



Teamwork in action: Collaborating across borders

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Abstract: Academicians are often found working in silos and focused on producing scholarship to attain tenure. Collaboration between faculty members has the potential to increase their productivity and help achieve tenure and promotion quicker. In this paper, the authors discuss both challenges and opportunities that faculty face when they collaborate. The paper describes a case study of a team of faculty including their efforts in creating an effective team and their guidelines to successfully work collaboratively over a 5-year period while addressing challenges that arose. The team comprises of three members from different engineering fields and different cultural backgrounds and working at different universities in two countries. This study discusses how the team was handled differences in cultural background and discipline as well as how they addressed conflicts and limitations introduced by geographical borders. In addition, this paper discusses best practices for effective collaboration, guidelines developed for this collaboration and similarities and differences among the team members that contributed to a stronger and more productive team. Furthermore, this study sheds light on important factors that led to more effective collaboration that is transferable to other teams.

Introduction:

According to the Accelerating Change for Women Faculty of Color in STEM: Policy, Action, and Collaboration report in 2013 [1] there were approximately 6,400 female faculty of color, while there were 19,800 white female faculty, 20,500 colored male faculty, and 65,100 white male faculty. Female faculty of color face many challenges in addition to the challenges faced by a typical faculty, as they are few in number. The following paragraphs discuss the various challenges faced by faculty.

Faculty experience high levels of stress during their probationary years, working towards their tenure [2], [3]. Of the many requirements for tenure, the requirement of sufficient publications is a tough one to achieve given all the new teaching assignments, student advising, service, research and more. One of the hurdles faced by new faculty is to publish, hence knowledge of mechanisms to improve scholarship of publications will aid in achieving their goal to secure tenure. In addition, ethical considerations of scholarship of publications has to be taken into account when discussing scholarship of publishing. This paper reflects on a 5-year collaboration between three faculty from different disciplines, universities and countries. The authors reflect on challenges they faced to continue successfully collaborating and publishing papers while addressing these impediments. This paper will first discuss the various methods of collaborations, and then it will discuss the challenges faced during collaborations. The second part of the paper will discuss and reflect on the collaboration between the authors, the rules and policies they created to help them make decisions on order of authorship, roles and responsibility sharing. Collaborations are often formed to extend skills and expertise to accomplish tasks.

Collaborations in higher education are favorable and encouraged. According to [4], the two main traditional forms of collaboration are in the areas of teaching and research. The authors in this paper combined both of these forms and conduct research in the area of teaching and research. They have conducted several active learning activities in our respective classrooms and studied these from a research perspective. These findings are reported in this paper. Furthermore, the authors describe the set of policies and guidelines put in place for their collaboration to establish guiding principles and define roles and responsibilities of each member, which we will share in this paper as well.

Background:

Methods of collaborations

Effective collaboration is key to obtaining positive results in a workplace or research setting. Various methods have been developed and implemented to ensure its presence among new employees and new faculty members. A team that is functioning effectively will not only yield great results, but also create less stress and resentments for its members [5]. Ensuring that all members are engaged is crucial for maintaining the efficiency of the team, and there tends to be at least one member who is disengaged [6]. Furthermore, it is important to be aware of certain methods which can be beneficial to the collaboration within the team. One of the best ways to collaborate is setting up a time in the day to meet as a group, and set the tone for the entire day. This will allow members in the group to know their role and work towards a common goal. To determine the effectiveness of the meetings, a few questions should be considered regarding areas of improvement of the team's collaboration; accessibility to resources; quality of feedback received from teammates [5]. In addition, when detailed information is presented to the team, members, they tend to forget most of it through verbal communication. Therefore, with such information, implementing the usage of email, online shared documents to grant group members easy access to it would be time efficient.

Challenges in collaborations and how to overcome them

There are several challenges faced by collaborators in research, such as fair acknowledgement of individual contributions, distribution of responsibilities or contributions, decisions such as author ranking are just a few of the well known challenges. Unfair treatment of minorities, women, diverse groups and students is often experienced. Another challenge is lack of experience with issues of teamwork that can lead to situations and hurdles that need delicate handling. Often academic settings discourage collaborations due to demands and higher recognition for single authorship. Teamwork is not given importance and encouraged enough. Supervisors play a key role in dictating the climate of the department that fosters and encourages collaborative work. Collaborations offer an opportunity to advance science and innovate, but this can also create complications such as ownership and intellectual property issues. Finding a niche for research

area is increasingly becoming difficult and hence research areas that are overlapping with one's expertise are sought out for. These areas require a wider range of expertise, calling for collaborations to fill the gaps in expertise [4].

There are areas where there can be potential collaborations besides traditional research, such as teaching scholarship. Conducting teaching scholarship alone is challenging. However, collaborating on teaching scholarship introduces its own unique challenges that arise from the dynamics of multiple team members working towards a common goal. There is one main broad category of teaching collaborations- where teaching is done in a class in collaboration with other faculty. The less common form is where a group of collaborators chose a teaching mechanism and implement it in their individual classes. Our group has followed this second type.

One of the most significant causes for difficulties in collaboration arises due to cultural differences, and people's varying degrees of acceptance of different cultures. People can sometimes be uncomfortable working with someone who is not like them, which reduces productivity in the workplace. This should not be solved by choosing people of only one culture but by rather doing team-building exercises and allowing everyone to be comfortable with each other. Stereotyping also presents another common issue. Another way to overcome these obstacles in the workplace is that the parties involved need to become aware of the cultural differences between them and effectively learn about each other's cultures. A study done at the University of Harvard showed that managers that were more familiar with different cultures received higher ratings from their colleagues in relation to collaboration and communication than those that were not [7]. In another study at the same university, an experiment was done to measure the amount of creativity a group of people with different backgrounds utilized while completing a task. The results revealed that the groups that had personal conversations unrelated to the task, developed a deeper understanding of each other's culture and therefore were able to be more creative [7]. These studies show that in order to overcome the obstacle of collaborating with people from different cultures, the involved parties must not only get to know each other but also each other's cultures [7]. Those that do not take the time to immerse themselves in different cultures often fail in group tasks where they have to work with people from different backgrounds. This is because their lack of knowledge on different cultures forces them to assume that "their approaches are what others also believe and adhere to" regardless of their culture [8]. This is not the case, in fact Professor Roy Chua, who was responsible for the studies mentioned earlier, says that the solution to overcoming cultural differences is simple, the parties concerned just have "to deeply involve [themselves] in cross-cultural interactions" [7]. This will allow them to understand different cultures and therefore be able to get the most out of their collaboration with people from different cultures.

Another challenge that presents itself when collaborating is working from different locations and time zones. It is near impossible to collaborate effectively without the proper tools. According to the Harvard Business Review, collaborators in different locations must adapt many

different online communication tools, including but not limited to “Google Drive, Drop Box, Spark, and Murally” so that they can switch between them at a moment's notice, should one of them fail to provide the function needed [9]. Another way to overcome the challenge of location and time zones is to make a schedule with predetermined times, where all group members can discuss their progress face to face on the video call or on the phone [9]. Harvard Business Review says that for a collaboration to be successful over the phone, each individual must be fully present and aware of the conversation [10]. Distracted phone calls will result in miscommunication and an ineffective collaborative team.

The reason why collaboration in the workplace is not always effective, especially between new faculty members, is due to the lack of incentive to work together. People that have been working together for years have come to form a bond with one another and they truly care about each other's success. This sentiment provides them with the motivation they need to work together effectively and produce better results than they would have had, had they worked on something individually [11]. Newcomers have no personal connection or bond with the already present employees and so there is no motivation for anyone to work with them effectively. A solution to this problem is providing the employees with an incentive to collaborate with new employees. If they have something on the line themselves, they are proven to be more effective in a collaborative environment, according to a study done in 2013 [11].

Collaborations are sometimes unsuccessful due to the concerned parties having different mindsets and perspectives. According to Pabini Gabriel-Petit, Founding Director of the Interaction Design Association, “diverse mindsets can also present challenges to teams. Our psychological types, needs, power bases, conflict styles, and stress quotients differ, leaving us open to potential misunderstandings” [12]. These problems are usually a result of different personalities feeling threatened by one another. For example, someone who is not creative may feel threatened by the ideas of someone who is. A solution to this is to value the different strengths that people bring to the table instead and find a way to utilize them. In order for different personalities to blend well, the parties involved must develop trust between each other [12]. When people with different skills are working together, they need to figure out how to leverage each other's unique skills to get the best results [13]. Overall the only way people can effectively collaborate, is if they engage with each other and identify problems as they arise [14].

Clearly, there is a need for formal academic policies to guide successful collaborations. The authors collaborative team faced many of the challenges described above and to mitigate these challenges they crafted a set of policies. This not only strengthened their collaboration but also made their efforts count.

Developing Collaboration Guidelines

The authors created the guidelines below for their collaboration on research and publications. The guidelines clearly spell out the role of different authors and how the order of authors are determined. In addition, the guidelines address the protection of intellectual contributions. These are issues that collaborators do not necessarily think about but which can lead to conflicts in collaborative teams and could potentially lead to the dissolution of such teams.

The authors utilize some of the previously discussed elements for successful collaboration identified in the literature including effective use of online documents, communication (emails, phone calls and video conferences) as well as efforts to understand cultural differences. For example, for ASEE conference papers, the authors meet during the ASEE conference to discuss the topic of the paper for the next conference and to determine the lead author for the paper. Once the topic and the lead author are determined, the lead author then has until two weeks before the abstract submission deadline to send a draft to the other team members who edit the abstract and provide any feedback. All documents for the collaboration are saved in a shared drive that is accessible to all members and typically the abstract, draft paper and final paper are developed as shared documents that all collaborators can edit simultaneously. Once the abstract is accepted, the authors meet virtually as needed as they develop the paper. Throughout the collaboration process, the authors make ample use of emails and virtual meetings to discuss progress and to clarify any outstanding questions that may arise. Additional information about the mechanism for working together on a paper are described in the guidelines provided below.

In addition to discussions on collaborations, these meetings provide opportunities for the authors to discuss other important topics both professional and personal. Therefore, in addition to producing scholarship outputs, this collaboration has also developed to be a source of both professional and personal support to its members. This is particularly important since the authors are in different stages in their careers, have different cultures and are in different types of higher education institutions; therefore, they offer each other unique perspectives. The group serves a dual role of both professional development (in terms of research and scholarship output) and professional/personal support (including other professional topics the authors encounter in the workplace).

The guidelines document is a living document that is updated and refined over time. The authors found that the creation of the guidelines led to a much more efficient collaboration with minimal conflict on the issues addressed in the guidelines. This is particularly important for long-term collaborative efforts. Prior to the development of the guidelines, there were no clear rules guiding the authors' work together. The guidelines have also significantly eased the challenges that arise due to the three collaborators working in three different universities across two countries. It is worth noting that when the authors met, they were all in the same institution. In fact, the authors collaborated in a much larger group (+10 participants) about one and a half year before working with just themselves. Therefore, having to collaborate across three institutions and two countries presented some new challenges, which the guidelines addressed. Over the

time that the authors have collaborated, they have worked wholly or in part on several proposals and peer reviewed collaborations.

Guidelines for Collaboration

Protection of Ideas and Intellectual Contribution

This collaboration should represent a safe space where ideas can be freely shared and respected. Therefore, it is critical that the ideas generated by individuals (aka idea owners) are protected and used only with explicit permission

- Ideas or intellectual contribution shared by one collaborator cannot be used by another collaborator without explicit permission from the idea owner preferably in writing.
- Using parts or all of an idea should be done only with permission of the idea owner
- When in doubt if someone's idea is being used, the collaborator must check with the idea owner.

Order of Authorship

- Always discuss order of authorship before writing the paper.
- The person who generated the idea gets the first right of refusal for first authorship and taking the lead in writing the paper
- Generate final preview and send to all authors prior to submission deadline for final approval
- If multiple people generate ideas, then discussion (and agreement) needs to take place about the order of authorship
- Last two authors are rotated for every paper all things being equal otherwise order of authorship will be based on level of contribution

Lead Author Responsibility

- Coordinating paper activities
- Delegating tasks to co-authors
- Timely communication about author roles and deadlines
- Abstract and paper submission on the conference website

Additional Authors

- Will be decided on a paper-by-paper case
- Will either generate ideas or offer needed expertise

Deadlines

- Lead author is responsible for communicating specific deadlines.

Abstract:

- The first author takes the lead on writing the abstract
- Lead author sends abstract for feedback at least 2 weeks before the deadline
- Other authors must respond within one week

Draft Paper:

- All authors should have their contribution completed at least three weeks before draft paper deadline on shared document except for cases where data collection/analysis is restricted to the end of the semester.
- All authors should ensure that their sections/contributions are cohesive with entire document
- Each author should read through the entire paper, edit and provide comments at least 2 weeks before the ASEE deadline
- The role of final reviewer/editor will be rotated except where an author needs this role to make up her contribution

Addressing Reviewers Comments:

- Lead author should delegate comments to be addressed to each team member within one week of receiving reviews. Typically, each author should address reviewer comments that affect their contributions.
- Authors should address reviewer comments at least one week after assignment from lead author
- Final reviewer should review paper and send to authors for final comments

Exceptions

- If an author is not able to meet a deadline this should be communicated immediately with a proposed extension date
- After the draft paper has been submitted, if an author, due to unavoidable circumstances, is not able to complete their task by a submission deadline, this must have communicated immediately to fellow authors so that an alternative can be found.
- If an author realizes that she is unable to fulfil her duties before the draft paper is due, then she must immediately communicate this to the other authors to be considered for removal from the list of authors.

Conclusions:

New faculty in tenure track positions face enormous amount of stress to successfully complete the tenure requirements and secure tenure. One potential to help support and lighten the load is to collaborate in order to increase productivity and efficiency. There is ample evidence to suggest that collaborations when done right can increase publications, grant support and achieve a higher level of scholarship. Along with the promise of success comes the load of challenges that can deter one from collaborating. These challenges may not only cause hindrances but also reduce productivity and cause a break in professional relationships. Although the authors come from different countries, backgrounds, cultures, and disciplines as discussed in this paper, they collaborated to increase productivity and overcame the challenges they faced by crafting policies that helped to guide and improve their collaborations and ultimately increase productivity. They have successfully collaborated for 5 years and produced 4 papers in consecutive years. This

paper can be used as a model for new tenure track faculty to help collaborate with faculty from different backgrounds, fields and countries.

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