NETWORK



Cohort 2 participants reported **significant improvement** in having available professional support in different aspects (Table 4.5).

Table 4.4. To what extent do you have access to

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
People you can talk to about research topics you find interesting?	3.24 (1.34)	3.62 (1.09)	
People you can talk to about the challenges of going back to graduate school after working?	**2.64 (1.47)**	**3.39 (1.14)**	*
People who can give you advice about applying to graduate school?	3.19 (1.31)	3.60 (0.97)	
People who can give you information about what graduate school is like?	**3.33 (1.20)**	**3.79 (1.00)**	*
People you can talk to about balancing professional and personal responsibilities?	**3.18 (1.24)**	**3.68 (1.01)**	*
n	67	56	

(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) None - (5) Very much

Table 4.5. To what extent is each of the following available to you at this point?

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
People whom you can ask professional development questions?	3.15 (1.27)	3.71 (1.06)	*
A strong network of peers to interact with at conferences?	2.15 (1.40)	2.77 (1.31)	*

	Time 1	Time 2	
A strong network of mentors to interact with at conferences?	2.00 (1.35)	2.86 (1.24)	*
People who would be excited to learn about your professional successes?	3.30 (1.15)	3.71 (1.07)	*
People with whom you can discuss issues you are having?	3.04 (1.17)	3.48 (1.19)	*
n	67	56	
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) None - (5) Very much			

Table 4.6. Who do you consider to be a mentor?

	Time 1	Time 2	
	Percentage	Percentage	Sig.
My academic advisor from my undergraduate institution	28%	25%	
A professor from my undergraduate institution (not my advisor)	45%	48%	
A faculty member from an academic institution other than my undergraduate institution	N/A	N/A	N/A
A Director or administrative faculty	9%	12%	
A graduate student (includes graduate teaching/research assistants and student mentors)	31%	38%	
An undergraduate student (includes undergraduate teaching/research assistants and student mentors)	1%	2%	N/A
Someone I met at a conference or mentoring program sponsored by an outside organization (or other professional activity)	9%	20%	

	Time 1	Time 2	
A family member, partner, friend, religious leader, or someone else with whom I have a personal relationship	33%	52%	
A coworker, supervisor, or someone else with whom I have a professional relationship	66%	68%	
Someone else	4%	9%	N/A
I do not have a mentor	7%	5%	N/A
n	67	56	
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. Select all that apply.			

Table 4.7. To what extent do you have a mentor who:

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
Helps you improve your computing skills?	2.58 (1.41)	2.81 (1.33)	
Helps you improve your research skills?	**3.03 (1.53)**	**3.58 (1.23)**	*
Helps you identify or develop your research interests?	**2.73 (1.46)**	**3.45 (1.28)**	*
Gives you insight into what graduate school is like?	**2.92 (1.49)**	**3.79 (1.10)**	*
Provides information or advice about applying for graduate school?	**2.91 (1.48)**	**4.25 (0.71)**	*
Explores career options with you?	**2.42 (1.29)**	**3.32 (1.22)**	*
Shows compassion for any issues you discussed with them?	3.65 (1.25)	3.96 (1.14)	
Shares personal experiences as an alternative perspective to your problems?	**3.12 (1.26)**	**3.66 (1.18)**	*
Prepares you for a career in academia?	**2.53 (1.38)**	**3.58 (1.20)**	*
Provides constructive feedback?	**3.45 (1.28)**	**3.92 (1.11)**	*

	Time 1	Time 2
n	66	53
(*) p ≤ .05; (N/A) n<5 or test criteria were not met. (1) None - (5) Very much		

Table 4.8. Overall, how satisfied are you with the amount of mentoring support you have for issues related to your professional life?

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
Overall, how satisfied are you with the amount of mentoring support you have for issues related to your professional life?	3.20 (1.21)	3.98 (0.91)	*
n	66	53	
(*) p ≤ .05; (N/A) n<5 or test criteria were not met. (1) Extremely dissatisfied - (5) Extremely satisfied			

Table 4.9. Overall, how satisfied are you with the amount of peer support you have for issues related to your personal life?

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
Overall, how satisfied are you with the amount of peer support you have for issues related to your personal life?	N/A	N/A	N/A
n	0	0	
(*) p ≤ .05; (N/A) n<5 or test criteria were not met. (1) Extremely dissatisfied - (5) Extremely satisfied			

SECTION OVERVIEW

This section's findings and tables summarizes cohort two participants' motivation, knowledge, and preparedness in applying graduate school throughout their participation in the program, including:

- Graduate School Motivations
- Graduate School Preparation & Application
- Knowledge about Graduate School

SECTION KEY FINDINGS

GRADUATE SCHOOL MOTIVATIONS

The most responses for cohort two fellows' motivations to apply to graduate school were they wanted to make an impact on society with their advanced degree and future career and work on advanced research projects (Table 4.10).

On average, participated reported that they were more likely to already identified one or more programs where they wanted to apply to graduate school. (Table 4.11).

GRADUATE SCHOOL PREPARATION & APPLICATIONS

On average, participants reported that they are more likely to successfully complete a doctoral program, if they are accepted (Table 4.12).

KNOWLEDGE ABOUT GRADUATE SCHOOLS

After Year 1, cohort two mentees showed **significant improvement** in their knowledge and learning about the graduate school process (e.g., application materials, resume/CV, etc.) (Table 4.14).

Table 4.10. Which of the following are your biggest motivations for deciding to apply to graduate school?

	CSGrad4US Participants
	Percentage
Wanting to continue my learning	70%
Making an impact on society with an advanced degree	**78%**
Feeling limited in my current career options	15%
Disliking the work I am currently doing	9%
Wanting to work with a specific professor	3%
The job market for advanced degrees is promising	3%
My dream job requires an advanced degree	21%
Wanting to work on advanced research projects	**75%**
Wanting to make a lot of money	4%
My family or friends encouraged me to apply	6%
Other; please specify:	3%
n	67
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. Choose up to 3 items below.	

Table 4.11. To what extent are each of the following statements true for you?

	CSGrad4US Participants
	Mean (SD)
I have friends who are or have been in graduate programs who tell me what it is like.	3.51 (1.32)
I am unsure about what research area I want to focus on in graduate school.	2.30 (1.10)
I have already identified one or more programs where I want to apply to graduate school.	**3.82 (1.32)**
My supervisor at work knows all about my current graduate school plans.	3.14 (1.71)
I have work colleagues who are supportive of my decision to apply to graduate school.	3.42 (1.65)
It will be difficult for me to leave my current job to attend graduate school.	1.80 (0.98)
I have strong connections to my former professors and advisors from my undergraduate program.	2.79 (1.43)
I am concerned that my academic background is not strong enough to get me into graduate school.	2.61 (1.27)
I wonder how well I will be able to handle the stress of graduate school.	2.76 (1.33)
n	67
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Not at all true - (5) Extremely true	

Table 4.12. How likely is it that

	CSGrad4US Participants
	Mean (SD)

	CSGrad4US Participants
You will apply to one or more doctoral programs in computing this fall?	4.24 (1.16)
You will receive admission to one or more doctoral programs in Spring 2022?	3.26 (1.10)
If accepted, you will enroll in a doctoral program for Fall 2022?	4.39 (1.01)
If you enroll, you will successfully complete your doctoral program?	4.42 (0.79)
n	66
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Not at all likely - (5) Extremely likely	

Table 4.13. How committed are you to completing a doctoral degree program?

	CSGrad4US Participants
	Mean (SD)
How committed are you to completing a doctoral degree program?	4.54 (0.75)
n	67
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Not at all likely - (5) Extremely likely	

Table 4.14. How much do you feel you know about

	Time 1	Time 2	
	Mean (SD)	Mean (SD)	Sig.
How to find graduate programs that are right for you?	N/A	N/A	N/A
What to look for in a graduate research advisor?	**2.61 (1.04)**	**3.96 (0.80)**	*
Whether your graduate school goals are realistic?	**2.45 (1.15)**	**3.70 (0.93)**	*

	Time 1	Time 2	
How to identify and approach good candidates for writing your letters of recommendation?	**3.06 (1.13)**	**4.09 (0.81)**	*
How to write a strong resume for your graduate applications?	**2.73 (1.16)**	**4.00 (0.85)**	*
How to write a strong personal statement for your graduate applications?	**2.64 (1.00)**	**4.12 (0.85)**	*
What parts of your background you should emphasize in graduate applications?	**2.45 (1.02)**	**4.02 (0.84)**	*
Which research areas you would like to pursue in graduate school?	N/A	N/A	N/A
What graduate admissions committees look for in an applicant?	**2.27 (1.08)**	**3.98 (0.79)**	*
How to choose between different graduate programs that may offer you admission?	N/A	N/A	N/A
What to do during site visits for potential graduate programs?	N/A	N/A	N/A
How to choose your graduate courses?	N/A	N/A	N/A
What doing research as a graduate student is like?	N/A	N/A	N/A
n	0	0	
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Nothing - (5) A lot			

SECTION OVERVIEW

This section summarizes cohort two participants' future career/professional interests and preferences at program entry, including their general job interests and preferred career setting.

SECTION KEY FINDINGS

Cohort two participants were very interested in becoming a computing researcher in the industry (Table 4.15) and more likely to work in academia (Table 4.16).

Table 4.15. How interested are you in having the types of jobs listed below after you finish your highest degree?

	CSGrad4US Participants
	Mean (SD)
College or university professor in computing field (teaching focused)	3.06 (1.36)
College or university professor in computing field (research focused)	3.97 (1.15)
Computing researcher in industry	**4.24 (0.85)**
Computing researcher in a government lab or agency	3.51 (1.17)
Entrepreneur (computing related; e.g., individual contractor, build a start-up)	3.25 (1.39)

	CSGrad4US Participants
n	66
(*) p ≤ .05; (N/A) n<5 or test criteria were not met. (1) Very uninterested - (5) Very interested	

Table 4.16. For your future career, in which setting would you like to work the most?

	CSGrad4US Participants
	Percentage
Academia	**52%**
Industry	28%
Government	10%
Self-employment	6%
Something else	3%
n	67
(*) p ≤ .05; (N/A) n<5 or test criteria were not met.	

Table 4.17. How interested are you in having a career:

	CSGrad4US Participants
	Mean (SD)
How likely will your future career have a computing-related focus?	**4.73 (0.77)**
How likely will your future career have a research focus?	4.45 (0.93)
n	67
(*) p ≤ .05; (N/A) n<5 or test criteria were not met. (1) Extremely unlikely - (5) Extremely likely	

5. Program Year 1 Perceptions & Feedback

SECTION OVERVIEW

This section summarizes cohort two participants' feedback on their experiences with the quality and mentoring impact on their motivation and success on their graduate school application after the first year of the program.

Followed by the results of survey questions, qualitative data were collected via open-ended comments and summarized into themes below.

Table 5.1 Rating on the Quality of Program.

	CSGrad4US Participants
	Mean (SD)
Overall, how would you rate the quality of the CSGrad4US individual coaching you received?	4.12 (0.97)
Overall, how would you rate the quality of CSGrad4US group mentoring sessions and panels?	3.95 (0.91)
Taking all your experiences into account, how would you rate the quality of the CSgrad4US program support you received during Year 1?	3.94 (0.98)
Overall, how would you rate the quality of CSGrad4US program so far?	**4.28 (0.77)**
n	57
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Poor - (5) Excellent	

Table 5.2 How would you rate the following aspects of the CSGrad4US program so far?

	CSGrad4US Participants
	Mean (SD)
The information you received about the graduate application process	**4.33 (0.81)**
The information you received about what graduate school look like	4.09 (0.81
The information you received about what doing research is like	3.56 (1.02)
The information you received about how to choose the right graduate program for your needs and goals	4.00 (0.91)
The coaching you received about how prepare you graduate application materials	**4.33 (0.85)**
The amount of support you received from your coach about your decisions	3.95 (1.15)
The connections you made with your CSGrad4US peers	3.40 (1.21)
n	57
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Not necessary - (5) Very helpful	

Table 5.3. Rating on Overall Impact

	CSGrad4US Participants
	Mean (SD)
What impact do you think the CSGrad4US mentoring and coaching program has had on your ability to achieve your graduate school goals so far?	3.68(0.51)
n	57
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) No impact - (4) A large impact	

Table 5.4. Overall learning on graduate school and the application process in Year 1.

	CSGrad4US Participants
	Mean (SD)
Overall, how much did you learn about graduate school and the application process during the first year of the CSGrad4US Mentoring Program?	4.19 (0.83)
n	57
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) None - (5) A lot	

Table 5.5. Rating on the success of applying to graduate school.

	CSGrad4US Participants
	Mean (SD)
How successful do you feel you have been in achieving graduate school admissions goals that you had when you started the CSGrad4US program?	4.00 (0.91)
n	57
(*) $p \leq .05$; (N/A) n<5 or test criteria were not met. (1) Not at all successful - (5) extremely successful.	

Table 5.6. Feedback on program's mentoring and coaching

Please tell us below if there is anything else you feel the program's mentoring and coaching should have covered more or differently in the first year. This information will help us plan for the next cohort of CSGrad4US mentees.		
Themes	Positive Comments	Areas of Improvements
 Quality of Coaching & Mentoring Sessions	• " This program was amazing. I can't say enough good things about both the program's mentoring and coaching. I feel very lucky to have been a part of it." • "I feel that the program mentoring and coaching was great! I think my main suggestion would be to have the mentors reach out a bit more proactively, I feel that I should've have been leveraging the time and access with my mentor a bit more, especially early on." • "I loved working with my coach! Professor Rushalnagar was so kind and informative about my application materials and schools list!"	• "I definitely feel that there could have been a better match between my mentor and me so that I could more clearly express my concerns within my field of choice. Otherwise, I feel that the advice I receive feels quite general." • "Cohort participants have varying levels of industry experience. I think it would be helpful to explore creating subgroups by experience level and providing relevant coaching to each subgroup. The coaching needs of someone a few years removed from undergrad studies are different from the coaching needs of someone 10 or more years removed from their last degree."

Table 5.6a. Feedback on program's mentoring and coaching

Please tell us below if there is anything else you feel the program's mentoring and coaching should have covered more or differently in the first year. This information will help us plan for the next cohort of CSGrad4US mentees.		
Themes	**Positive Comments**	**Areas of Improvements**
 Additional Information & Coaching Support	• "I'm just excited I get this opportunity, I never thought I would get into grad school. I had poor grades in undergrad and everyone who helped me with my application looked past it and allowed me to dream big." • "Please maintain the panels of former students. That was extremely helpful. The design of the program is spot on. Perhaps you could include more information on available programs by acceptable content areas to help us get started quicker in identifying prospective schools." • "The sessions and individual coaching was extremely helpful and effective. They gave great information and I felt completely prepared to fill out my applications. Thank you for everything!"	• "Perhaps more insight into how research develops towards a thesis and whether or not the topic you research is more important than the development of research skills which can be used for any topic." • "The biggest gaps in my knowledge going into the process were getting a good grasp on what research was actually like and the financial aspects of going to graduate school. In particular I would have like more clarity about the limits around funding (the fact that you're not allowed to work), what awards you are and are not allowed to accept, and how the grant status relates to accepting teaching or research assistant positions." • "I think it may be helpful to emphasize throughout the entire series in the fall which specific programs the funding is eligible for. While I remember it being stated clearly in at least one meeting and elsewhere, and encountered no problems myself, I met a handful of people who did not seem to have remembered or felt misinformed about what programs they should have applied for, and they were pretty upset about it."

Table 5.7. Feedback on concerns related to participation.

If relevant, please describe any current or ongoing concerns you have related to your continuing participation in the CSGrad4US program.	
Themes	**Cohort 2 Mentee Comments**
 Funding and Financial Assistance	• "I have no concerns about the program, overall. I may personally have a slightly different funding situation where my funding would ideally start in January rather than August, since my university will provide a fellowship of their own in the first semester." • "My only concern about my participation is the same financial concerns I've echoed at every stage of the process. We're fighting to make it happen and either find work in another city or some other income stream just to cover living expenses. The lack of transparency with the rules of the program left me blindsided and scrambling to reassess my whole life on top of the graduate process." • "My only concern is just ensuring that I am completing all necessary steps for the program's financial support to be disbursed smoothly when I start this fall."
 Graduate School Transition & Lifestyle Adjustment	• "I am currently dealing with some health problems and am unsure if it will be realistic for me to begin a PhD program by Fall 2024. (I am part of the 2022 cohort and decided not to apply in Fall 2023, but can still apply for Fall 2024.) I will reach out to erik@cra.org regardless, but I am not sure what the policies are regarding further deferment of a PhD program. Do I need to reapply for the grant from scratch? Are there exceptions to the Fall 2024 deadline I'm unaware of?" • "I received the grant with recommendations that I could apply to an educational technology program. Once in the program I learned that I could not apply to anything in the education department. Because I do not have any educational background in computer science, I felt it was difficult to find a program that met my needs. I have been an elementary school teacher for fifteen years and wanted to continue my work at my school."
 Program/Degree Eligibility	• "I'm currently going through the process of working with Erik to confirm that my chosen program (in computing education) complies as a CISE discipline. My advisor has drafted a letter to address the concern and we're hoping that it will suffice but were not given much guidance on what is acceptable. I was simply told that "Purdue has to certify that the program is CISE". I did not know how few research based PhD programs there are in computing/STEM education (vs EdDs) until I started researching." • "I feel like there is a lot of information that is obscured to me, the fellow. For example, there was some discussion on whether or not some programs would be accepted based on CIP code, but a more concrete standard would be nice. Alternatively more concrete examples of things that do or do not qualify as CISE."

Table 5.8. Overall feedback on valuable aspects of the program.

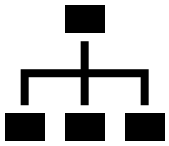
Please tell us below what has been the most valuable aspect of your experience in CSGrad4US so far.	
Themes	**Cohort 2 Mentee Comments**
 Coaching & Mentorship Appreciation	• "The most valuable aspect was absolutely the individual coaching that I received form my mentor. The help with writing my personal statement was substantial, I think. Not to mention, since my advisor was matched to my interests, I was able to discuss the field some with them as well." • "One on one mentorship and panels with other students. Also the breakouts where we met each other were really neat too." • "I found the mentorship I received extremely valuable. There was much I did not know about the grad application process, and having been in industry for a few years now, I was unsure that grad school was still a realistic goal for me. The mentorship sessions and office hours were my favorite parts CSGrad4US and I wouldn't be heading to grad school if it were not for this program!"
 Community & Peer Support	• "I have found great value in seeing other applicants receive admission into their programs of choice. It's extremely reassuring to see that the CSGrad4US program has helped them achieve those goals and it motivates me as I complete my application materials." • "Having a community of people in a similar position has been invaluable. I am already going into my first semester knowing someone who I met in the program!" • "For me, the individual coaching sessions were the most important aspect for my personal success in the application process. Additionally, I appreciated the Discord channel where we were able to connect with others in the program. I have made a couple of very good friends already through this channel."
 Comprehensive program structure	• "The way the group meetings were organized over the couple months of the application process, and the amazing support and meetings I received from my mentor." • "The most valuable aspect of the program was how comprehensive it was in stepping us through all aspects of the process. I was floundering in deciding what type of program, whether to self-fund, how to evaluate programs for 'fit', etc. I didn't even consider aspects of chosen advisor and ancillary program access and what a difference that can make on a successful experience"

Table 5.9. Additional program-specific feedback.

Please use the space below to add any other program-specific feedback or comments.
For the future, if the program is going to continue using Google products, e.g. Google Drive, for file sharing / storage / etc., please have the program request that everyone have or make a new Google account, even if just for participation in the CSGrad4US program. Not having a Google account is still doable, but authentication to get access to shared drives etc. is fundamentally more difficult and not worth the hassle. People can easily fall behind or get confused because they don't realize that they don't have access to files they should have - all because they are trying to use a non-Google account but the CSGrad4US program is using Google's ecosystem. Hope that makes sense.
I really enjoyed the whole précédas, appreciated that it was after work, and without it, I wouldn't be here.
Perhaps one of the earlier mentoring session can be on the GRE. What is the structure of the GRE. What content to expect to see. Just enough warning to kick the mentees into studying.
This program is amazing :)
The discord server has been a huge help for many of us
You should consider including GRE prep as an optional benefit. I know you said that we could access funding for a GRE prep course of choice but it could allow for more cohort interaction if it was offered as an option within the program. More programs are resuming the requirement for GRE scores and providing a prep option elevates the importance.
I will be doing a part-time doctoral program. I would have really liked to complete my studies as an NSF CSGrad4US Fellow and receive tuition support. I hope the NSF will, in the future, consider supporting students taking the part-time path. Not everyone can afford to leave their jobs and potentially relocate. I think CSGrad4US participants who are accepted into a part-time program, and who have the dedication, commitment, and willingness to take on a part-time doctoral program, should be supported with tuition assistance (no stipend) and allowed to be an NSF Fellow. During these early years of the CSGrad4US program, it is very much in line with the program goals to give the part-time approach a try and evaluate how it goes. Denying these rare and very small number of participants any support seems counterintuitive.

6. Discussion & Summary

The Year One evaluation report of the CSGrad4US Mentoring Program provides valuable insights into the immediate and mentoring impact on cohort two participants. It is essential to acknowledge the limitation in generalizability due to the sample size, recognizing that findings may not fully represent all participants' experiences.

The analysis indicates that most anticipated outcomes aligning with the program's goals were observed in participants who completed both Time 1 and Time 2 surveys. Positive changes were noted in perceived mentorship, professional support, and knowledge in graduate school applications. However, there were no significant observed changes in factors like identification with computing, sense of belonging, confidence for success in graduate school, and future career interests.

On the other hand, participants highly rated individual coaching for their goals and graduate school applications yet emphasized the need for clarity on the financial and funding process for the fellowship. Open-ended comments provided insights for improvement, including additional outreach to prospective PhD advisors, increased social time with peers, and more panels on research interests and gaining research experience, especially for fellows transitioning from industry to academia.

In summary, qualitative feedback from cohort two participants expressed overall appreciation for their coaches and programmatic support, contributing positively to their graduate school journey. Suggestions for improvement offer valuable guidance for future iterations of the mentoring activities. Overall, the first year of the program has made a significant impact on the participants' outcomes and experiences in applying and learning about the graduate school process. For next steps, CERP will conduct comparative analyses across these measures using first-year graduate students from our Data Buddies Survey for the year two evaluation report.

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