

University of Maryland Language Science NRT Program

INTERNAL EVALUATION, THIRD YEAR REPORT

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Overview of Internal Evaluation Activities

Funded by the National Science Foundation, the University of Maryland's Language Science National Research Traineeship (NRT) Program was designed to transform interdisciplinary STEM graduate education by training and educating graduate students to become engaged and adaptable leaders in language science (UMD Language Science Center, n.d.). Housed in the UMD Language Science Center (LSC), the NRT program provides funding (stipends, travel/research assistance) to graduate students ("NRT students" or "NRT fellows") in multiple language science fields of study. NRT fellows are expected to participate in a range of professional, research, outreach, and leadership activities designed to promote their development as interdisciplinary scholars. We provide an overview of the UMD's NRT Program goals below.

Program Goals

Student Goals

(1) To enhance doctoral student agency as interdisciplinary researchers

- a) to enhance student research skills
- b) to enhance student confidence and ability to pursue research independently
- c) to enhance student confidence and ability to collaborate on research with others and be an effective member of a research team
- d) to increase the likelihood that students will take risks, and work in areas outside their comfort zone
- e) to increase student ownership and contributions to their interdisciplinary program

(2) To change the nature of student professional networks

- a) to be more diverse (include more colleagues in other disciplines; and people using different methods or approaches)
- b) to be larger (more people in them)
- c) to increase the value of the information, feedback and ideas networks provide

(3) To enhance student understanding of particular research problems and the relationship between research problems and contexts

- a) to have improved understanding of the relationship between the particular research problem they are studying and macro issues (zoom in/out)
- b) to have improved understanding of how the particular research problems they are studying relate to knowledge and research in other fields and disciplines
- c) to have improved understanding of how the particular research problems they are studying relate to real world applications and problems (such as in industry, policy, clinical or educational practice)

(4) To enhance student ability to communicate about research problems and their contexts, and adjust their communication according to the audience, channel, and goals

- a) to be better able to communicate the details of a research problem and its relationship to macro issues, knowledge and research in other fields and disciplines, and real world applications and problems

- b) to be better able to adjust their communication for different audiences (e.g. scientists, government officials, high school students, etc.)
- c) to be better able to adjust their communication for different goals (e.g. informing, entertaining, persuading)
- d) to be better able to communicate through different channels (e.g. journal articles, conference presentations, websites, blog posts, various informal interactions)

(5) To enhance student ability to choose and successfully pursue a career within or outside academia

- a) to have improved understanding of their personal interests, skills, and values, and how they fit potential careers.
- b) to have improved understanding of the career options available
- c) to be better able to communicate how their knowledge and skills are applicable to their career of choice.

Graduate Education Goal

(6) To share, and help other graduate programs adopt, best practices in interdisciplinary graduate education that emerge from the NRT project.

Institutional Change Goal

(7) To reduce organizational constraints to, and facilitate, faculty collaboration on interdisciplinary research.

Questions and Methods

This document is a third year, internal evaluation of the University of Maryland's Language Science NRT Program. We provide an assessment of NRT progress to date. We use case study methods (Merriam, 1998; Yin, 2009) to evaluate the NRT program's progress towards its seven goals. Specifically, our evaluation is guided by the following questions:

- To what extent has the NRT program achieved its seven stated goals?
- Which elements of the program were most influential in accomplishing these goals?

In addition to these research questions, our team's overall objective is to contribute to the social research on graduate education practices that facilitate the development of graduate students as interdisciplinary scholars, such as network development, scholar identity, and communicating across difference.

Case study approaches emphasize the value of multiple data sources to enhance the reliability and validity of findings (Yin, 2009). Our evaluation draws primarily from qualitative data sources, including: interviews with UMD NRT fellows, focus groups with NRT fellows and faculty involved in teaching, mentoring, or advising NRT fellows, and observations of NRT-related programs and activities. In Table 1, we provide a description of the data sources we drew from to evaluate UMD's NRT program between Fall 2015 and Spring 2018. University of Maryland's IRB office approved the protocols for our observations, interviews, and focus groups. Faculty and students who took part in focus groups and/or interviews completed a consent form prior to participating. Members of the internal evaluation team transcribed each interview and focus groups recording. At the time of writing, we have completed six focus groups, interviewed 13 NRT fellows, and observed approximately 40 hours of NRT programs and activities. We have additionally reviewed the application materials and progress reports submitted by

each NRT fellow. Finally, beginning in Fall 2017, we launched an IRB-approved survey that compared the curricular and out-of-classroom experiences of UMD's NRT fellows to language science students at three peer institutions (University of Connecticut, The Ohio State University, and University of Wisconsin).

Internal Evaluation Team Members

Our internal evaluation team consists of researchers in higher education with expertise and interest in graduate education.

- KerryAnn O'Meara (Lead Evaluator): Associate Dean for Graduate Studies and Faculty Affairs, UMD College of Education; Professor, Higher Education; Director, University of Maryland ADVANCE Program
- Dawn Culpepper (Researcher): Doctoral Student, Higher Education, University of Maryland (On team from Summer 2017 – Present)
- Stephanie Hall (Researcher): Doctoral Student, International Education Policy, University of Maryland (On team from Spring 2015-Summer 2017)
- Gudrun Nyunt (Researcher): Doctoral Candidate, Student Affairs, University of Maryland (On team from Summer 2017 – Present)

Table 1. *Data Sources*

Type of Source	Date	Number of Participants*
Observations		
Language Science Center Academic Year Wrap-Up Meeting	Spring 2015	40
Language Science Day	Fall 2015	200
Winter Storm	Winter 2016	50
Outreach Activity - Maryland Day	Spring 2016	20
Lunch Talk	Fall 2016	20
Winter Storm	Winter 2017	50
Lunch Talk	Spring 2017	25
NRT Fellows Community Meeting	Fall 2017	20
Language Science Day	Fall 2017	200
Lunch Talks (2)	Fall 2017	30
Staff-Led Community Forum	Fall 2017	20
Outreach Activity (Science Career Day)	Fall 2017	30
Winter Storm	Winter 2018	50
Focus Groups		
Student Focus Group 1 was attended by students who were a part of the language science community, were NRT fellows, or were in the process of applying to become fellows.	Spring 2016	10
Faculty Focus Group 1 was attended by those serving as advisors/mentors for NRT students.	Spring 2016	7
Student Focus Group 2 was attended by active NRT fellows.	Fall 2016	11
Faculty Focus Group 2 was attended by those serving as advisors/mentors for NRT students.	Fall 2016	4
Faculty Focus Group 3 was attended by those serving as advisors/mentors for NRT students.	Fall 2017	3
Student Focus Group 3 was attended by active NRT fellows.	Spring 2018	13

*Participant numbers for observations are approximate.

Table 1 Continued. *Data Sources*

Type of Source	Date	Number of Participants*
<i>One-on-One Interviews</i>		
Interviews with the majority of Cohort 1 of the program were conducted at the end of the Fall 2016 semester.	Fall 2016	5
Interviews with the remaining Cohort 1 students (2) and all Cohort 2 students were conducted throughout the Spring 2017 and Fall 2018 semester.	Spring 2017-Fall 2017	8
<i>Student Applications and Progress Reports</i>		
Students submit applications to join the NRT fellowship.	Fall 2014 – Fall 2017	13
Students submit regularly updated progress reports. The applications and the progress reports contain each student’s CV, research and professional goals, and a research proposal.	Spring 2016 - Spring 2018	13
<i>Student Surveys</i>		
UMD NRT fellows completed survey about curricular and out-of-classroom experiences.	Fall 2017	17
Language science students at 3 peer institutions took the same survey.	Fall 2017-Spring 2018	28

*Participant numbers for observations are approximate

Findings

UMD's Language Science NRT Program was designed to achieve seven goals organized into three categories. The program aims to provide a transformative experience for graduate students individually and collectively, to innovate within graduate education more broadly, and encourage change at UMD and in the field. We organize our findings in these three categories. We draw primarily from observations, interviews, and focus group results for this third year report.

Graduate Student Development

(1) To enhance doctoral student agency as interdisciplinary researchers

Evidence of Progress: There is significant evidence that the NRT program has been effective in enhancing doctoral student agency as interdisciplinary researchers. Students are given multiple opportunities to engage with disciplines outside of their home department, to participate on research teams composed of members from multiple disciplines, and to develop skills that will enable them to do interdisciplinary research. This was revealed in reviewing the resumes of NRT fellows as well as through interviews and focus groups. Several program activities facilitated student development in this area, including Winter Storm (in particular, special interest groups which have led to research projects; poster sessions where students have learned about shared interests), reading groups, teaching opportunities, and making connections with advisors and mentors outside of their home department.

a) Through the NRT program, students have gained knowledge and awareness of disciplines engaged in language science research outside of their home department. In multiple interviews, NRT students listed a range of disciplines outside of their own that they had become familiar with by participating in NRT programs (e.g. computer science, second language acquisition, hearing and speech sciences, linguistics). For example, one student explained that although their home department was linguistics, they had developed a stronger understanding the contributions of computer science to language science through connections made via the NRT program:

“Part of what I proposed that I do for the NRT program was to broaden my awareness and knowledge of educational tools in language acquisition research. I've been working with faculty members that are cross-appointed in linguistics at UMIACS, and develop knowledge of that area and taking courses outside of linguistics to help kind of gain the technical knowledge to be able to use those tools. Just this semester, I started attending some reading groups that are...jointly held between computer science and linguistics, which has been really interesting for me to be able to see how a lot of these questions are approached from the computer science perspective. I'm kind of heading in the direction that some faculty members in the linguistics department have been going in, trying to span the gap between the two disciplines.” *NRT Student*

In other words, this student saw reading groups and faculty cross-appointments as the mechanisms by which they learned about the relationship between linguistics and computer science.

Faculty also noted that their students' skills and knowledge of other fields had improved as a result of NRT events and activities. One faculty member explained that their students had developed better research skills and knowledge of grant making:

“I think my students have shown this kind of improvement in research skills and the quality of their work. I think they broaden their views...[The language science] community allowed them to develop

that more. Rigorous experimental scales, to be able to seek out the different funding sources, so my students received an orientation among grants. I think it may not happen if they're not a part of this science community. The improvement they gain over the years at learning from talks and the Winter Storms and everything." *Faculty Member*

This quote suggests that faculty members have seen their students develop as interdisciplinary scholars through the NRT program.

b) Co-taught courses, cross-listed courses, and the expectation that students will do coursework outside of their department empowered students to venture outside of their comfort zone to take classes that they might not otherwise consider or be intimidated to take. For example, in interviews and focus groups, multiple students cited class projects as the platform by which they had made long-term connections with peers and faculty outside of their department. The quote below is illustrative of this finding:

"I've worked on class projects with NACS people - that's probably where I've had the most one-on-one explaining to each other where we're coming from, because we had to do a project together, and that has always been interesting and valuable I think to see like what similarities we have even though we're in completely different, you know we have completely different backgrounds, but we have enough that we can see eye to eye to design an experiment together. I guess I find those useful in seeing what am I taking for granted that I know, because it's hard to realize what you didn't know before or how far you've come or now or what is unique to your discipline." *NRT Student*

From this quote, we see that class projects allowed students to develop an awareness of the way disciplinary affiliation shapes research approaches, which facilitated their identity development as interdisciplinary scholars.

c) Students indicated that learning to be interdisciplinary researchers meant learning to navigate conflict between collaborators who disagreed on how research problems should be approached. For example, we observed this phenomenon while students were creating outreach activities during Winter Storm. One student suggested an activity around a specific language science topic and explained to the group that in speech pathology, they view in the topic in one way. A linguistics student suggested that, in their field, the topic was approached in a drastically different manner. This launched a conversation among a group of five students about how their disciplinary affiliation influenced their perspective of the problem. Ultimately, the group agreed upon the approach they would use to guide the activity. In other words, the creation of outreach activities facilitated student learning of how to negotiate disciplinary differences when working on a collaborative project. The NRT program also gave students the opportunity to see how different perspectives on research problems played out through panels/discussions among faculty at events like Language Science Lunch Talks, Winter Storm, and Language Science Day. Most students felt that observing these conflicts between faculty was conducive to learning about the challenges of interdisciplinary research. For example, one student commented on a contentious discussion between faculty members that occurred at an NRT event:

"That roundtable was very much like right in the center of the type of stuff that I do, that sort of tension is something...I experience constantly, very frequently. And I think it is an important thing to negotiate, it is important not to avoid it because it is there, it is something that if we find the right way to mesh we can totally can, I think there is much more disagreement than there needs to be, we need to recognize where the differences are and where they are reconcilable and where they are

based on different priorities or ways of thinking about things. I think for the most part it tends to be the latter.” *NRT Student*

Based on this quote, we can see that this student perceived faculty at the event as role models for how to navigate conflict in interdisciplinary research, a skill that they would need to use in their own research career.

d) Students showed ownership over the NRT program, primarily through formal and informal roles with planning outreach activities, organizing Winter Storm and Language Science Day, and being able to act as representatives of graduate student needs during program planning. We observed several examples of student leadership during Winter Storm, where students led sessions such as “Elevator Pitches”, facilitated meetings of the outreach committee, and arrived early or stayed late to prepare for events. For example, one student had participated in organizing a Winter Storm discussion and said the following of their experience:

“That was a positive take away, because people really got into the discussion and I could see that I had been right to think that there was a need or desire to talk about these things more openly. So I felt good about like the fact that I could identify something that other people needed and that wasn't being addressed yet. I think it's something that I will want to keep pushing as a venue for that kind of discussion.” *NRT Student*

In other words, this student took pride in the discussion they had planned. They felt ownership over the NRT program.

Overall, NRT students developed agency as interdisciplinary scholars because of the multiple opportunities that they have to be exposed to and engage in interdisciplinary research and through their connections with peers, faculty, and colleagues outside of their home department. Additionally, faculty doing interdisciplinary research serve as role models for how scholars in this field collaborate. Finally, they demonstrated agentic actions through their leadership and ownership of Language Science Center programs.

Areas for Future Development: Though we find that the NRT program has made positive progress towards its goal of enhancing doctoral student agency as interdisciplinary scholars, our findings also suggest some institutional and theoretical challenges that the NRT program staff may wish to explore in future program planning.

a) Despite gains in recruiting students from and collaborating with non-Linguistics departments, both students and faculty associated with the NRT program suggested that Linguistics remains the dominant discipline in the language science community at UMD. In one focus group, students alluded to the differences between linguists and non-linguistics in their community, suggesting that linguistics faculty give more critical feedback to linguistics students than to students from other departments. Students recognized that this was likely due to the fact that linguistics faculty are more present at NRT events and more familiar with research content in this area.

b) Students and faculty also noted challenges in being able to define what interdisciplinary research truly is and articulated some challenges/obstacles to students' ability to identify as interdisciplinary researchers. For example, one student suggested that they did not have enough time to develop expertise in a discipline other than their own, which made them hesitant to feel confident in their ability to participate on interdisciplinary teams:

“I think if I had more time and could develop a better understanding of where all the different disciplines are and like what they think and then it would be so much easier to collaborate to try to take on other people’s perspective, and I don’t have that, I mean I have some idea of the big kind of research questions, but I don’t have an idea of how these other fields progressed through time and where these people are coming from fully. I think if I had that I would feel more confident in my ability to collaborate.” *NRT Student*

This quote illustrates the challenge of trying to know both a primary and secondary field really well. Some students wondered if they were gaining enough content knowledge in a secondary area.

Faculty members also suggested that there are multiple ways that one could develop an interdisciplinary identity, which presents challenges for how the NRT can approach developing this identity among students:

“In [Faculty Member A]’s case and in my case, we were fully disciplinary people who then acquired a second discipline and found a way to merge them. In [Faculty Member B]’s case, she was interdisciplinary from birth. Those are different ways of being, I think there should be more emphasis on different ways of being interdisciplinary.” *Faculty Member*

This quote suggests that the definition of interdisciplinarity is not agreed upon, and student identity development in this area may also take on a variety of forms.

Overall, our findings suggest that students are developing agency as interdisciplinary scholars via the NRT program, particularly through opportunities to learn about and make connections in other disciplines. However, students still need to build confidence in their ability to collaborate on interdisciplinary teams and gain enough content knowledge in secondary areas to effectively work across disciplines. Likewise, evidence suggests that multiple meanings of interdisciplinarity may make identity development in this area more challenging.

(2) To change the nature of student professional networks

Evidence of Progress: NRT student networks have become larger and more diverse (in terms of individuals using different research methods or consisting of individuals from other disciplines) since beginning the NRT program. Student networks include both peers and more senior students as well as faculty. Students mentioned developing these networks through several specific NRT activities including class, Winter Storm (in particular, the Teams and Themes events, poster sessions), reading groups, and Language Science Lunch Talks.

a) The NRT program has facilitated a strong language science community that enables doctoral students to develop and maintain relationships with individuals from outside of their home department. Through observations and interviews, we found that students and faculty were familiar with each other’s research areas, and provided encouragement, support, and connections that benefited students both personally and professionally. Several student quotes illustrate the interdisciplinary community in the NRT program:

“One thing that I really appreciate is the opportunity to work with several students from the second language acquisition program and I don’t think that would have been possible if there wasn’t an existing sort of language science community in the first place, and then under the kind of NRT - the auspices of the NRT - there has also been this effort to create or continue that kind of

communication and that I think has kept our relationship going. That kind of research relationship, professional relationships, going, for the past couple of semester, couple of years actually.” *NRT Student*

“I definitely appreciate just the sense of community, so it's not like one event, but an ongoing thing that there's so many it's just an incredible amount of interesting ideas that I think, it's a very unique opportunity to think like to see what's going in the greater language science community but also to start maybe even asking questions about your own research. So that is ongoing so that's all the lunch talks, all the invited talks by faculty they are great.” *NRT Student*

In other words, students developed relationships outside of their home departments and the sense of community within the Language Science Center facilitated interdisciplinary collaborations and projects.

Faculty also saw the NRT program as a platform for students being able to expand their networks beyond the bounds of their home department. One faculty member illustrated this in the quote below:

“I speak for a small program in the language division we have a small graduate program, mostly PhD's. With a small faculty body and very limited research sources. For us, it opens the doors for our students to take courses to prepare them to work with sophisticated, contemporary technology. To meet faculty outside our small group and work in different projects. For our students it is mostly enrichment in all possible. It's right up there professional wise.” *Faculty Member*

This quote suggests that faculty perceived the NRT program as not only developing students' technical knowledge, but also as enriching students' professional networks.

b) Students also provided concrete examples of getting feedback from their network. Students get significant feedback from advisors/supervisors and colleagues in the lab or in regular meetings with faculty. Many students also mentioned the weekly Language Science Lunch Talks as a way that they receive feedback from their networks. Through our observations, we confirmed that these events were interactive opportunities for students to present their research to an interdisciplinary audience where both faculty and students asked questions and gave feedback to the presenter. For example, one student commented on their recent Language Science Lunch Talk experience:

“I got tons of feedback today. It was awesome. There was a lot of people, had suggestions, which was really nice and it was all like, ‘Oh, have you thought about this’ and ‘Oh, we have this’ and ‘I know someone who might know about this would you like me to put you in touch with them.’ Just additional suggestions for things that come to mind. For the project I was working on last year that I mentioned, we presented on it in the seminar and got feedback from the people who were at the seminar which was really nice.” *NRT Student*

This quote illustrates the importance of Language Science Lunch Talks as not only a feedback mechanism but also as a platform for students to make connections on shared research interests.

Other students noted that, because of connections made via the NRT program, they had sought out interdisciplinary feedback from faculty and peers, as illustrated by this quote:

“Within linguistics, I have gotten tons of feedback of course, on all aspects of my research. On other projects, trying to branch out, it's been more, I have gone to talk to a few different faculty members outside of linguistics, just to say here's what I do for research, I would like to incorporate some sort of computational stuff with it. And just discussing with them about what kinds of

possibilities that would be, what I could contribute to the comp side and what the computational side can do for my research.” *NRT Student*

Through this quote, we can see that this student developed agency in getting interdisciplinary feedback because of the connections that they made through NRT program.

Evidence in this area overall indicates that NRT students have strong, diverse networks within the language science community, especially at UMD. Further, evidence suggests that students make initial connections at events like Language Science Day, and that activities like cross-listed courses serve as a platform by which they develop and maintain more significant relationships with peers and faculty. Additionally, NRT students receive significant interdisciplinary feedback from their language science network, particularly at events such as Language Science Lunch Talks.

Areas for Future Development: We found that while students had strong networks within the language science community, there are areas where their networks could be further developed.

a) Though students reported large and diverse disciplinary networks, they also indicated that the majority of their network was within academia. Very few mentioned that they had been developing strong networks outside of academia. For example, in the majority of student interviews, when asked about who they considered to be a part of their networks, students mentioned examples of peers, their advisors, or other faculty. Most students mentioned colleagues outside of their department and a handful mentioned colleagues at non-UMD institutions; however very few students specifically referenced individuals who work in policy, non-profits, or industry.

Overall, we found that NRT students have developed professional networks that are helpful to them in achieving their goals. However, most of these individuals are within the academic realm. This finding is unsurprising given that the daily lives of students are orientated around academia, but also suggests that students’ professional networks could be further strengthened to include non-academics.

(3) To enhance student understanding of particular research problems and the relationship between research problems and contexts

Evidence of Progress: There is significant evidence that the NRT program has been effective in broadening student understanding of research problems and contexts. Through policy internships, Winter Storm, outreach activities, Language Science Lunch Talks, and other on-going professional development workshops, NRT students have a strong foundational understanding of how their research fits into applied contexts.

a) NRT offers a variety of programs and activities that allow students to see the connections between language science and real-world issues. For example, during Winter Storm 2018, we observed a session on Elevator Pitches, where students were asked to describe their research problem and then prompted to discuss why the research problem should matter to a person not well-versed in the content. The NRT program thus provides students with opportunities to practice describing how their research connects to the big picture and to get feedback from peers on how to clarify or improve their reasoning. Student interviews likewise illustrated how the NRT program has facilitated student thinking this area:

“I think I also have learned a lot about how to think carefully about a research question, so it's a more abstract kind of soft skill. You know like why is my research interesting and why should I bother? And what other connection this has with what others are doing. That kind of being able to

ask that kind of question and being able to answer or being able to try to answer that question.”
NRT Student

“I'm involved with the outreach committee and this is my favorite thing. It's a lot of fun and actually it does help me think about my own goals. So, we always have these two goals and I really see it happening. We have one goal of the outreach committee is to basically go promote science to the public and make sure that people understand, and that we come out of the academic bubble and that we share the joy of science. But, also on the other hand, it really helps us practice the skills of how do you think about your research in different levels of complexity and what is it really about your research that is so important, so unique. You know, step back from these nitty gritty framework and methodological issues and what's the big picture?” *NRT Student*

These quotes suggest that students NRT programs and events have forced students to step back from the technical aspects of their work and carefully consider the real-world implications of their research.

b) Policy internships and other policy-orientated activities provide opportunities for NRT students to consider the ways that research can be used in the public arena. For example, during Language Science Day, NRT students attended a panel discussion on the role of language scientists in local and national policy. Three speakers from different language science disciplines provided insights and guidance to students about how their research can impact policy in areas such as education, healthcare, and civil rights. These speakers thus served as role models for NRT students, particularly for those still working on bridging the connection between their research and the policy world.

Students also indicated that they had developed knowledge of policy issues through the “Team and Themes” events, where they met with students and faculty around cross-disciplinary topics. One student described their experience in gaining knowledge of the policy issues in their field:

“As someone who studies child language, understanding the broader policy implications. And this is a very tangible policy implication of how do we come up with better recommendations for parents and schools and working with children from a variety of different language and family backgrounds to help them achieve better in school. I don't know enough about it by any means...I know the language science part, but I know nothing about the family interaction SES component. So that's something that, or really how this is applied to educationally, so that's the thing I'm really hoping to benefit from is learning a lot more about that.” *NRT Student*

This quote suggests that the Teams and Themes meetings acted as a mechanism by which the student could broaden their perspective on their research topic.

Faculty also perceived the policy component of the NRT program to be beneficial to their advisees. One faculty member illustrated what they saw as the advantages of student participation in policy discussions:

“I think it's really broadened the scope of their graduate program. In particular, the issue of having to figure how their research addresses some public policy issue, so one is now working with, and she never, you know, her research is on [X topic] which she had to come up with some policy issue that was related to her research interests and she's now working [a relevant department on campus and a community-based center on the problem]...So it's potentially a completely solvable problem...so anyway you know it's the kind of thing that's a really interesting public policy issue that's related to her research that she you know never would have even thought about working on except she had to come up with something.” *Faculty Member*

In other words, this faculty member saw the policy component of the NRT program as a value-add for the student they advised.

NRT students have developed a strong sense of how their research applies to real-world issues such as education, technology, and healthcare, as well as an appreciation for the implications of their research on policy issues. Evidence suggests that both students and faculty see development in this area as a benefit of the NRT program, as well as a positive enhancement to graduate education more generally.

Areas for Future Development: While all students were, to some extent, able to articulate how their research connected to real-world issues, evidence suggests that students vary in the extent to which they feel comfortable with or enthusiastic about connecting their research to policy. Similarly, evidence suggests clarifications around the policy internship could be useful for student development in this area.

a) Some students struggled with answering questions about the policy implications of their work. This challenge manifested in a variety of ways. On one hand, students could mostly articulate some of the “real-world” implications, whether applied to engineering, teaching language, or technological innovations. However, students had less confidence in articulating what the policy implications of these “real-world” applications were. For example, one student said:

“So it's much easier for me to answer the real-world question because that is something I do a lot of thinking about. Not having yet been very involved in policy-oriented stuff, it's hard for me to answer that, because I'm not really sure what applies and what doesn't. But I suspect the answer is also 'yes' but I'm just not sure of the breadth to which policy applies.” *NRT Student*

This quote suggests that the student knew that there were policy implications of their work but had not yet had the training needed to know what those implications were.

Other students seemed resistant to the notion that they needed to consider policy implications because their interest in language science was theoretical and/or not related to policy. When asked about the policy implications of their research, one student said:

“I think honestly, not much. So, I feel like with many of these things, with policy and the real world application, we could stretch it and make it such so we're almost like trained to do it. And I could totally do it, but this is not like primary concern...” Later in the interview, the same student said, “So I don't really don't like talking about the policy and the real-world application of that because it feels almost like dishonest because I'm not really actively doing anything about that.” *NRT Student*

In other words, this student felt that the policy requirements of the NRT program were not related to their career interests, which were more academic in nature.

b) While a handful of students have completed their policy internship and seem satisfied with their experience, the content of their internships varied significantly. For example, in focus groups, students who completed the policy internship shared what their experience had been. Other students in the room seemed surprised that certain activities had qualified for an internship while others had not. New NRT students seem confused and apprehensive about finding an internship and unclear on what would be deemed an appropriate internship by program staff.

Overall, we found that that the NRT program has made positive and significant progress towards the goal of enhancing student understanding of the relationship between research problems and contexts. NRT events and activities expose students to role models who connect their research to applied and/or

policy contexts, and students enjoy opportunities to learn about how their research interests connect to local, regional, and community issues. On the other hand, evidence suggests that students are less confident or excited about connecting their research to policy. This finding may be due in part to students' nascent knowledge of the policy world, or the personal interests/preferences of individual students. However, the finding does suggest the need for continued programming to build student confidence and knowledge of research problem contexts, particularly as related to policy.

(4) To enhance student ability to communicate about research problems and their contexts, and adjust their communication according to the audience, channel, and goals

Evidence of Progress: There is significant evidence that the NRT program has enhanced students' communication skills. Students have developed strategies for adapting their communication style and for communicating on collaborative teams or in leadership roles. Specific activities that contributed to student development in this area include: outreach activities, seminars on elevator pitches/other forms of communication, Language Science Lunch Talks, Language Science Day, Winter Storm, and leading/organization student committees.

a) NRT students have learned strategies for adapting their communication to the audience that they are engaging with. For example, during a meeting of the Outreach Committee, students contemplated the language science activities they were going to use at upcoming outreach events with K-12 students. One student brought up a particular language science issue, and then asked the group to brainstorm ideas for activities that would effectively translate the scientific concept to younger students. The group then considered how to make the activity more challenging for high school audiences in comparison to middle-schoolers. In other words, NRT students thought strategically about the best way to communicate with young students and adapted their strategies to meet the needs of their audience. In practice, we observed that NRT students doing outreach activities were enthusiastic about their work and were able to engage high school students in language science activities. For example, at one outreach event with high schoolers, a high school participant mentioned that she had interacted with small children who were learning English from parents with two different accents. NRT students used the high schooler's experience as a platform to talk about the research they do at UMD, which facilitated a longer, more engaged conversation with the high school student. Planning outreach activities thus serve as a mechanism not only to promote language science, but also facilitate student communication with younger, non-language science audiences.

b) In addition to outreach activities with children, NRT students have also developed several strategies/skills for communicating with adult, non-academic audiences. We observed this during the Winter Storm session on elevator pitches (described previously), where students had to describe the significance of their research problem to individuals who are not familiar with the research area. One-on-one interviews also revealed that students use many strategies when thinking about how to best communicate with non-academic adult audiences. For example, one student suggested that they would take a more general approach when discussing research with non-academic audiences rather than a highly technical one:

"I think would focus less on, I would start in a different place, I think I would focus less on what my particular research question is in the field and just kind of hope to get people to realize how amazing it is that kids can learn language that quickly and that it's not obvious they would because we have these technologies that are not great at it and hope that just like try to convey why the field in general is interesting, and then if they're on board there, maybe go into more specifics. I think just like different what I would be trying to convey would be different." *NRT Student*

This quote suggests that students have had opportunities to think about how to engage with non-academic audiences and gained insight into best practices for doing so.

c) NRT students also developed their communication skills through leadership and committee opportunities where they learn strategies for communicating with teams towards a common goal. In interviews, multiple students discussed how their communication and leadership skills had improved through chairing student committees to plan Language Science Day, Winter Storm, and other events throughout the year. A quote from a student about their experience at Winter Storm illustrates this:

“Winter Storm is certainly salient for me because I was the one organizing it the past two years and that was a very valuable experience, a very challenging experience, in terms of just a broad range of organizational and communication-based skills for me. Needing to bring together a bunch of people and plan something that will be valuable and appealing to a broad range of folks in different domains. So yeah that, I haven’t mentioned this but the service work...the service responsibilities of the NRT have been valuable to me, even if hard, so that was certainly memorable and definitely gave me exposure to a lot of people throughout the community and that was great.” *NRT Student*

In other words, committee roles facilitated this student’s ability communicate effectively as a leader during Winter Storm.

Overall, we find that the NRT program offers multiple opportunities for students to practice their communication skills and develop strategies for communicating with both academic and non-academic audiences.

Areas for Future Development: Although students demonstrated the ability to successfully communicate with non-academic audiences and indicated that NRT programs and activities had facilitated their communication skills, our findings suggest that not all students have developed full confidence in their abilities in this area.

a) While students suggested that they had honed their communication skills generally and developed *some* strategies for communicating with non-academic audiences, they tended to express some reservations about being able to communicate with individuals outside of academia.

“Normal members of the general public, even though that they find that the fact is interesting, or it is hard to explain, they might not still appreciate the fact for being what it is. They're like ok this is really interesting, but it is of no relevance to my life. That is the hardest part, I think I would struggle with. Being able to show them that this is interesting, and this is relevant. I think it's the second - why is this relevant - I don't really think I can communicate that.” *NRT Student*

“I find it hard to connect my specific research [to policy issues]... like I could explain how it builds up to more general problems, but it's still pretty academic. Yeah, I wouldn't think that my particular research wouldn't inform policies but in general it is important to work with policymakers. I....just at this point, I don't think I will do this as a career.” *NRT Student*

In other words, students feel less confident about their ability to translate their research to non-academic audiences, particularly in the policy arena.

Findings in the area of student communication skills highlight a tension – while NRT students demonstrated the ability to communicate with diverse audiences, when they reflect upon these

experiences, they seem less confident about their ability to do so. This finding may be a result of the natural feelings that young scholars experience as they build expertise in their field; however, the findings also suggest that getting constructive feedback on their communication skills should remain a priority for NRT programs.

(5) To enhance student ability to choose and successfully pursue a career within or outside academia

Evidence of Progress: NRT students are familiar with the skills and competencies needed to pursue an academic career and are somewhat knowledgeable about the options available to them outside of academia (e.g. non-profits, industry, policy). Specific NRT activities that facilitate student development in this area include policy internships, Advocacy Day, and career-specific development workshops (at Winter Storm and throughout the year).

a) NRT career development programs have provided students with opportunities to explore careers outside of academia. Faculty see this as a value-added component of the program. For example, one faculty member suggested that one of their students had benefited from participating in a specific, non-academic professional development activity:

“So I'm thinking of my student...I think it's been helpful because among faculty mentors there is a knowledge that many of our students don't pursue academia but there wasn't a necessarily a conversation that occurs earlier in the program because, partly because we're not necessarily in a great position to tell students like what do you do if you don't pursue academia. We all pursued academia so, you know, what else is there? And so, I think that it's been useful to have a very, kind of explicit discussion with students, like you know here are a variety of careers that one could pursue that focus on things like [specific topic].” *Faculty Member*

In other words, the NRT program gives students exposure to career development opportunities that faculty cannot offer them.

Students appreciated programs focused on career preparation and discussions around the things that they can do as graduate students to prepare for careers. For example, one student described a session at Winter Storm that they found particularly helpful:

“We had a great session on early careers, so the kind of like work balance and you know we are all very, very stressed out about the idea that there are very few jobs and that we have to not only be the best but be very lucky. How do you deal with that, how do you not put all your eggs in one basket but, at the same time, have enough eggs in some baskets, you know? To compete with others. That was a great session.” *NRT Student*

This quote suggests that students see discussions about career preparation as meaningful to their professional development.

To sum, NRT's career development activities have enhanced student knowledge of both academic and non-academic careers, and students have benefitted from the shift towards career development activities in the last year.

Areas for Future Development: NRT students have a good sense of academic careers but could use additional guidance and development when it comes to non-academic ones.

a) As noted in Goal 2, most students did not identify non-academic individuals as part of their professional network. This suggests that while students have exposure to non-academic audiences, they

do not all view their connections in this area to be as strong as their academic ones. This may be a result of students not yet having completed their policy internship and/or limited participation in other non-academic professional experiences. It may also be a result of student interests. However, while students seem generally knowledgeable about non-academic careers, most seem inclined towards pursuing a career in the professoriate or in research settings when prompted.

Overall, the available evidence in this area suggests that while students are generally knowledgeable about what is needed to pursue a career in academia, their interest in or knowledge of non-academic fields may be somewhat limited by comparison. However, we note that career development has been a recent focus of the NRT program and several students and faculty indicated that the emphasis on career development has been useful.

Graduate Education Reform

(6) To share, and help other graduate programs adopt, best practices in interdisciplinary graduate education that emerge from the NRT project.

Evidence of Progress: There is strong evidence that many NRT practices, programs, events, and activities are positively contributing to graduate student development and could be adopted by other graduate programs, both within UMD and at other institutions.

a) As suggested by the evidence above, formal and informal NRT activities have fostered connections between faculty and students across departments and colleges that would not have existed otherwise. This suggests that the Language Science Center/NRT has facilitated a language science network that creates opportunities for interdisciplinary graduate education and research.

b) Faculty teaching interdisciplinary courses noted that having a significant number of students from other disciplines forces them to teach the content in new ways that they think mostly improves the course. One faculty member said:

“Even if I'm teaching a course in linguistics, even for the linguistics students in the course I feel they are benefiting from having all these students from other departments enrolling in the course. I feel like that's making my course better having all the students from SLA and has been all the different. We have a really wide enrollment now and I think they really talk to each other well and I feel like that's a really good cross impact.” *Faculty Member*

This quote suggests that cross-listed and co-taught courses are influencing graduate education for the better in some departments.

c) There is evidence from faculty, students, and project personnel of NRT innovation being replicated in other units on campus and of sharing of best practices between NRT PIs and PIs from other language science programs, both Big 10 Academic Alliance (e.g. University of Wisconsin, Ohio State) and outside of it (e.g. University of Connecticut).

Overall, there is evidence that NRT program has adopted many strategies that have improved interdisciplinary graduate education and begun to share these strategies with other institutions.

Areas for Future Development: More research is needed in order to evaluate the extent to which NRT best practices are influencing other graduate programs on campus and/or other institutions.

a) Though there are insights that can be gained from the interviews and focus groups already conducted, our data to date better reveals student development goals rather than institutional perspectives on the effect of the program on graduate education at UMD more broadly. We suggest interviews with program leaders (PIs, staff), deans, department chairs, and faculty that focus on the development of the language science center and its impact on campus structures, policies, and practices, which can inform interdisciplinary graduate practices both at UMD and at other institutions.

Altogether, there is significant evidence that the NRT program has developed practices for interdisciplinary graduate education that can be shared with leaders interested in improving graduate education. However, we need additional information in order to understand how/if these practices have influenced other graduate programs, both inside and outside of UMD.

Institutional Change

(7) To reduce organizational constraints to, and facilitate, faculty collaboration on interdisciplinary research.

Evidence of Progress: There is evidence that the NRT program, and the Language Science Center more generally, has created and sustained a diverse network of language scientists from across UMD. As with students, this network has increased faculty's knowledge of others doing language science research on campus and sparked energy around language science more generally.

a) The NRT program has facilitated opportunities for faculty involved in language science to become familiar with each other and identify potential areas for collaboration. Faculty have, for example, co-taught courses with faculty members from other departments and frequently present on research they are doing that is interdisciplinary in nature. The NRT program has acted as a mechanism that brings faculty together, as illustrated by this faculty quote:

"I think that actually I'm really looking forward to this center, this initiative, bringing together faculty as well as students to work on common research agenda instead of just right now sometimes I feel like we work on very similar things but the professor acts in a different department but the only way to communicate is to write comments on the paper that students that would both advise is writing. Sometimes it's fun to discover that but sometimes I'm thinking maybe we should have a meeting." *Faculty Member*

This quote suggests that through the NRT program, and particularly through their students' involvement, faculty have become more aware of other faculty with shared interests.

b) In some departments, the NRT program/Language Science Center has shifted expectations about faculty service roles as well as about the value of interdisciplinary research. For example, in one faculty focus group, a member suggested that their department was strongly tied to the LSC, which facilitated their involvement because it had become a departmental norm to be active with the Center. Another faculty member in a focus group suggested that the Center had increased the levels of support that junior faculty receive for doing interdisciplinary work:

"I feel like the junior faculty get an awful lot of support that they wouldn't get if this culture didn't exist. Support is kind of not codified in any way, that there are senior faculty at their lab meetings and when their students are doing presentations that's a lot of support for junior faculty. Certainly, if they want to discuss their tenure case or whatever, there's lots of ... the

lines of communication are pretty open that way. I think we are kind of doing what we said we were going to do for faculty involvement in the program. Maybe we could do more, but this is it." *Faculty Member*

In other words, this faculty member perceived high levels of support for junior faculty doing interdisciplinary research, particularly in relation to tenure decisions.

c) The LSC's physical location and permanent program staff also facilitate faculty collaboration on interdisciplinary research. Faculty and students go to the Center frequently and it serves as a central hub for research team meetings, advisor-student interactions, and community-building. Likewise, faculty and students strongly saw the program staff as anchors for organizing programs, communicating across the language science community, and advising students. The two quotes below summarized this notion:

"For me, the language science center itself, as separate as you point out from the NRT, is something that I think is an enormous asset as a center mass for - literally in terms of just it's geography actually - for language science activity on campus. And, finding ways to kind of get people out of their own research box into let's look at things more broadly is something that I care about a lot." *Faculty Member*

"I don't think we could cobble together this on faculty support only." *Faculty Member*

These quotes suggest that the Center, as a space, and its staff play an integral role in facilitating the overall sustainability of the language science community as a whole.

d) There is evidence that the NRT program and Language Science Center have elevated the status of language science at UMD, which may also facilitate faculty collaboration on interdisciplinary research. As noted by UMD's Vice President for Research (Laurie Locascio) and project PIs at Language Science Day in 2017, UMD's language science community has been internationally recognized by *Times Higher Education*. This sense of prestige around the language sciences was echoed by a faculty member, who said:

"This goes back to I may have used the term critical mass earlier in the conversation, right, that the language science initiative is a big deal. Everything that we have that contributes, look we've gotten this external NSF funding, we've gotten this, we have this, is part of the support for the vision, and the momentum of that this is a big deal." *Faculty Member*

This quote provides evidence that the prestige and energy around language science at UMD has also contributed to interdisciplinary research endeavors around campus.

Taken cumulatively, findings in this area indicate that the NRT program has, to some extent, enhanced faculty networks in language science within UMD and facilitated change in faculty service expectations and recognition for interdisciplinary scholarship. Likewise, the NRT program, via the Language Science Center, offers faculty a physical location for collaborative meetings and the program staff provide much needed support for nurturing the language science community. Last, the NRT program has spurred an increase in energy and campus and field visibility around language science at UMD, which may encourage faculty involvement in interdisciplinary research.

Areas for Future Development: Evidence suggests that the NRT program has made progress in facilitating interdisciplinary research at UMD. However, evidence also indicates that several institutional

elements continue to constrain faculty involvement in the NRT program and in interdisciplinary research more generally.

a) Faculty outside of Linguistics experience challenges in having time to balance service expectations inside of their department with the service expectations to the LSC. One faculty member described the challenges of service commitments in the quote below:

“Yeah I feel like my department definitely has obviously...between [Faculty Member A] and [Faculty Member B]...has a lot of support for language science, on the other hand, that said...there is still a division between the kinds of service that you provide for your department versus the kinds of service that you provide for language science, those are distinct categories.”

Faculty Member

In other words, even though some departments are heavily involved in the LSC/NRT program, faculty still experience challenges that prevent them from participating to the extent that they want to.

b) There is some concern about a drop-off in faculty participation in events in the third year of the program compared to the first year. For example, in one focus group, students noted that they perceived that less faculty come to Language Science Lunch Talks now than previously. In faculty focus groups, faculty also noted that there are some NRT/LSC affiliated members who are more involved than others. Our team also observed that the same faculty tend to be present at many NRT/LSC events.

To sum, the NRT program appears to have facilitated interdisciplinary research, collaboration, and involvement among faculty in some units on campus, while more work needs to be done in others. While evidence suggests there has been positive momentum and energy around language science at UMD due in part to the NRT program, project leaders may also need to focus attention how to sustain this energy over time.

Additional Notes for NRT Program Leaders

Feedback on student and faculty participation: Students, and to some extent faculty, expressed frustration around the notion that a core group of students and faculty regularly show up and take on more responsibilities within the program. While students in this core group articulated many benefits from having strong NRT involvement, they wanted a more diverse group of students and faculty to participate in NRT programs.

Feedback on Summer Camp: Both faculty and students seemed confused about the goals and purpose of the Summer Camp initiative, an intensive workshop to take place in 2018 which has thus far garnered little participation. Faculty generally perceived the Summer Camp initiative to be work intensive and requested a template or guidelines for what a proposal would look like and how they were supposed to design a workshop that would meet the goals of the program. Students seemed to believe that the workshop call for proposals was primarily aimed at faculty and that at this point of their graduate training, they lack the skills and knowledge to come up with a proposal that would meet the needs of the program.

Feedback on Student Workload: Some students suggested that the while they saw significant value in the activities and experiences required of NRT fellows, they felt concerned that the increase in requirements detracted from their ability to focus on research and graduate on time. Several students

noted that they felt as though they were not able to dedicate as much time to research as their non-NRT peers.

Survey Results

From October 2017 through January 2018, our research team distributed a survey about student experiences in language science doctoral programs to UMD's NRT fellows and doctoral students at three peer institutions: University of Connecticut, Ohio State University, and University of Wisconsin (See Appendix B for the survey instrument). The purpose of this survey is to provide benchmark data on UMD NRT student professional growth to follow over time and to compare UMD NRT experiences to peer institutions with and without NRT programs. The survey included quantitative response questions as well as open-ended qualitative responses. We also required participants to upload their CVs. Because the survey distribution ended recently, we report only basic descriptive statistics. Qualitative results will be reported in a subsequent report.

In Table 2 (located at the end of this document), we report the demographics of respondents (N=45). UMD NRT students composed approximately 38% of the sample (N=17) while non-UMD students composed 62% of the sample (N=28). Of the non-UMD student sub-sample, University of Connecticut language science scholars made up just under half (45%), with Ohio State students at 32% and University of Wisconsin students at 21%. The sample is composed of 41% male students, 54% female students; 13% of students chose to self-identify or did not report. White students make up 58% of the sample, while a significant number of students (27%) chose to self-describe their race/ethnicity or did not report. Most students (73%) were in their first, second, or third year of their academic program; over 50% of respondents were still completing coursework. The majority of students (56%) indicated that they were interested in careers in academia, and 16% said that they were interested in government or industry research careers (though we note that over 26% of respondents said that they were interested in careers not listed or chose not to respond).

The survey was designed to examine the extent to which language science doctoral students experience their graduate programs as contributing to their development as interdisciplinary researchers. The survey items were developed based on the extant literature on doctoral student development as well as the seven goals of the UMD NRT program. For example, respondents were asked to estimate the frequency in which they participated in specific professional development events and the extent to which they found opportunities for development present in their program. Respondents were also asked to report on their professional network and their perception of their contributions to their department and field. To ensure confidentiality, we compare the aggregate results of UMD NRT students to non-UMD language science students in Figures 1-13 and Tables 3-7, located at the end of this report.

1) Frequency of Participation in Professional Development Activities (Figures 1-13)

Overall, UMD students participated in a high number of professional development activities compared non-UMD language science students. For example, 88% of UMD students reported that cross-listed courses were offered throughout the academic year, compared to 66% of non-UMD students. In regard to career planning, 59% of UMD students said that they had participated in career planning events several times in the last year, while 52% of non-UMD students indicated that they had not participated in any kind of career planning event. A large majority of UMD students (71%) noted that they had participated in professional skills training several times in the last year, compared to about one-third of non-UMD students (34%). Most UMD students reported that they had met on an ongoing basis with collaborators and research teams (71%), compared to 55% of non-UMD students.

There were areas for growth and development. A high number of both UMD students (76%) and non-UMD students (97%) reported that they had not participated in an internship in the last year. This is likely due to the concentration of students who are still in earlier phases of their doctoral program. While 47% of UMD students indicated that they had met with a reading group ongoing throughout the last year, 35% indicated that they did not participate in a reading group at all. This suggests that existing reading groups may need to extend invitations to those who are not currently participating. Approximately 70% of UMD students reported that they had participated in outreach activities several times or on an ongoing basis in the last year, suggesting student high participation in outreach overall. However, 24% of UMD students indicated that they had participated in only one outreach event in the last year, which suggests that some students participate in outreach only because it is a requirement of the program. This mirrors findings from qualitative interviews and focus groups where students suggested that some are carrying more of the weight of outreach activities than others.

2) Doctoral Student Experiences and Opportunities (Table 3)

Respondents were asked 16 questions to indicate the extent to which they found certain experiences and opportunities present in their graduate program (1=experience/opportunity was not at all present, 5= experience/opportunity was present to a great extent). We ran a series of t-tests on each survey item to assess whether UMD and non-UMD students reported significant differences in responses in terms of mean scores. However, we note that the power of the results is limited due the small sample size and caution against weighing the results heavily.

There were seven survey items where significant differences between UMD and non-UMD students emerged. In each case, UMD students reported that their doctoral program offered experiences/opportunities to a greater extent in comparison to non-UMD students. The areas where UMD students had significant differences from non-UMD students were:

- Team-teaching by faculty from different departments and/or disciplines
- Opportunities and encouragement by faculty to contribute to the development of my program
- Opportunities to take courses in other departments
- Opportunities to learn and practice strategies from communicating with diverse audiences
- Opportunities to learn about the impact of research in my field on clinical applications, industry, or public policy
- Opportunities to communicate about my research field to non-academics
- Opportunities to learn about academic and non-academic career options

We note that even though differences on other survey items were not statistically significant, UMD students in general reported more positive outcomes on these items than non-UMD peers. None of the mean scores for UMD students on these items was below 3 (where 3 indicates that the experiences/opportunities were somewhat present). Results in this area suggest that UMD's language science program offers students' opportunities and experiences that are unique, particularly in the areas of courses offered, communication, and exposure to non-academic audiences.

3) Doctoral Student Confidence in Research, Collaboration, and Communication Skills (Table 4)

Respondents were asked 12 questions where they indicated their level of confidence in their skills/abilities with regards to communication, research, and collaboration (where 1=not at all confident and 5=confident to a great extent). We ran a series of t-tests on each survey item to assess whether UMD and non-UMD reported significant differences in responses in terms of mean scores.

There was only one survey item where there were statistically significant differences: when asked about their confidence in explaining their research to peers, UMD students were statistically more confident than non-UMD peers.

As was the case for the previous survey items, though results were not statistically significant, UMD students in general reported greater confidence than non-UMD peers. Most of the mean scores for UMD students on these items was above 3 (where 3 indicates that students were somewhat confidence). However, there was one item where UMD students had a mean score below 3: when asked about their confidence in collaborating with a range of professionals (e.g. senior scientists, policymakers, business leaders, leaders of local communities), UMD students reported an average score of 2.53. Non-UMD students also reported lower confidence ($M=2.64$) in this area. These findings may be due in part to the fact that most students have not participated in policy internships that have facilitated confidence to work with non-academics; however, findings could also suggest that students are less sure of their ability to create collaborations outside of academia.

4) Doctoral Student Contributions to Field and Society (Table 5)

Respondents were asked four questions about the extent to which they agreed that they were making valuable contributions to their field, program, and career (where 1=Strongly disagree and 5=Strongly agree). While there were no significant differences between UMD and non-UMD students, UMD students had higher mean scores across all four items when compared to non-UMD students. In general, UMD students seemed to agree that they were making valuable contributions to their program and to the field. These findings suggest that most students feel as though they have ownership and self-efficacy in their doctoral program, particularly around their own research skills.

5) Doctoral Student Networks (Table 6)

Respondents were asked five questions about their professional and discussion network (where 1=Strongly disagree and 5=Strongly agree). There were no statistically significant differences between UMD and non-UMD students, however, UMD students had high mean scores of 4 or above on four out of five of the survey items. These findings suggest that UMD students believe their professional networks are strong and provide the supported needed to be successful in their doctoral program.

Recommendations

Graduate Student Outcomes

There is evidence that the NRT program is making positive progress towards achieving the program seven goals. Our findings suggest that the NRT program has been particularly successful thus far at encouraging students to be agentic in their growth as interdisciplinary scholars, providing opportunities for exposure to and engagement with an interdisciplinary network, and preparing students to understand the relationship between their research and the context around it. Program elements such as Winter Storm, Language Science Day, cross-listed courses, outreach activities, reading groups, and research opportunities contributed to student development in these areas.

Evidence suggests a few areas of future development that program leaders may wish to consider. While our findings revealed that students appear to have strong communication skills with diverse audiences, student interviews suggested that this was an area where students felt less confident about their abilities. Likewise, the NRT program's recent focus on career development is seen as positive contribution to student development; however, more emphasis on non-academic careers would strengthen student development in this area. We note specific recommendations below.

- Policy Internship and Policy Communication
 - Clarify practice and procedure for student internship requirements. Specifically, is the policy internship limited to policy or might it also include internships in industry or intensive professional development opportunities such as a course?
 - Provide more opportunities for formal and informal networking with individuals involved in language science policy and create opportunities for students to become familiar with the language science policy landscape. One example, which the NRT program has already initiated, are Language Science Advocacy Days on the Hill. A curated list of language-science relevant organizations might also be useful. For interested students, establishing an industry/policy mentoring program might also be useful for enhancing student networks in non-academic fields.
- Non-Academic Communication
 - While the quantitative results suggest that UMD NRT students have multiple opportunities to communicate with non-academic audiences, our qualitative results suggest that this is an area where students feel somewhat less confident in their ability to communicate with non-academics and work with them effectively. Based on this, it would be useful for some workshops to continue to focus on non-academic writing and communication (e.g. writing a brief as opposed to a research article, testifying to Congress or the University Senate, etc.) and give students formal opportunities to get feedback from each other about what effective communication in this area looks like.
- Facilitating Feedback Processes
 - Language Science Lunch Talks were cited as one of the primary ways that students give and receive feedback. At times, students mentioned being intimidated with the rapid-fire feedback provided in this setting. It might be useful to experiment with more structured feedback environments for the talks (e.g. have a student facilitator moderate the number of questions a student takes during their talk, ask the audience to save questions for the end, designate a period for student-only questions before faculty ask their own questions) to facilitate student input and increase student confidence in their presentation skills.

Graduate Education Reform

Positive findings in the area of graduate student development suggests that the NRT program has much to share about best practices in interdisciplinary graduate education. However, more research is needed in order to evaluate the extent to which these practices have been shared and adopted across campus and/or at other institutions. We make some specific recommendations for how the NRT program leaders might begin to share practices below.

- Quantitative results suggest that cross-listed and/or co-taught courses are particular strengths of UMD's language science curriculum. The LSC should encourage faculty who are participating in co-taught courses to share their curricula as a model for future courses (both inside and outside of UMD).
- The Language Science Center might consider hosting a workshop with the Graduate School on best practices and innovations they have perfected for other graduate program directors across the University.

Institutional Change

We found somewhat mixed evidence in the extent to which the NRT program had facilitated faculty involvement in interdisciplinary research: while faculty reported more connections and energy around interdisciplinary research, some faculty reported that institutional constraints that made involvement in UMD's language science community difficult. More research is needed in order to better understand the extent to which the NRT program has changed institutional structures or perspectives on interdisciplinary research. We make a specific recommendation on how the NRT program could facilitate faculty interdisciplinary research and involvement in the LSC below.

- It might be useful to convene a meeting of department chairs whose faculty are involved in the LSC to discuss how they have managed service loads for faculty doing this type of work and to consider changes in policies that would facilitate faculty involvement in the LSC, particularly for non-Linguistics departments.

Future Evaluation Plans

In fall 2017, our research team developed a yearly evaluation timeline that outlines the data collection activities we will undertake each year (See Appendix A). These efforts are primarily aimed at understanding the graduate student experience in the NRT program. Though we feel the current activities effectively capture much of the student development that occurs within the NRT program, in future evaluation activities we hope to better understand how the NRT program is impacting student career aspirations and development.

To better understand the impact of the NRT on graduate education and interdisciplinary research across campus, we also propose the following activities to take place in addition to the ones already agreed upon, outlined below.

- Observations of co-taught courses
- Interviews with faculty teaching co-taught courses
- Interviews with faculty, department chairs, and deans involved in the language science community

- Interviews with program staff (PI, directors, etc.) and graduate school staff regarding ways in which the LSC and NRT efforts have served as a model for other departments on campus.
- Annual analysis of survey results
- Analysis of NRT students' vitas

Tables & Figures

[See Attachment]

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Appendix A: Yearly Evaluation Timeline

- Focus Groups
 - One focus group annually with faculty (December) and students (January)
- Interviews
 - One on one interviews with students after they have been in the program for at least one semester.
 - One on one interview with graduating students prior to degree completion.
- Observations
 - Ongoing
 - Language Science Day (October)
 - Winter Storm (January)
 - Maryland Day (March/April)
 - Language Science Talks (Weekly)
 - Outreach activities (ongoing)
- Survey
 - Annually each October

Appendix B: NRT Student Survey

[See Attachment]