"Collaboration - It's a Good Thing!: A multi-faceted role analysis in graduate student education as 'faculty-in-training'"

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Introduction

"Collaboration appears to play a unique role in science and science education today," and serves as a rite of passage for new graduate students that indicates acceptance and achievement in research (Hara et. al. 2003). Collaboration is a crucial skill for faculty and students, helping advance knowledge and exploit the results of research effectively.   In this project a group of six new Ph.D. students worked together with one faculty member and one post-doctoral researcher to develop a new course in Environmental Information Science. This poster is a report on the successes and barriers to collaboration encountered during the course of the project.

One of the unique features of this project were the multiple roles in which each of the participants were engaged. "Faculty-in-training" must be prepared to work across the roles of student, teacher, and researcher.   Our findings show some of the difficulties and benefits with collaboration encountered among new Ph.D. students engaged in early career research, teaching, and learning. We believe that the description of these findings will be helpful for future doctoral students and help improve collaborative learning at the doctoral level.

Literature Review

Collaboration is generally defined in the literature as an undertaking of two or more individuals or organizations, where responsibility for completing tasks is shared among the members to more

quickly and/or efficiently accomplish common goals. The literature review revealed three main roles for collaboration in an educational setting for "faculty-in-training": student, teacher, and researcher.

Collaboration among students has many beneficial effects: increased retention of information on the topics discussed, increased number of "teachers" as a result of peers becoming a de-facto instructor to the other students, enhanced learning opportunities via increased social interaction, and stimulated creativity via group discussions. Some barriers identified by the research include: learning to adapt to changing situations and dealing with the various work styles in peer interactions. (Gokhale 1995).

New instructors benefit from the collaborative sharing of ideas; building on the knowledge of experienced colleagues, they share more philosophical discussions on their topic, leading to more insightful teaching for all involved (Letterman & Dugan 2004). The close working relationship with mentors allows for greater insight into this process than a strict student-teacher relationship provides. Two crucial parts of collaboration among instructors are regular mentoring from more experienced colleagues and structured interaction with peers. (Austin 2002)

Researchers have a tradition of collaboration, especially in big science.   Working together is essential on large research projects, as no one individual possesses the expertise needed to complete all necessary tasks. Social dynamics are an important part of the collaborative process. Some individuals naturally gravitate toward each other based on common research interests and effortlessly enter into a collaborative process. Other research groups are artificially constructed, making the development of social cohesion difficult because the group members may not have good synergy.   The need to share knowledge, resources and responsibilities are not always enough to overcome difficult social dynamics, even though this is essential for scientific collaboration (Hara, et al 2003).

Methods

At the start of the project all participants were asked to monitor and keep track of their experiences working on the project through the semester. The project served as a case study of collaboration across multiple roles. Written and verbal reports were collected at the end of the semester and synthesized into the findings presented in this poster. The descriptive data gathered during the project was used to assess the relevance of the benefits of, and barriers to, collaboration identified in the literature. Additional barriers that were absent from the literature were added based on the descriptive data collected during the project.

Findings

We found that student collaboration affirmed the benefits described in the literature: increased retention of knowledge, mutual sharing of expertise, increased social interaction, and increased creativity from group interactions. The major barriers to collaboration as a student were adjusting to a novel situation, time management and adapting to peer work styles. All of the team members needed to adjust to new expectations as a doctoral student, especially the multiple roles and concomitant expectations. Working together on a project defined by faculty members before the start of school helped to provide a clear goal for students and alleviated some of the anxiety. Time management was a challenge for all team members, especially those who had jobs outside of the classroom. Collaboration technologies, such as wikis, and Blackboard proved to be only partial solutions to working with team members outside of the classroom and office. Adapting to peer work styles was a matter of ongoing negotiation and discussion among team members. Physical proximity contributed greatly to overcoming different working styles because problems could be easily negotiated face to face.

In the role of teachers we found that collaboration was beneficial for idea sharing, building on the expertise of experienced faculty, and philosophical discussion. One of the barriers identified in the literature, regular mentoring and advising, did not become a problem for this project because faculty feedback was common at weekly progress meetings throughout the semester. Another barrier

identified in the literature, structured peer interaction, was a barrier for this project. Peer interaction on the topic of teaching was too informal and ad-hoc. Future projects may benefit from more structured peer interaction focused on the roles of teachers.

From the point of view of researchers-in-training, we found that the structure of our group provided a positive environment for collaboration among the doctoral students and faculty involved. Although the team members exhibited differing work styles, with some preferring tight deadlines and others more flexible in this regard, members negotiated around these differences to produce on-time deliverables. Social dynamics are a potential barrier to research collaboration, according to the literature, but did not become a problem in this project.

The project identified three barriers in addition to the those identified in the research literature: technology challenges, remote collaboration, and openness. We identified technical difficulties related to software interfaces, lack of equipment, and remote coordination. Two software programs were used to organize the collaboration through the semester: MediaWiki and Blackboard. Both of them had a steep learning curve for people new to the system. Some people were hesitant to contribute to the wiki because they were unfamiliar with the interface and usability of the software. A similar situation arose with Blackboard. Those who were more familiar with the software were willing to give the products more time before abandonment. Some products, like Blackboard, couldn't be abandoned because they were part of the core infrastructure of the university.

An additional barrier was the difficulty in working with team members remotely, especially one member who currently is working on an almost full-time job in addition to his duties as a doctoral student. Attempts at overcoming this with the use of technologies (Skype, email, phone conference calls) helped mitigate the situation, but were not completely successful.

Openness and sharing of research information is a pressing issue for many researchers. Determining the amount of information revealed to the public and when that information is revealed are difficult questions for individuals and collaborations. The project began with an extreme willingness to share the research progress and findings hosted at OpenWetWare, a wiki host site for the biological

sciences. There were questions about how much information should be shared in an online forum accessible to anyone connected to the internet only a few weeks after the start of the project.   Some of the participants feared being scooped or preempted by other researchers because of the gaps discovered during the literature and syllabi search. Others felt the chance of stealing was slim. A compromise was made to post sensitive information to a more secure environment in Blackboard. After that decision was made, all future updates were made to the Blackboard site instead of the wiki, leaving the wiki to function as an archive of the early project progress.

Conclusion

The research and the experience of the team members on this project confirmed the importance of collaboration across a spectrum of roles in an academic environment. Team members were challenged by the variety of roles and responsibilities required for the completion of the project but ultimately found the experience to be a useful part of the Ph.D. educational process. Being "faculty-in-training" means learning and experiencing the multiple roles that faculty members fill. This project was a success from that perspective.

Acknowledgements

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