# GRIP: A University's Program Develops Tracks to Bridges, A Professional Development Opportunity

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***Abstract*--Data literacy education provides an opportunity for libraries and departments to collaborate to meet the rapidly changing needs of students, faculty, and researcher. Expertise is required and expected in so many areas that navigating the changing climate can be overwhelming. However, a large midwestern university has developed a library-facilitated initiative that delivers instructional content to graduate students, postdocs, and faculty on the matters on data management and professional managements. The program has designed two tracks covering topics like professional identity, creating data management plans, understanding funding agency requirements, and others. This paper will discuss the development and maturation of the program, as well as the needs assessment techniques that inform the future practices of the program. This paper will provide a possible solution to bridging the information gaps on data management topics for graduate students and translating those gaps into bridges of understanding and collaboration. This work in progress paper will discuss the challenges with this project, insights, and future directions for the program.**

## I. INTRODUCTION

GRIP began as the Graduate Research Information Portal in 2014. It was intended to be the university's Libraries' attempt to grapple with research services for graduate students, consolidating outreach efforts and workshop offerings in a single place on the Libraries' website. It has since evolved into a larger program, the Graduate Research Information Program (retaining the same acronym), which works to coordinate library outreach and instruction aimed at the university's graduate student population.

Beginning in 2016, GRIP partnered with the university's Graduate School to deliver information literacy content to graduate students. This collaboration also included the creation of two tracks of workshops, professional development (covering professional identity management, citation management, copyright, etc.) and data management (covering data organization, data sharing, data preservation, etc.). GRIP gained access to better communication channels with graduate students and the Graduate School gained access to library expertise in communicating information literacy concepts.

2016 also saw the beginning of a more concerted effort to gather data and assess graduate student research needs. This has taken the form of a series of focus groups across multiple departments, as described below. IRB approval was obtained for this project, and the results will inform future graduate student interaction and outreach.

## II. LITERATURE REVIEW

Workshops are a popular means of outreach when engaging with graduate students. Bradigan, Kroll, and Sims (1987) described the use of workshops as a way to connect with graduate students in an environment where few faculty members requested a library presence in courses, with a focus on interdisciplinarity. Kazlauskas (1987) highlighted workshops as one of four main methods for reaching graduate students (the others being course-integrated instruction, library courses within specific disciplines, and individual consultation), noting that graduate students prefer the flexibility of workshops over course-based outreach. Hoffman (2008) assessed graduate student needs and preferences regarding library workshops and concluded that general, cross-disciplinary workshops were appropriate, but that specific disciplines may require special attention.

Studies have shown the effectiveness of workshop-related outreach, although not without caveats. Rempel (2008 and 2010) described the long- lasting effects of library workshops on graduate research behavior, well after the workshop was completed, but cautioned that each student's progress was highly variable and depended heavily on disciplinary, programmatic, and personal quirks. Piette and Dance (1993) used quantitative methods to assess workshop effectiveness, and found that workshops need to scale with students' previous library and computer experience. Washington- Hoagland et al. (2002) surveyed graduate students and determined that, while students claimed to value library instruction, this did not

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translate to workshop attendance.

A trend in libraries over the last decade has been support for research data management. While the services provided can vary, these programs often involve an outreach component. Zilinski, Sapp Nelson, and Van Epps (2014) discussed the application of data information literacy competencies for STEM students, highlighting a set of activities and approaches for use in course-integrated library instruction. Johnston and Jeffryes (2014) described a library workshop series on data management and data literacy, mentioning that the reaction was positive and that the transdisciplinary nature of the libraries' involvement was especially valued.

## III. METHODS

For the purposes of a larger research project two focus groups were conducted one in the Department of Nuclear Engineering and one in the Department of Physics & Astronomy. Invitations for both focus groups were sent through the campus wide graduate student Association representative. The focus groups were conducted in the spring of 2017. Each focus group was comprised of five broad questions, allowing for redirection and follow-up questions. The questions pertained to the traditional services of the library, as well as emerging topics such as data management, research productivity teaching and research methods. For a list of focus group questions, see Maybee, et al. (2017).

In each focus group, members of the research team participated as either facilitator or note-taker. After each focus group was conducted, the note-taker shared the notes with a team of coders. Each focus group session was coded by at least two research team members. After all the coding was complete, the results were compared to subject level focus groups looking for similarities and differences that will be discussed in this paper.

## IV. RESULTS

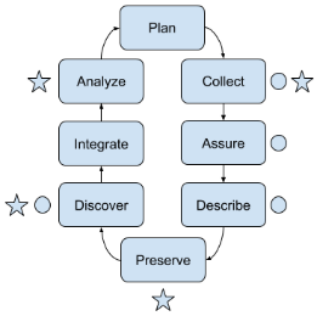
### *Nuclear Engineering Graduate Student Focus Group*

Five students participated In the Nuclear Engineering focus group. There were three first year master's students, one second year master's student, and a single third year doctoral student. In answering a question about their use of information on an average day, students spoke about the databases that they use for research including web of science and google scholar. They also spoke about the different library and departmental spaces that they use for studying, writing, and meetings. They discussed specific library services such interlibrary loan, book holds, printing and manuals, as well as using the library resources for finding computer code. When asked about the challenges that they face as graduate students they mention time management, overall organization, staying current on scholarship, and team management. Unsurprisingly, they also mention lab equipment and software issues.

Specific to the data collected in their studies, they spoke about hardware and software issues, as well as, preserving and storing data long and short term. They also talked about issues with cloud computing. Participants spoke at length about the challenges of coursework and team based projects. They also spoke at length about coding, namely the difficulties inherent in Python scripting and modeling. Lastly the group talked about various communication methods that work for discussions inside and outside of the research team.

### *Physics & Astronomy Graduate Student Focus Group*

Seven students participated In the Physics focus group. There




were three second year master's students, a single fourth year doctoral student, two fifth year doctoral students, and one sixth year doctoral student. Most of the students were theoretical physicists and not experimental physicists. In answering the question about an average day at a Physics graduate student, the students spoke about their use of the online resources of the library, campus computer clusters to running experiments and code. They also mentioned traditional library services like meeting rooms and online journal access. ArXiv repository was also mentioned by name as a source of scholarly publications.

When discussing challenges of their research and teaching, the students cited coding and simply "figuring it all out" as obstacles. The students mentioned varying qualities of the types of advising that they received and felt lost at times. Organizing themselves for productivity and their research information seemed to be great challenges for them. It was particularly notable that both those newer to the program and those who have been in the program for several years seemed to be feeling overwhelmed by their teaching and research responsibilities. There were too few TAs and too little teaching orientation, and they felt they had too little command of the topics that they were assigned to teaching.

In terms of data management, not many of the students had much experience with managing their own data, but some had limited experience with the data collected with their groups. One student mentioned publishing data on another institution's repository because they needed to publish both code and data and haphazardly found the other institution's repository. None of the students had a deep understanding of data management or data publishing.

## V. DISCUSSION & CONCLUSION

The data management skills of the Physics and Nuclear Engineering student were sparse and unpredictable. Some of the students exhibited proficient data literacy in some areas, while demonstrating practically none in other areas. The findings with the focus groups were striking and exposed gaps in the students' understanding of the best practices of data management. Furthermore, the findings presented opportunities for instruction and professional development. Specifically, we saw that there are opportunities for consultation from the pre- grant phase, with planning for onboarding of new lab members, to the publication/re-use phase, with the including of planned storage and preservation

of data. Librarians can also assist in data publishing, where both sets of student were weak in how to share data. Not to be overlooked, there are possible interventions in the lab spaces themselves, in the writing of code and the construction of metadata. From Fig. 1, we can see that students' responses aligned with multiple points along the DataOne Life Cycle and, thus, presented opportunities for librarians and libraries to share their expertise and experience. The Data One Life Cycle (2014) provides an overview of the research data process from project planning through implementation and sharing.

Fig. 1. The Data One Life Cycle with markups. Stars represent elements discussed by Physics students and circles represent elements discussed by Nuclear Engineering students.

The next steps for this project include devising a response plan, based on what is feasible for the Libraries, the Graduate School, and the individual departments served. The Libraries will need to consider the necessary resources for implementing a response plan, including but not limited to time, space, and personnel. Questions would also have to be answered regarding the appropriateness of the response to some of the needs of the students, i.e. perhaps referrals or collaboration with other campus entities may be preferable. The focus groups and the findings thereof are a great step towards more deeply understanding and meeting the needs of our graduate students.

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