



**Bass Connections Annual Evaluation
2021-2022**



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Executive summary

This report summarizes key findings from the 2021-2022 Bass Connections annual program evaluation, which seeks to understand the experiences of team leaders, graduate/professional students and undergraduate students who participated on one of the 61 year-long project teams that ran this year.

While many Bass Connections teams returned to semi-normalcy this year, the pandemic continued to require teams to adapt their research plans during COVID-19 peaks and restricted most field research. At the same time, many teams embraced new modes of virtual communication to engage more frequently with external partners.

Teams produced a range of research outputs including new data sets, interventions and prototypes, white papers and publications, oral histories, websites and applications, training programs and service delivery models. Just as each team took a unique approach to their research and deliverables, so too did they take different approaches to organizing their teams.

This report focuses on understanding the experience of students and faculty in the program over the last year to describe the impact of the program and identify challenges and best practices to improve it.

Key trends include:

- **Satisfaction:** While most participants are satisfied with their team experience, satisfaction among graduate/professional students declined this year, and among all survey groups a small minority of participants reported being dissatisfied.
- **Team organization:** A growing number of students and team leaders report that their teams have clear goals, timelines and roles – these are all issues that the program has dedicated a lot of effort to helping teams improve upon over the past several years.
- **Skill development:** Graduate/professional and undergraduate students reported that the program helped them develop new skills related to research, project management and teamwork.
- **Relationships:** Team leaders, graduate/professional students and undergraduate students all exhibited enthusiasm for the ways in which the program helped them develop new relationships, often noting that the interdisciplinary nature of the program gave them access to parts of Duke with which they would not normally have interacted.
- **Applied outputs:** Team leaders, graduate/professional students and undergraduate students noted that the applied nature of Bass Connections projects provided a meaningful opportunity to have an impact while also learning about the nature of research in “the real world.”
- **Ongoing impacts of COVID-19:** Team leaders and students noted that COVID-19 continued to present barriers to conducting research and developing a strong team culture. Team leaders in particular noted the ongoing toll of the pandemic on student engagement.
- **Time commitments:** Team leaders and students noted challenges finding time to dedicate to team activities. As with past years, team leaders voiced this issue most frequently.

To jump to a report section, click any link below:

[Overview and methodology](#)

[Satisfaction with the Bass Connections experience](#)

[Team structure and organization](#)

[Undergraduate student benefits and challenges](#)

[Graduate and professional student benefits and challenges](#)

[Team leader benefits and challenges](#)

[Conclusion](#)

Overview and methodology

Since the Bass Connections program began in 2013-2014, we have administered an annual end-of-year survey to participants to understand factors that influence team success and the impact of the program. Each participant group – team leaders, graduate/professional students and undergraduate students – receives a different survey version that includes common questions across all three participant groups as well as questions specific to each group. The majority of survey questions are repeated each year to allow for trend analysis. Survey topics include overall satisfaction, factors for team success and the impact of the program on participant development. Responses from this annual survey provide an important barometer of the program’s impact and areas for improvement.

The undergraduate student survey is administered as a pre-post survey in which students complete a self-assessment of their skills and abilities in research, teamwork and communications at the beginning and end of the program year. These results are benchmarked against those of a comparison group of similar Duke students who are matched on the basis of gender, race/ethnicity, class year, citizenship status, first generation status, student-athlete status, transfer status and Duke admitting program. By readministering the same survey to both groups, we are able to assess self-reported gains for both populations over the course of the year. In addition to the general skill assessment questions asked of both the Bass Connections undergraduate participants and the comparison group, the post-survey administered to the Bass Connections undergraduate participants also includes several end-of-year survey questions about their experience in the program.

Response rates

A total of 200 end-of-year surveys were completed this year. Response rates for each survey population are detailed below.

Table 1: Response rates

Survey population	Surveyed	Respondents	Response rate
Undergraduate students	518	88	17%
Graduate and professional students	155	67	43%
Faculty and staff team leaders	148	45	30%
Total	821	200	24%

It is worth noting that response rates were particularly low this year. Our overall response rate last year was 33%; in 2019-2020, the response rate was 48%.

Team leader respondents include both faculty and staff members leading a team. Graduate/professional student and postdoc respondents (referred to hereafter as “graduate students”) include 36 master’s/professional students (54%), 23 doctoral students (34%), 3 medical students (4.5%), 3 postdocs (4.5%), and 2 joint PhD/MD students (3%). These numbers are roughly proportionate to the distribution of each group in the survey pool, which included approximately 51% master’s students, 43% doctoral students, 5% MD students and 2% postdocs.

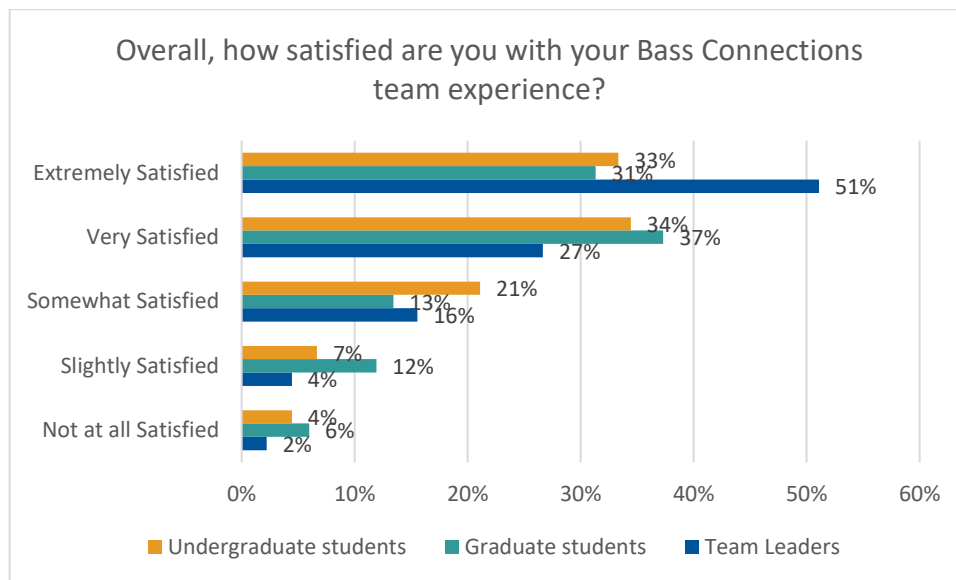
The undergraduate student pre-post analysis referenced in this report includes responses from only those respondents who completed both the pre- and post-survey in order to ensure a direct one-to-one comparison (56 Bass Connections participants and 18 comparison group participants). The response rate

for both surveys combined was 14% for Bass Connections participants and 4% for the comparison group.¹ This difference in response rates is to be expected since the comparison group was invited to participate by the Office of Assessment as part of a general study, whereas Bass Connections participants were informed that the study was related to Bass Connections, a program with which they had some relationship.

Satisfaction with the Bass Connections experience

Graduate students, undergraduate students and team leaders were each asked about their satisfaction with their Bass Connections team experience. The largest share of graduate and undergraduate students reported being “very satisfied” with the experience (37% and 34% respectively), while the majority of team leaders (51%) reported being “extremely satisfied” with their team experience. While, on the whole, these responses are positive, there are a number of respondents from all survey groups who reported being dissatisfied with their experience. We will explore common sources of satisfaction and dissatisfaction below.

Chart 1: Satisfaction rates among Bass Connections participants



Likelihood of recommending Bass Connections

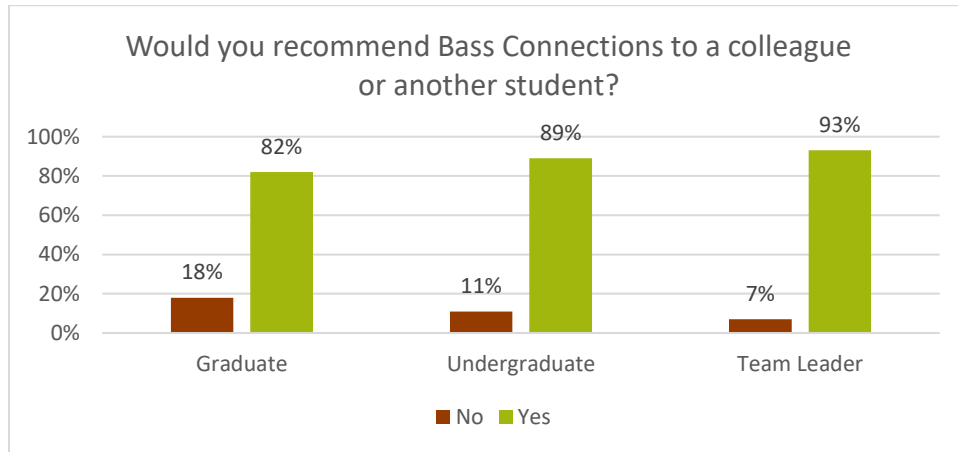
When asked if they would recommend the program to others, more than 80% of all survey populations said “yes,” with team leaders being the most likely to recommend the program, followed by undergraduate students, and then graduate students.

While historically graduate students tend to be the least satisfied with their experience, a larger percent of graduate students said they would *not* recommend the program this year than prior years – this trend

¹ 514 Bass Connections participants and 507 comparison group students received the pre-survey. Of the Bass Connections students, 106 dropped the program before the spring, leaving 408 students eligible for the post-survey; 110 new students also joined Bass Connections during the year and were invited to participate in the post-survey but were excluded from this analysis since they did not receive the pre-survey.

should be explored further.² That said, the percent of undergraduate students who said they would recommend the program increased this year.³

Chart 2: Recommendation rates for Bass Connections



Team structure and organization

Program evaluation efforts over the past nine years have consistently shown a strong relationship between participant satisfaction and the organization and management of teams. To assess the extent to which teams are communicating clearly with one another around project goals and roles, the end-of-year survey asks participants a series of questions related to team organization.

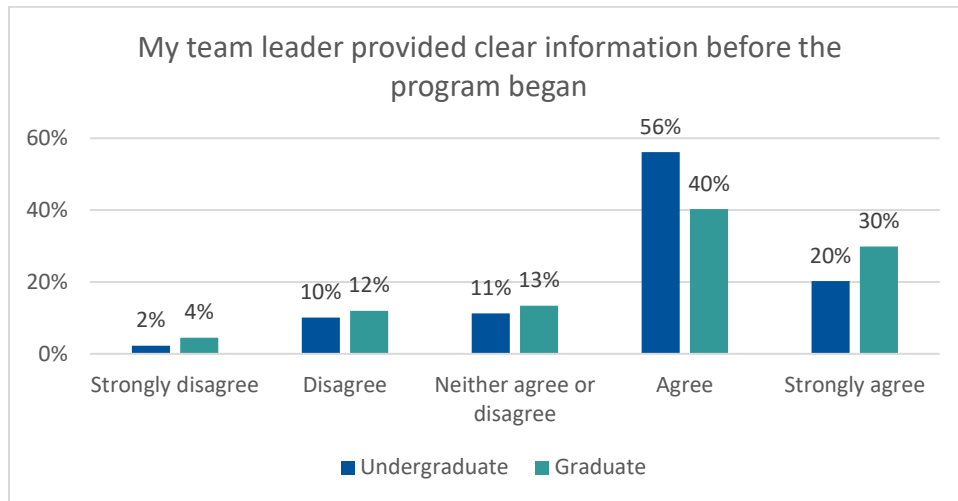
Goals, roles and timelines

The following question assesses communications between team leaders and students after students have been selected but before the program begins (starting with onboarding). While the majority of students agreed that they had clear information before the program began, there is room to improve. Team leaders were also asked if they felt that the goals of the Bass Connections program as a whole were clear to them from the start – 86% agreed/strongly agreed with this statement and only 4% disagreed.

² In 2019-2020, 88% of graduate students said they would recommend the program; that figure was 90% in 2020-2021.

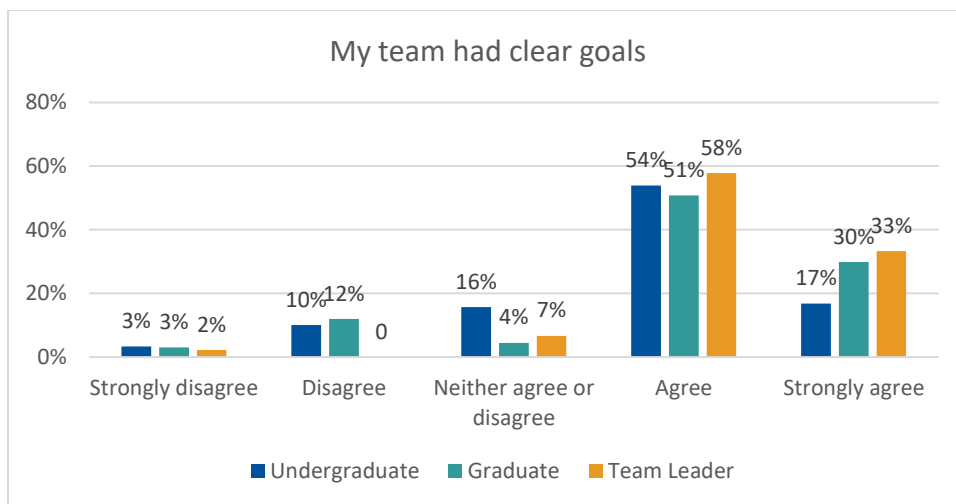
³ In 2019-2020, 87% of undergraduate students said they would recommend the program; that figure was 83% in 2020-2021.

Chart 3: Extent to which students received clear information before the program began



As shown below, while the majority of participants in all groups agreed that their team had clear goals, there were still a notable number (29%) of undergraduate students who did not agree with this statement. The fact that team leaders are more likely to agree with this statement than other respondent groups mirrors findings from prior years and suggests that team leaders may be clear on the project goals but that they may not be successful in communicating this information to all members of the team.

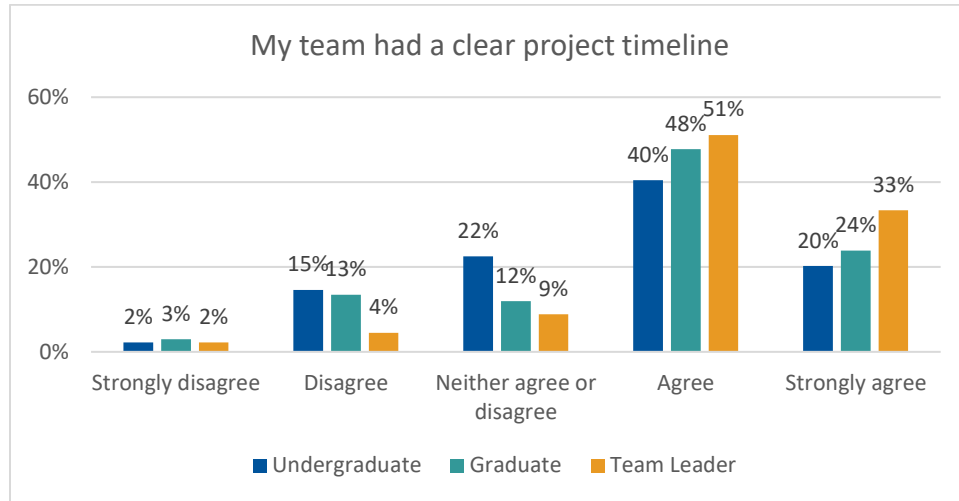
Chart 4: Extent to which participants felt their team had clear goals



The majority of participants in all groups also agreed that their team had a clear project timeline. Compared to last year’s evaluation, the number of respondents disagreeing with this statement has also declined, which may be an indicator that some of the program’s guidance around project planning has been implemented by teams.⁴

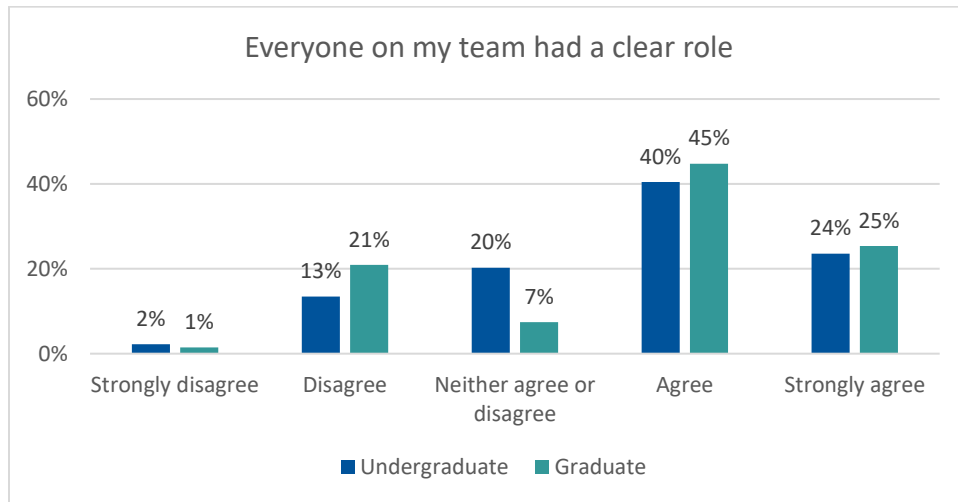
⁴ In 2020-21, the percent of undergraduate students and graduate students who disagreed/strongly disagreed with this statement was 23% and 25%, respectively, compared to 17% and 16% this year

Chart 5: Extent to which participants felt their team had a clear timeline



The majority of student respondents also agreed that everyone on the team had a clear role. However, of all of the questions relating to team structure, this item registered the highest number of respondents who disagreed, indicating an opportunity for improvement.

Chart 6: Extent to which participants felt that all team members had a clear role



Commitment

While the vast majority of graduate and undergraduate students felt that their team leaders were committed to the outcome of the project, 10% of undergraduate students and 4% of graduate student respondents did not agree with this statement. When team leaders were similarly asked to assess the commitment of students on their team, 89% agreed/strongly agreed that students were committed and just 2% disagreed.

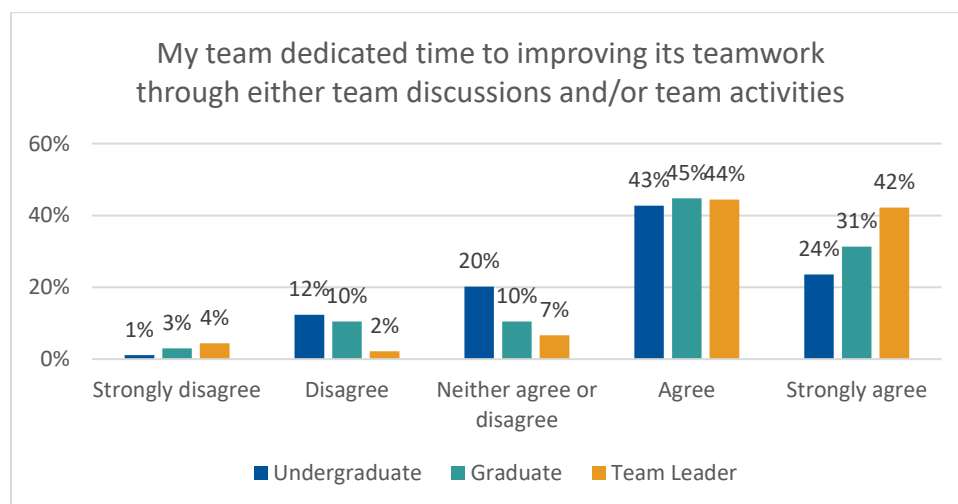
Chart 7: Extent to students felt that their team leaders were committed to the project



Team relationships

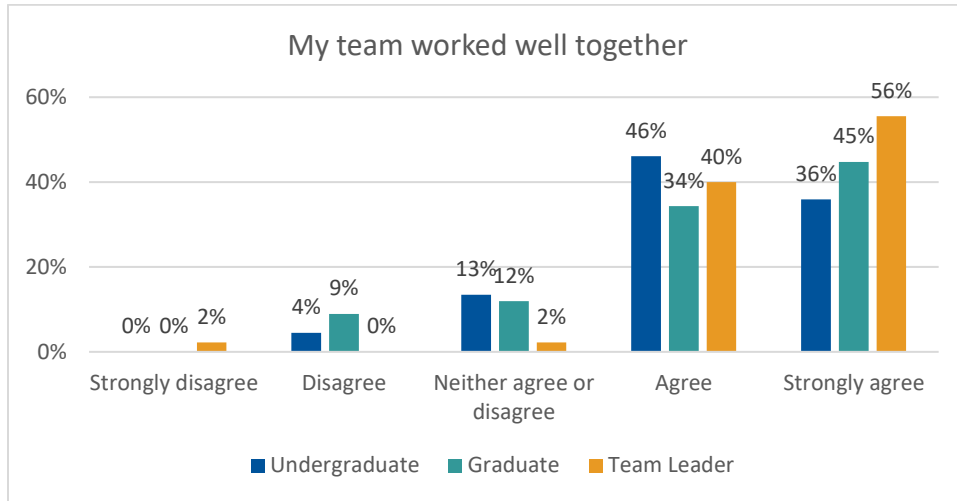
The Bass Connections model is built on the premise that some forms of research benefit from collaboration among individuals from different backgrounds. For these teams to fulfill their potential, team members must develop strong working relationships predicated on trust. To foster these connections, we encourage our teams to dedicate time to team building, and as shown below, the majority of participants report that their team was intentional about fostering effective teamwork. That said, undergraduate students were more likely to disagree with this statement.

Chart 8: Extent to which participants agree that their team dedicated time to improving teamwork



As shown below, across all survey groups, respondents reported that their team worked well together. This is a positive finding as the program has dedicated a great deal of effort over the years to ensuring that teams have a productive team experience, even if the research itself does not yield the expected results.

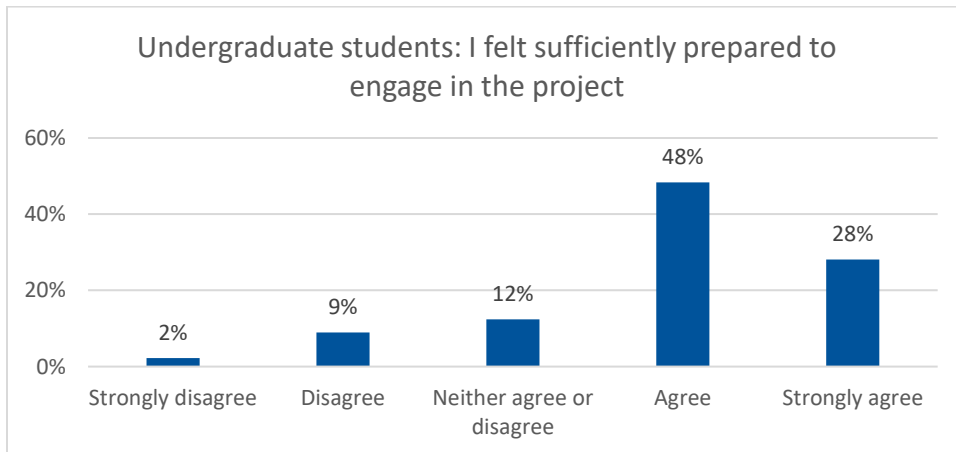
Chart 9: Extent to which participants felt that their team worked well together



Support and preparation

For some undergraduate students, a Bass Connections team may be their first research experience. This can cause some students to feel insecure about their ability to contribute to the project, and team leaders sometimes need to invest a lot of time to prepare students to engage. As shown below, 76% of undergraduate student respondents reported feeling prepared to engage in their project activities. Similarly, 82% of team leaders agreed/strongly agreed that students were sufficiently prepared. However, 13% of team leaders disagreed/strongly disagreed that students were prepared. This closely aligns with the 11% of students who also felt ill-equipped to participate. As one means of helping students prepare, the program introduced a series of foundational research modules this year, but many students did not avail themselves of this opportunity.

Chart 10: Extent to which undergraduate students felt prepared to participate

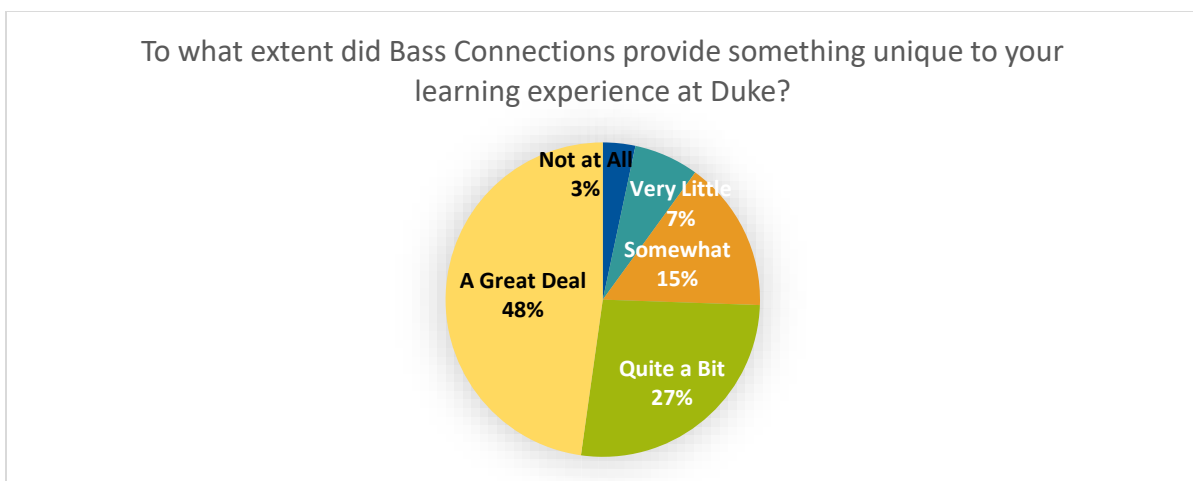


Undergraduate student benefits and challenges

A unique learning experience

Undergraduate students were asked to indicate the extent to which Bass Connections added something unique to their learning experience at Duke. Approximately half of the students surveyed (48%) reported that Bass Connections made a unique contribution to their learning experience by “a great deal,” while 27% of respondents said the program made a unique contribution by “quite a bit.” Ten percent of students did not feel that the program made a unique contribution to their experience.

Chart 11: Extent to Bass Connections contributed something unique to the Duke undergraduate experience



Undergraduate student skill development over the year

As noted in the [methodology section](#), undergraduate students completed a pre-participation and a post-participation survey that was also administered to a comparison group of Duke students. This section summarizes self-reported gains for Bass Connections participants versus the comparison group over the course of the year.

When asking students to assess their own skills and abilities in research and teamwork areas related to the goals of Bass Connections, we grounded their perspective by asking: “How do you think your abilities compare to other Duke students in the following areas?” Responses to 17 items were on a five-point scale ranging from “far below average” (1) to “far above average” (5). The intent of this framing was to offer students a comparison basis that might also help tease out the unique contributions of Bass Connections by accounting for the range of other experiences in which students at Duke have the benefit of participating.

The table below shows the difference in the mean on a 5-point scale between the pre- and post-responses for Bass Connections participants and the comparison group, where a positive number indicates an improvement. Asterisks denote the degree of statistical significance with three asterisks denoting the highest confidence level (* $p < .05$, ** $p < .01$, *** $p < .001$).

As indicated by shading in the table, significant improvements were reported by Bass Connections participants for six survey items. By contrast, students in the comparison group did not report statistically significant gains on *any* of the 17 survey items.

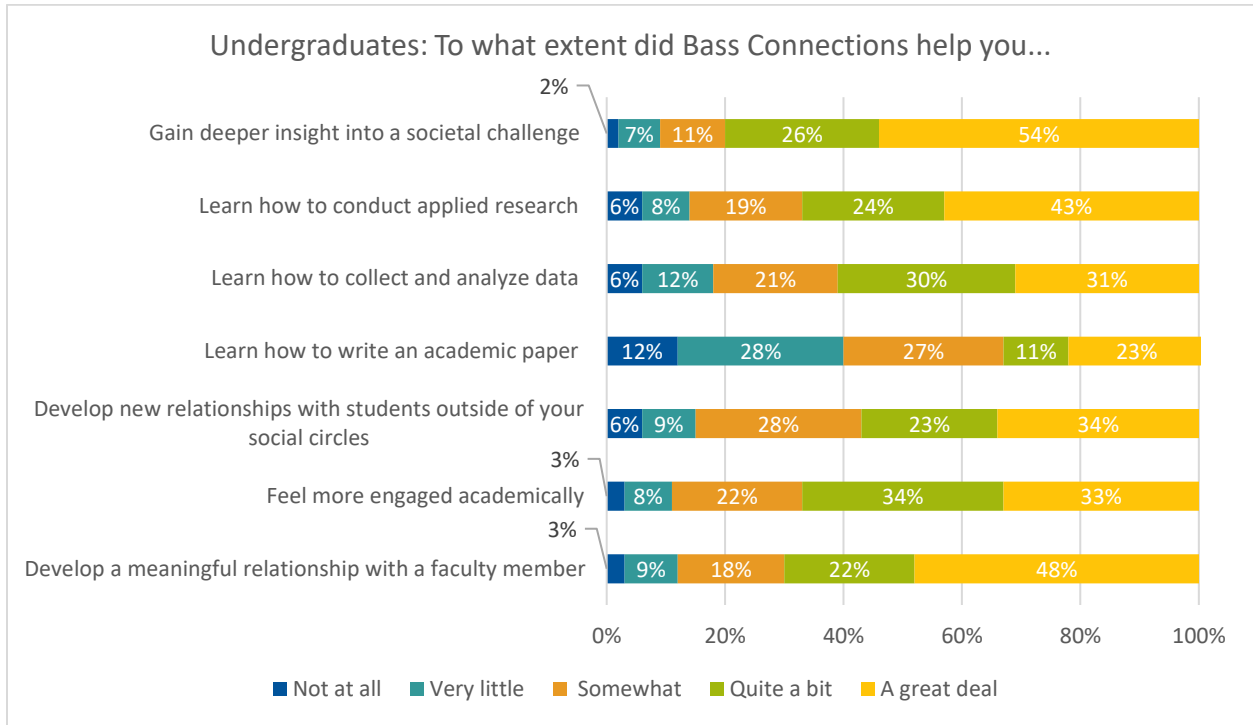
Table 2: Mean changes in students’ self-assessment of ability over the year

Item	Difference in means between pre- and post-surveys, on 5-pt scale	
	Bass Connections	Comparison
Developing an actionable research question	0.45*	0.39
Identifying appropriate research methods based on a given research question	0.36*	0.17
Developing a plan to execute on a long-term project	0.46**	-0.06
Navigating the IRB process	0.68*	0.44
Drawing a coherent conclusion from large amounts of information	0.36**	0.11
Creatively generating new ideas	0.55	0.17
Communicating research findings effectively based on the audience (e.g., experts vs. general populations)	0.29	0.17
Effectively prioritizing tasks	0.23	0.06
Taking initiative to pursue new ideas	0.07	0.22
Effectively communicating my ideas to faculty and students from different fields of study	0.07	-0.17
Constructively navigating frustrating situations within a team	0.19	0.00
Defusing group conflict	-0.05	-0.11
Engaging in constructive debate	0.25	0.17
Asking for help when needed	-0.04	0.17
Giving constructive feedback to other team members	0.14	-0.44
Building on the ideas of others to move a team forward	0.34*	0.06
Mentoring other students in areas where I have more knowledge	0.02	0.17

Relationship building and research skills

Undergraduate students were asked to report on the extent to which Bass Connections helped them build relationships, develop research skills and apply those skills to social issues. These questions were only asked at the end of the year. The items with the highest rates of agreement include “gaining deeper insight into a societal challenge,” “learning how to conduct applied research” and “feeling more engaged academically.” The item with the highest rate of disagreement was “learning how to write an academic paper.” This finding makes sense given that not all teams produce such papers.

Chart 12: Benefits for undergraduate students



Drivers of impact for undergraduate students

To better understand the drivers that contribute to a positive undergraduate student experience in the program we asked students to comment on “what was most meaningful” about their Bass Connections experience. The following word cloud shows common themes found in these written responses, including the opportunity to gain experience in research, build relationships and have an impact on a community.

Image 1: Key words undergraduate students use when describing the program benefits



A sampling of specific comments that elaborate on these themes are noted below. These comments also demonstrate the rich, multi-faced nature of the program, with most students noting multiple benefits.

The most meaningful aspect of the Bass Connections experience has been exposure to research, which is something that I have never experienced prior, especially in a field of passion to me! In conjunction with this, the relationships with mentors and peers have been so insightful and irreplaceable.

I learned a lot from the interdisciplinary nature of Bass Connections. The discussions in large group meetings challenged me to learn to present my work in a way that every audience can understand and field questions from both professionals and beginners on my topic.

The research was based on a real-world problem in my area of study that significantly affects the health of many people in less developed countries.

I was able to work with real data, apply skills I had learned in statistics and public policy classes, work with software such as R and ArcGIS, and conduct logistic modeling outside of a classroom setting. The application of these to a project outside of school was super interesting and made me a more engaged student.

The most meaningful part of my Bass Connections experience was being able to gain insight into how environmental research works. It told me that I'm not very interested in the ecology part of research, but I wouldn't have known that if not for this experience. Additionally, it showed me the challenges of conducting scientifically rigorous and interdisciplinary research.

Learning to work on a team in a research setting was very meaningful; I learned a lot from my teammates themselves, and also how to collaborate and understand others' perspectives.

I really enjoyed the opportunity to connect with a lot of different people and faculty that I otherwise would not have gotten the chance to meet. Specifically, the Ph.D. and master's students. I feel like I learned a lot from them, and I really enjoyed working on a big team.

Challenges for undergraduate students

When undergraduate students were asked to comment on the most challenging aspects of their experience, common themes included time management, unclear goals and virtual engagement.

Image 2: Key words undergraduate students use when describing program challenges



Comments from students elaborate on the impact of poor team organization. However, some comments also reveal how the program provides a stretch opportunity for students to develop new skills and persevere through challenges.

Changes in our team goals during the fall semester and then again at the start of the spring [were challenging]. [I] felt like we essentially didn't do anything meaningful for the first half and then crammed a full year's worth into a few months (though I do recognize that the background work we did for the first 6 weeks was supportive).

The most challenging part of my Bass Connections experience was having to employ some of the skill sets that I hadn't fully developed yet or had just gotten a brief introduction to in some classes to my project. I had some challenges working with R and with statistical modeling. However, I think this only made me a more adaptable student and I was able to learn a lot more by doing than I would have been able to in a classroom.

Having relatively unclear goals and timeline for the project [was the most challenging], especially in the beginning.

It was very challenging for me to manage my time. We didn't have any hard deadlines, which are very important to keeping me on track, so I kept giving other classes more time than Bass Connections.

Seeking help when I was struggling was sometimes difficult, just because I was the youngest on my team and I never wanted to slow the project down! However, when I did ask for help, I was always met with so much support.

In the first semester, we spent a lot of time figuring out what we wanted to do as a team because it was the first year of the project, but for me it didn't feel like I could contribute anything to the group. If I was assigned to do something that would help me develop skills while doing useful work, I would have felt more useful. However, I don't think I contributed anything to the first semester of work besides manpower for sampling.

Graduate and professional student benefits and challenges

When graduate/professional students were asked to rank up to three skills that they believed they most improved upon as a result of their participation in Bass Connections, the top three skills selected were “organizing and managing projects,” “communicating with a team,” and “working with team members from diverse areas of knowledge.” The two skills that students selected most infrequently were learning “how to develop a grant proposal” and “how to write an academic paper,” which makes sense given that not all teams undertake these tasks. The chart below shows the number of students that selected each skill among their top three areas of development.

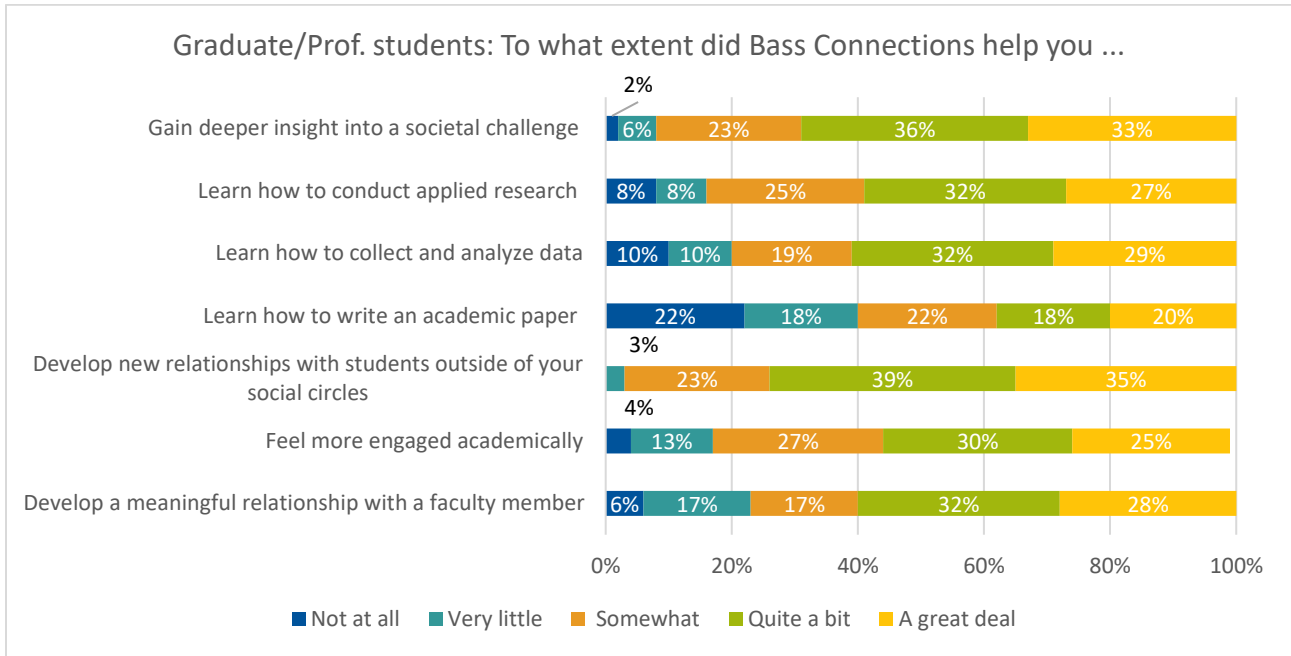
Chart 13: Top skills developed by graduate students



Relationship building and research skills

Graduate students were asked to report on the extent to which Bass Connections helped them build relationships, develop research skills and apply those skills to social issues. The items with the highest rates of agreement include “develop new relationships with students outside of your social circles” and “gain deeper insight into a societal challenge.” While this second item was also ranked as a top benefit by undergraduate students, undergraduate students were less likely to report the same relationship benefits as graduate students, perhaps reflecting the fact that graduate students tend to feel more siloed within their academic programs and that Bass Connections can provide a unique opportunity for these students to connect across the university. As with undergraduate students, the item with the highest rate of disagreement was “learn how to write an academic paper.”

Chart 14: Benefits for graduate students



Drivers of impact for graduate and professional students

When asked about the most meaningful aspects of the program, written comments from graduate students indicate that common benefits include the opportunity to collaborate, gain experience in project management, mentor undergraduate students and develop new skills.

Image 3: Key words graduate students use when describing the program benefits



The following sampling of comments elaborate on these themes:

I enjoyed the cross-disciplinary aspect of the team. The project also gave me the opportunity to develop additional research skills that complemented my degree program.

My Bass Connections project re-injected an enthusiasm for science at a time during my Ph.D. when I was otherwise stalling. It helped me reconnect with the value of my work and seeded career-changing collaborations. My team co-leaders were fantastic mentors, who made me feel valued, and were incredibly flexible as I navigated the end of my Ph.D. work.

Building relationships across Duke, learning to work with undergraduate and graduate students, learning project management skills.

The research experience that I gained was very meaningful and I felt that it added an element to my degree that I would be missing without Bass Connections.

I think the most meaningful part of my Bass Connections experience was being able to learn from and build relationships with faculty across disciplines that I would have never had the opportunity to interact with otherwise. Not only did I learn lots of subject matter information from the faculty leads but I was able to be mentored and learn from their leadership and teaching which informed how I managed my own subteam.

Bass Connections provides a clear channel for students to engage in interesting issues and apply their skills to research. The diverse set of students, faculty and staff involved created a rich environment for me to work in. I was given an active role in the research process and team.

Challenges for graduate and professional students

When asked about the challenges they faced, common issues noted by graduate and professional students include a lack of clarity around project goals and/or their individual role on the team as well as time management issues.

Image 4: Key words graduate students use when describing the program challenges



The following comments elaborate on the nature of these challenges, and in particular illuminate a theme that has also emerged in prior years – graduate students expect a clear and meaningful role on these project teams that will further their academic and professional goals.

I was treated as a project assistant when I was told that I would be treated as a researcher contributing to the team in a meaningful way. Instead, I felt very unsupported and often had to do the tedious tasks for the project. It has not helped furthered my Ph.D.

The scope of the project was poorly defined, and remained poorly defined for a long time, making it difficult to distribute the work over the course of the year. The breadth of questions being asked, and the sheer number of people on the team, made it difficult to feel like there was a clear goal or accountability.

Something that was challenging was having a rather open-ended deliverable, which ended up morphing over time. It was also challenging to not have specific tasks/roles for people.

I was hired to serve as the Project Manager, but I didn't feel like my team leaders really set any expectations or norms about what my role should entail. I often felt like I was not fulfilling the responsibilities my team leader expected me to, but I really didn't have a clear picture of what those responsibilities were.

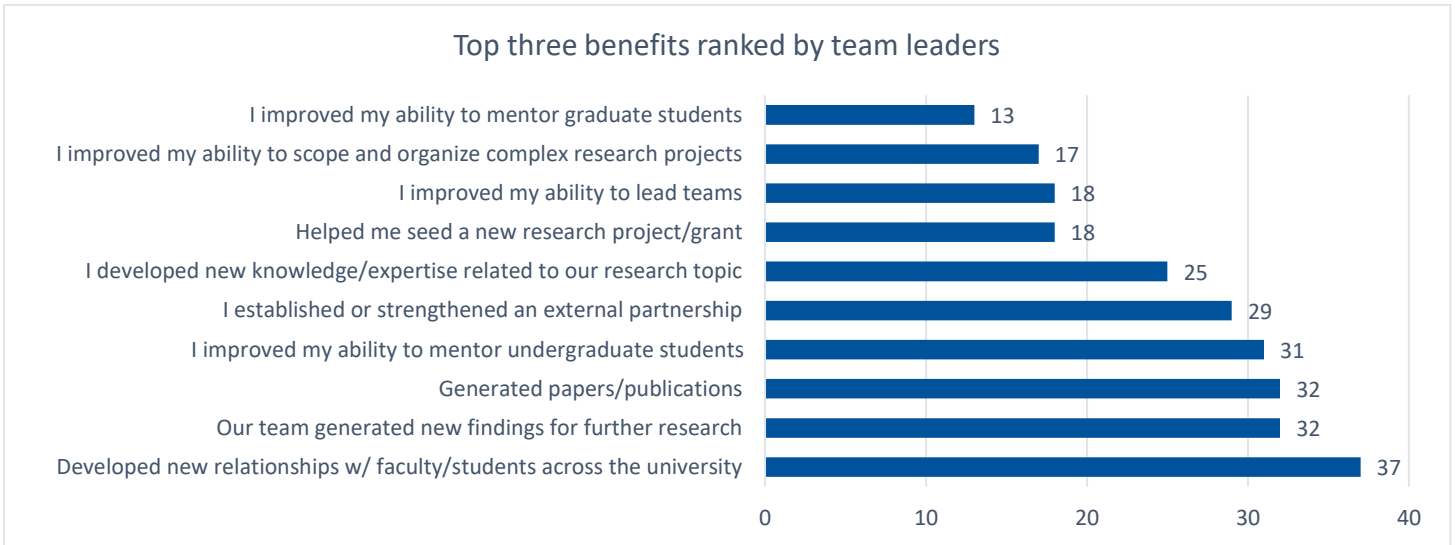
Technical problems and blocks in progress were profound throughout the project. Additionally, I find that I am left with more questions than answers regarding my project. However, this is the reality of working with geographic information systems and the data that we have so it was truly a real-world experience in doing this kind of work.

Amid the lingering effects of COVID and the general stress it has placed on students, being delayed and then catching up, it was hard to set expectations, and even with very generous deadlines we lost multiple students who felt overwhelmed by their other academic commitments.

Team leader benefits and challenges

When team leaders were asked to rank the top three ways in which they benefited from participating in Bass Connections, their responses spotlighted the opportunity to develop new relationships, followed closely by the generation of research outputs.

Chart 15: Benefits for team leaders



Team leaders were also asked to comment on “the most meaningful outcome” of their team’s work. As shown below, response ranged from the impact on students to a range of outputs including papers, websites, community impact and new research insights.

Image 6: Most meaningful outcomes for team leaders



Drivers of impact for team leaders

In written comments, many team leaders remarked on how much they enjoyed the opportunity to work closely with bright, passionate students. Other team leaders noted that the program helped them learn from others and build new connections with students and faculty in different fields.

As always, seeing the students grow in their abilities and their confidence in those abilities is HIGHLY rewarding. And working together towards a permanent deliverable (a paper or other publication) is a process from which I always grow professionally in how to structure projects with diverse teams and how to mentor students.

Everyone has expertise, from beginning undergraduates to Ph.D. students to faculty, that they were able to bring to the table this year. That has been wonderful to watch, because I learn from students, they learn from each other, our staff participants learn and teach, etc.

The most meaningful [thing] about Bass Connections was to be able to "think out of the box" with people from different backgrounds, and to work with students/faculty outside of my field.

Seeing lots of passionate people working to serve the broader Durham community.

The ability to work with bright engaged students who had skills (computational, engineering) that I don't have myself.

Challenges for team leaders

Common challenges cited by team leaders include the amount of time required to lead a project team and new challenges related to student morale in the wake of the COVID-19 pandemic.

Time challenges

To conduct a research project with undergraduates that doesn't replicate a class structure is a challenge, as undergraduates are not informed enough on many of the contextual issues, so much of the research is a form of teaching, but without teaching credit, which is not necessarily satisfactory for faculty.

Running a complex research project that is ancillary to my central line of scholarship, without any effort allocated to the project, is quite a challenge. It has been the equivalent of teaching an additional class per semester, with no reduction in other responsibilities.

Many students are not well prepared to conduct research or analyze data, demanding a lot of handholding at various stages.

If you want faculty to develop and lead quality learning experiences for Duke students, you need to protect their time to do so.

Issues related to COVID-19

The students also have significant social and mentoring needs, more than usual, which occupies more of my time.... As a team leader it has also been exhausting trying to keep up the morale, keep up the energy for the team. I left like I was always planning social activities for our teams because students really needed the interaction.

The pandemic is still making things difficult for students. Faculty and staff are also suffering. There's a lot of anxiety and burnout from classes, life, etc., and students feel overwhelmed by the state of the world. We're working hard to keep it fun and engaging and support them.

Managing COVID-related challenges was the most difficult part of the past year. Many of our student team members were facing significant challenges. Our team was greatly supported by Bass Connections, allowing us the flexibility to adjust to the needs of our team members while moving forward with our project.

Conclusion

Bass Connections continues to provide students of all levels with a meaningful opportunity to conduct applied research while developing new skills in research, working collaboratively and managing complex projects. For team leaders, the program offers an opportunity to mentor students closely, meet faculty from other fields and further their research.

While the evidence suggests that teams are increasingly implementing best practices for management of collaborative projects, written comments suggest that some students still lack clarity around the goals of their project and their role on their team. Comments from team leaders indicate that finding the time to dedicate to project teams remains a perennial challenge and one that has perhaps been exacerbated by pandemic fatigue. These issues require further attention to improve the program and ensure a more consistent experience for all participants.