Leveraging Student Voices to Center Career Self-Efficacy in STEM PhD Programs

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Welcome and Introductions

- Expectations and hopes: Why are you attending this session?
- What do you hope to learn from today's session?

Key Take-Aways

Together, we will:

- Reflect on challenges related to implementing changes within programs based on assessment findings
- Discuss assessment design through the lens of actionable, equitable, aligned, and sustainable approaches
- Consider how the assessment process can build relationships across institutional departments and programs
- Identify concrete steps in our work in higher education assessment

Outlining the Theoretical Foundation

Doctoral education in the sciences has a high attrition rate nationally, with approximately 50% of students who enter doctoral programs completing the degree (National Academy of Sciences, 2023)

Calls for evidence-based improvements in higher education have been increasing in recent years, as data collection and data accessibility have grown (Montenegro & Jankowski, 2020; Cubarrubia, 2019)

Recent studies have led to increased awareness of the hurdles faced when trying to use assessment findings for changes within programs. For example, Blaich and Wise (2011) discovered that **only 25% of the institutions they studied, actively used assessment data that had been collected**

This finding corroborates research demonstrating that it is atypical within higher education to use survey feedback in decision making to improve educational programs (Jonson, Guetterman & Thompson, 2014)

Challenges: Free-write

What challenges have you encountered when trying to implement changes based on assessment data?

Group Discussion

Challenges in assessment design

- Assessments can be scaled too large, trying to collect too many things at once time
- Low response rates can call into question what to do with what you have
- Poor communication of findings to key stakeholders, including those who completed the survey/focus group/interview

Challenges in using data

- Lack of direct authority to implement changes recommended
- No follow-up from stakeholders after sending a report

Collaborative Assessment Model (CAM)

(Bathgate & Claydon, 2021)

In this case:

Thoughtfully engaging students, faculty and administrators in the discussion and use of evaluation data was foundational

To use student feedback in actionable ways, the design of any assessment tool needs to incorporate deep consideration of the participant experience and respect for their intentions and contexts

The design of the Biological and Biomedical Science graduate surveys involved iterative input from a broad range of stakeholders and reflected shifting language of the funding agencies to support evidence-based approaches to graduate training (Blume-Kohout, 2007; Deneke et al, 2017; Fuhrmann et al, 2011)

Survey design and methodology
Equity centered practices

First, engaged in a comprehensive literature review of current assessment methods in graduate education

Surveys designed with Directors of Graduate Studies, Training Program Directors, and adhered to the National Institutes of Health's training grant guidelines

Provided survey to Yale BBS Diversity and Inclusion Collective for graduate student feedback

Planned launch of surveys for the end of first year, and at graduation

Surveys incorporated

- existing measures (Anderson et al., 2016; Sinche et al., 2017)
- satisfaction with training activities
- confidence across skill sets
- career interests in 13 previously identified sectors (with "other" option)

Survey Implementation and Analysis

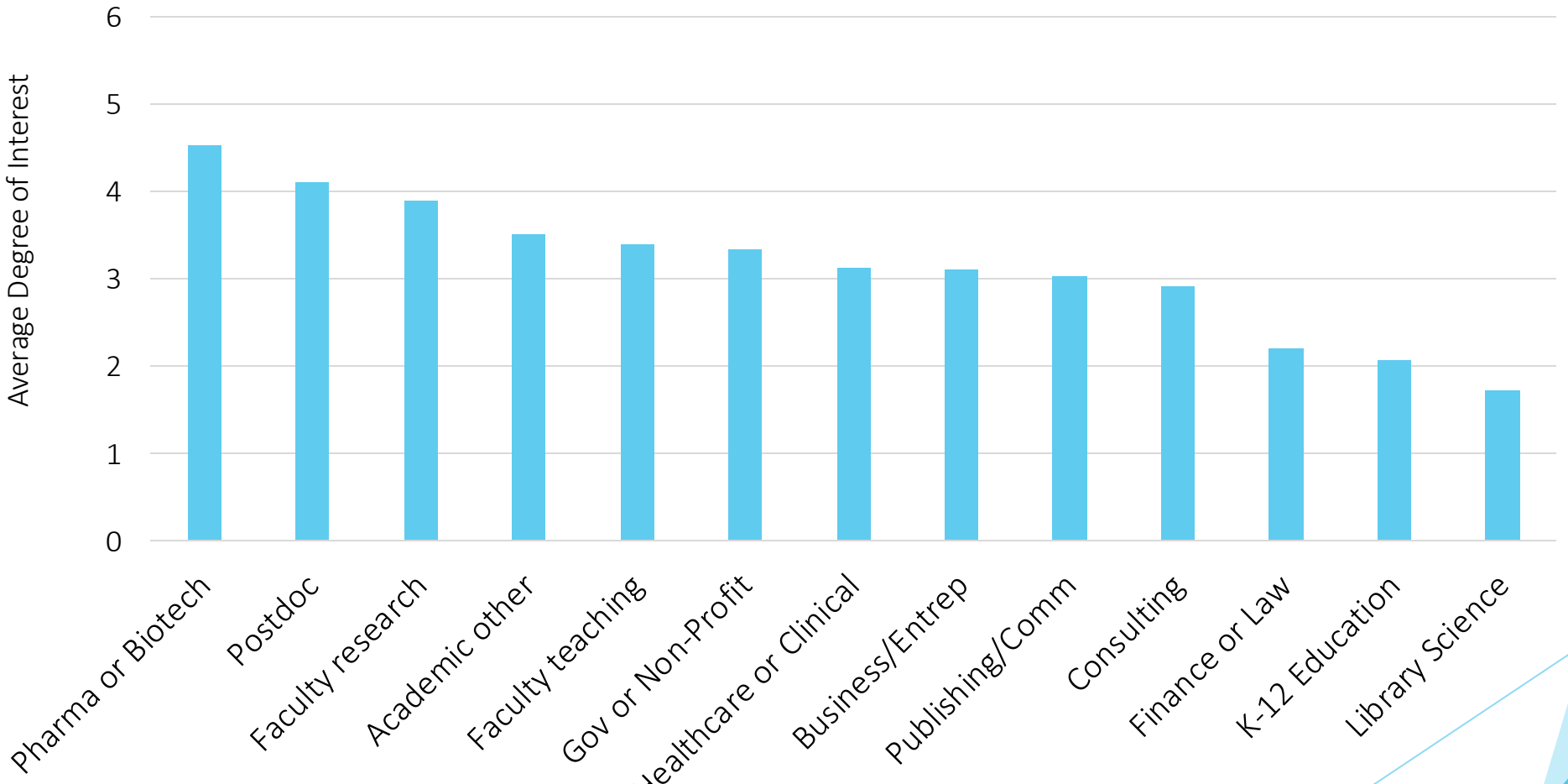
Surveys were deployed via emails using Qualtrics software from 2021-2024

8 surveys have been consolidated to explore career interests across all students, and we can also explore cohort effects (all first-year students, to all graduated students)

Data were de-identified after exporting from Qualtrics, and then analyzed using both SPSS for quantitative data and NVIVO for qualitative data. Total sample included 364 students (224 first years) with 47% response rate

Career Areas Students are Most Interested In

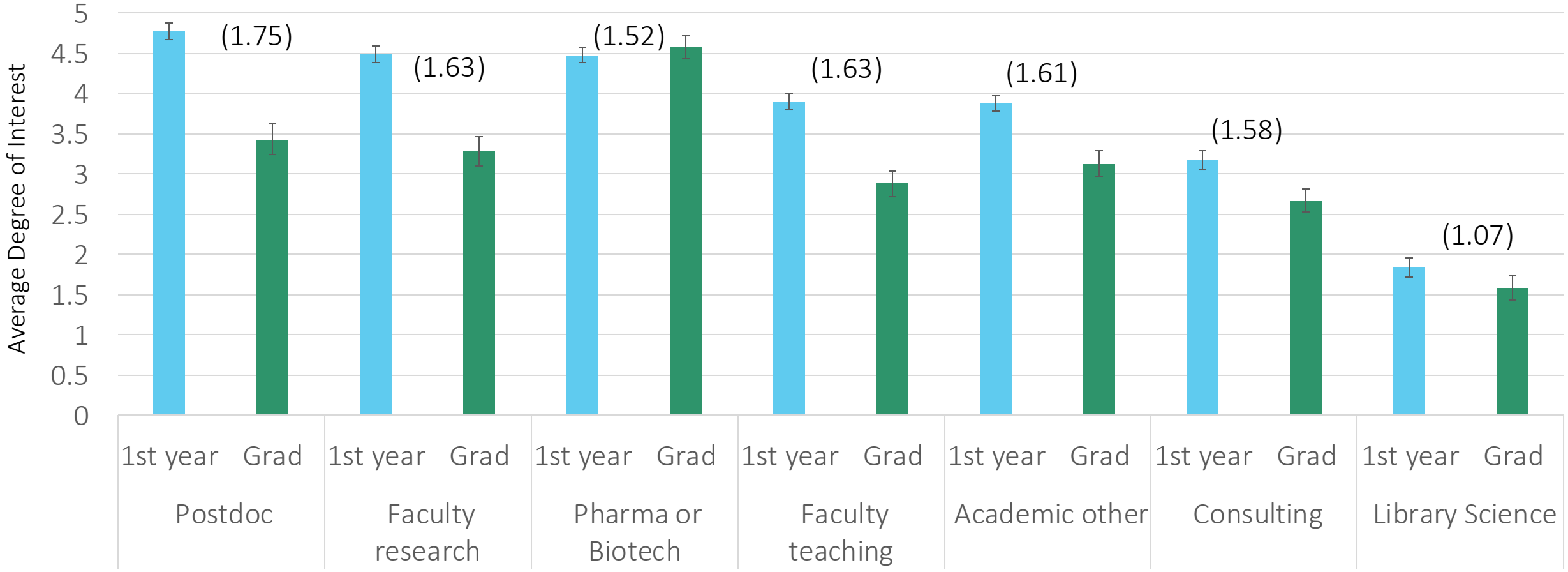
"I am interested in pursuing a career in this field." (strongly disagree to strongly agree)



Breaking Down Interest by Cohort

(With Cohen's d effect sizes)

These large practical effect sizes across groups demonstrate students' shifting interests in career paths. Tailoring opportunities to learn about career avenues could support their academic journey.



Selected quotes about Career Suggestions

More Support for Career Exploration

"Also, I would appreciate if the program were more accepting and supportive of first years pursuing internships. The BBS advertises internships/extracurricular activities in the newsletter, but I received somewhat negative feedback from my program director about how the summer internship would set me back even though I am pursuing the internship to learn a skill and even though some of my colleagues and peers are still rotating over."

More Support for Teaching

"My only other suggestion would be to perhaps prioritize teaching a bit more, or at least have avenues for that. While we require TF semesters, most of the time the courses available do not require any independent teaching (at least that's been the experience I've observed). That's fine for some, but for others who want to teach, I think it poses a challenge."

Additional Courses in Data Analysis

"Data analysis courses could be offered in 1st year from BBS, and that would be extremely helpful for many BBS students."

Diversify areas of Career Exploration

"I also don't feel that the program provided enough resources or support for people trying to enter fields other than academia or industry. Often there wasn't even acknowledgement that other options exist for people with science PhDs."

Pausing with the Data

Conclusions:

We engaged stakeholders (faculty and graduate students) to mitigate bias in analysis and reporting, discussed and critiqued how meaning is attached to our results, and sought multiple avenues for disseminating our findings (Oliveri et al., 2019).

Dissemination

Results were shared with students via Directors of Graduate Studies

A 50+ person BBS Executive Committee who were encouraged to share broadly within their home departments

Shared with the YBDIC (graduate student group across BBS)

Training grant director's meetings presentations and discussions

Our hope in sharing summary data was to develop a collaborative process to address the needs students were highlighting, and acknowledge the broader calls to revolutionize training programs based on evidence and student experience (Gammie, 2017).

Implementing changes from our Data

Interdisciplinary Neuroscience Program: added students to their Executive Committee and made significant curricular revisions to focus on diverse skills development

Computational Molecular Quantitative Biology: added required statistics course for all trainees to develop deeper knowledge of scientific research avenues and added events with guest speakers to raise awareness of additional career avenues

Genetics: revamped their orientation programming to offer student-led "bootcamps" in various coding, statistics and data analysis skill sets

YBDIC is running a day long panel and workshops on Careers outside of Academia for spring 2025

Where can you elevate student voices?

- How can the assessment process can build relationships across institutional departments and programs?
- Different presentation platforms-Where can data be shared to different audiences?
- Communications: How frequently do communications go out that highlight results from data? To whom?
- How frequently do you see programmatic changes due to prior assessment data? Are there ways to increase this frequency?

Potential Impact

How data are used can visibly shift the perspectives of the participants providing that data, and if students can see changes being implemented in their programs, this can create an excitement to provide additional feedback in future endeavors.

Sharing results not only with participants, but all possible stakeholders can help decision makers to design future workshops, webinars or courses that align with student needs.

Our collaborative evaluation process can be used as a framework by other programs to help you conduct evaluations of your own programs (Chouinard & Cousins, 2009).

Limitations

- Middling response rates revealing the need for streamlined processes to capture when students are defending their dissertations
- Administrative infrastructures need streamlining to coordinate across 12 departmental registrars
- The need to build a centralized database to capture key information that will drive timing of assessment collection methods has arisen
- Determining best practices in using the data that continues to be collected to continuously improve the BBS program and best prepare the next generation of scientists

Reflection Questions for Next Steps

- How could you invite students into your assessment process?
- What would a concrete next step look like in your work?
- What practices do you engage in to invite various stakeholders into the process of designing, disseminating, analyzing and reporting?

Thank you!!!

Please feel free to reach out with questions!

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