

Mediation of Difficult Graduate Student and Faculty Discussions in Engineering and Science

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Abstract— This Research-to-Practice full paper introduces a custom-developed protocol and process to mediate difficult graduate student and faculty interactions within engineering and computer science departments. Positive and productive graduate student and faculty cultures and dynamics are essential for ensuring a healthy research environment. When interpersonal issues arise between a faculty and a graduate student a solution may not always be straightforward. As a result, healthy research environments may be at risk. While some research-intensive universities can afford services for mediation such as those offered by an ombudsman, not all universities and institutions of higher education have the resources to hire and financially support such services. Thus, it is important to provide easy-to-implement and accessible materials for mediation that engineering and computing departments can build upon to provide this much needed training and educational resource to its faculty, staff, and students.

The materials presented on this paper were designed and created based on evidence-based practices of parent and teacher mediation meetings when seeking special education services and accommodations in K-12 school settings. The innovation elements of this paper include: (a) communicating and documenting concerns and needs from both the graduate student and the faculty member; (b) the creation of guidelines and restrictions for the mediation meeting; (c) the use of a handout and protocol; and (d) the follow-up processes that results after a mediation meeting.

The paper introduces some of the most salient challenges documented in the literature regarding graduate student and faculty conflicts. Also, the paper introduces the considerations and resources that were used to create mediation materials and protocols. Furthermore, the author includes self-reflections and insights as they prepared for and conducted mediation meetings with the provided materials. The conclusion of the paper recommends and implications for introducing these materials across engineering and computing education environments and ways that mediation can support healthier research cultures.

Keywords—graduate students, faculty advisor, conflict resolution, mediation, engineering and science

I. INTRODUCTION

The cost of unresolved or poorly managed conflict impacts all members of a higher education institution such as faculty, staff, administrators, and students [1]. Disputes can vary from work-related matters such as scheduling to complex, interpersonal issues such as those connected to gender, race, ethnicity, among others [2]. For graduate students (GS), unresolved conflicts with their faculty advisors is one of the two most predominant reasons for why they leave before completing their Ph.D. [3]. In the United States, statistics connected to graduate student departures point to 55-64% of the graduate dropouts coming from science, technology, engineering, and math (STEM) disciplines [3], [4]. From the literature, it is unclear what happens when trust and communication begins to deteriorate between a faculty advisor (FA) and a graduate student. Mediation of conflicts that may arise from GS-FA relationships is an area of great interest of colleges and administration in higher education but the topic is severely underexplored [5].

Furthermore, the absence of research of both the causes of supervisor-student disagreements and strategies to guide “parties on how to prevent, navigate, or settle issues when they arise” [5, p. 67] leaves us with only ‘war stories’ to rely on for handling these types of conflicts. There is a dire need to develop evidenced-based tools and strategies for colleges and administration to equip departments to cope with these increasingly complex challenges. This research-to-practice paper leverages literature on conflict mediation typically used for secondary education, as well as considerations of ethical mentoring, and hidden curriculum to improve GS-FA relationships [6]-[8].

II. THEORETICAL FRAMEWORK

A. What is conflict and mediation?

According to Shahmohammadi [6], conflict arises when friction, disagreement, or discord arises between individuals. Conflicts occur when beliefs or actions are either resisted by or deemed to be unacceptable resulting an agnostic state [6]. Conflicts can be intrapersonal (within an individual), interpersonal (between two people), intra-group (between individuals in a team), or inter-group (between different groups in an organization) [6]. Either organizational (e.g., authority relationships, roles and expectation differences, goal differences) and interpersonal (e.g., personality conflicts,

perceptions, communication) factors require that management strategies are leveraged to minimize the potential negative outcomes of conflicts [6].

Conflict management, consists of a set of skills that support individuals and groups to understand and handle conflicts that arise in all aspects of professional and personal lives [6]. There are many methods for conflict management but perhaps one of the most effective is those that view problems as systematic in where individual and group factors contribute to the problem. For these types of conflicts, medication, circle time, and participatory conflict resolution and management, whole school policy, and assertive trainings are known method that yield positive outcomes [6]. These types of methods are known to strengthen fundamental communication between parties, strengthen sympathy as well as self-esteem of the individuals involved in the conflict [6].

Mediation, has been specifically described as one of the most effective methods for conflict and problem resolution [6]. Mediation is a simple, clear, and positive process in where trained and neutral individuals help the two sides of the conflict come to a solution that is acceptable to both parties [6]. In educational settings, there are two forms of mediation: (a) adult mediation and (b) peer mediation. Adult mediation may involve recruitment of external ‘mediators’ from outside a school, university, or educational center/organization to prevent challenges that arise between educators and student in a learning setting. Peer mediation occurs when students are trained under a mediation program to serve as trained peers who can handle essential elements of non-violent forms of conflicts between students [6]. While there are examples of these programs across varying levels of education (e.g., K-12) and institutions of higher education, most programs outsource mediation to either centralized offices (e.g., Ombudsman) or appointed Associate Deans within their respective colleges.

Typically, these independent party roles serve to manage and neutrally listen to and offer strategies related managing FA-GS conflicts, conflicts with department chairs, staff, students in a class, among others. However, Ombuds offices tend to be handling multiple matters across the university campus and reporting or resources made available to these students rarely make it to the hands or awareness of graduate students or their faculty advisors [7].

While the value of having Ombuds offices or trained personnel is unquestionably beneficial [7], not all students or faculty use these services either due to a lack of understanding of Ombudsman roles, stereotypes of not being able to internally handle conflicts, costs, or perceptions of whether an Ombuds office is truly ‘impartial’ if they are housed within an institution of higher education [8]. Other reasons include a lack of awareness of the role of Ombuds and their benefits, perceived bureaucracy in providing a delay in the resolution or complicate matters, fear of reprisal or negative impacts on their careers or relationships within a department, perceived loyalty to department heads that may discourage employees from seeking external conflict resolutions that results in a preference towards an internal resolution approach, institutional culture and norms that may influence if Ombuds are embraced, or smaller

departments or institutions with limited funding or allocation for personnel for an Ombuds office [8].

Upon exploration of existing resources recommended by the International Ombudsman Association (IOA), mediation resources are not typically shared or endorsed unless the interested party contacts an IOA member [7], limiting accessibility and use of materials that can benefit smaller schools, departments, and even FA-GS relationship conflicts.

This research-to-practice paper positions that every department, school, institution of higher education who may either be unaware of the role of Ombuds offices, hesitates to use these resources, or do not have the monetary income to hire external parties for mediation, baseline resources need to be made accessible so that these structures can at least have an internal mechanism by which personal factors involving conflicts between FA-GS are both documented and managed. Of course, these types of resources should never be an end-all-be-all document nor should they be treated prescriptively as different contexts and situations may complicate the utility of said mediation resources. With that said, not properly contextualizing even mediation in the literature around mentoring between FA-GS risks furthering the misconceptions and miscommunications that typically surround faculty and student conflicts, especially within research environments [5]. Given that existing literature has reported decades of exceedingly higher percentages attrition for STEM graduate students (55-64%) [4] and faculty advisor conflicts continue to be the predominant reason for departures [3], [4], it is very likely that either or both parties may not be using Ombudsman or similar impartial parties for campus resolutions across institutions of higher education, posing a missed opportunity to retain and equip research teams to have the thriving environment needed to promote positive and impactful research productivity [5]. This research-to-practice paper will present a sample protocol, custom developed as a starting resource for research labs to both introduce the concept of mediation as well as a training resource for labs, departments, and colleges to model conflict management and resolution. This document builds upon the literature on mediation for conflict resolution [1]-[7] as well as the author’s research expertise on both ethical mentoring and hidden curriculum as ways to minimize conflicts that may arise between faculty advisors and graduate students, particularly in STEM disciplines like engineering and computing.

B. Ethical Mentoring Principles

For faculty advisors and graduate students to prevent mentoring dysfunction, described as an “unproductive or characterized primarily by conflict” [9, p. 45], elements of ethical mentoring must be considered [9]. Ethical mentoring, originally proposed by Johnson [9], [10] originally was proposed to include six ethical principles that equally impacts a mentor and mentee: Beneficence, Nonmaleficence, Autonomy, Fidelity, Fairness, and Privacy. *Beneficence* ensures that the professional interests of both parties are considered. *Nonmaleficence* considers how a mentor or mentee engage in actions that aim to avoid using their professional roles and responsibilities for the intent to harm the other party. *Autonomy* is a principle that explores the ways that a mentor or mentee are intentional in their promotion for pathways towards

independence in their roles and responsibilities. *Fidelity* takes into consideration how mentors or mentees nurture a sense of loyalty to each other. *Fairness* explores the degree by which a mentor and mentee experience equal treatment towards each other. *Privacy* takes care to avoid revealing sensitive material without consent. Other ethical principles consider justice (ensuring fair and equitable treatment of mentor or mentees regardless of cultural differences) [8], transparency (open and clear communication regarding expectations), and competence (establishment and committed continuation of skill-building) [11]. Earlier studies from the author, focusing on the first six ethical principles on the conflicts that self-identified women faculty and graduate students in science and engineering disciplines found that in the context of research, the salient themes that arise when ethical principles of mentoring are compromised are embedded in conflicts of power, communication, and awareness [12]–[15].

In the context of faculty advisory and graduate student relationships in engineering and science, *power* includes “establishing, communicating, and respecting boundaries, giving time to the other, and sharing informational power and social capital via the revealing of unwritten rules and expectations (i.e., hidden curriculum)” [12, p. 123]. *Awareness* was viewed “an ethical obligation of both mentors and mentee” [13, p. 13] that requires understanding of how a mentors and mentees’ actions can emotionally harm or compromise the other party. *Awareness of power* involves a reflexive belief of how power can manifest within the relationship [12], [13]. Awareness of power could result from the systemic influences and ways that resources (campus-wide offices, programs, etc.) with a perceived value can serve to attend a mentor or mentee conflict. *Communication* ensures that information and knowledge bases are held accountable to the success of the mentor and mentee in the mentoring relationship [13]. For example, sharing information without including a delineation of expectations for roles and responsibilities can lead to misinterpretations and misdirection [13]. *Communication of power* are intentional, respectful, and objective discussions that serve to establish mutually agreed upon norms and rules within the mentoring relationship to ensure that mentor or mentees’ roles and responsibilities are held accountable throughout the relationship to avoid or minimize conflicts that lead to toxic, harmful, or retaliatory actions.

C. Hidden Curriculum Mentoring Principles

Originally derived from sociology, hidden curriculum has been used to help people to learn the norms, expectations, and expectations as they navigate their learning environments [14]. Typically, hidden curriculum is used to explore how negative, covert messaging of a structure, system, or social groups communicates to an individual their fit and belonging [15]. However, when used as a counternarrative, hidden curriculum can be used as a strategy to improve persistence and retention among students [16].

The author has researched hidden curriculum in the context of engineering for several years [14]–[19] and in particular has developed and validated an instrument that serves to uncover how an individual becomes aware of hidden curriculum

messages and the subsequent motivations, decisions, and actions that they take as a result.

In the context of academic mentoring, hidden curriculum messages helps faculty advisors and graduate students to uncover miscommunications, expectations, and norms behind their professionalization [19]. For engineering faculty, hidden curriculum influences the expectations of fulfilling the professional expectations of the field [19]. Hidden curriculum becomes the primary mechanism of engineering professional cultures, the reasons behind assessment and evaluation metrics (e.g., ABET), and meeting the expectations of teaching, research, and service at the cost of an individual’s well-being [19].

When considering elements of faculty advisor and graduate student relationships, hidden curriculum like ethical mentoring involves an awareness of the unaddressed or underexplored assumptions, lessons, beliefs, and attitudes of an individual and an intentional action to clarify expectations, intent, and roles and responsibilities [16]. To gain awareness, strategies can include to open up avenues for gaining feedback using multiple procedures and policies. Since there is no one-size-fits-all approach to a FA-GS relationship, decisions on the approach may involve discussions with each party about the nature of the specified hidden curriculum that may be at the root of the conflict. A mediation protocol in this situation, may require the mediator to meet with each affected party individually to gather a sense of the source of the issue as well as the position of each party in committing towards a resolution, even if that involves a mutual agreement from the two parties to break the FA-GS relationship.

Mediation in a hidden curriculum sense will also need to consider both the emotions and self-efficacy of the graduate student and faculty as there may be many sensitivities and trigger points during a mediation meeting. To this end, it is important for a mediation protocol or procedure to include clear expectations of the neutrality of the mediator in the matter and the importance of objectivity as both parties discuss their points of arguments and views. Impartiality from the mediator and objectivity and self-regulated emotions during the meeting will ensure that both the faculty advisor and the graduate student will come to the meeting with a higher self-efficacy needed to cope effectively with the task at hand [16]. Previous studies from the author has pointed to the importance that coping self-efficacy has in a person’s ability to both make a judgement and an action that not only benefits them but others in the process [16]–[18].

Finally, action strategies in the form of self-advocacy or advocacy for others or other forms of outward strategies can involve not just the equipping of the faculty advisors and graduate students in the mediation but perhaps also the preparation of these procedures and protocols to other members of the department or institution. As discussed previously, higher levels of coping self-efficacy increases the changes for action strategies towards attending to a hidden curriculum matter. This requires an intentional strategy to equip not just the individuals involved in a mediation meeting but also the dissemination of said protocols and procedures as part of a training or case study to discuss in a department, lab, or college. The more international actions to practice conflict resolution and the better

faculty and graduate students understand the process of mediation, the better prepared they may be to handle conflicts internally and more immediately rather than to allow the matter to remain unresolved straining the relationships to the point of no return. Therefore, while actions can be taken from the impacted individuals, structural and systemic action must follow a mediation meeting by the mediator and impacted individuals to help others understand the process, benefits, and considerations of a mediation meeting. This is a step that perhaps an Ombuds office or personnel can further support a research lab as a follow-up activity. Independent to the approach, intentional education of mediation will serve to further mitigate potential issues and ensure a sustainable and dependable mediation process for years to come.

III. METHOD: PROCEDURAL AND PROTOCOL DESIGN

For this research-to-practice paper, the author relied on previous publications for both the practice of mediation [1]-[8] as well as findings from the author around ethical mentoring principles [12]-[15], and hidden curriculum [16]-[19]. It is important to note that Ombudsman office are always an excellent resource for any faculty advisor and graduate students in conflict [7]-[8]. However, the design and development of this protocol within a department is meant for situations where an Ombuds office or personnel are not available, there is hesitation on the two parties to go to an Ombuds office or representative, or there are insufficient resources with a department, college, or institution to hire such services. The reader is also warned that the process described below is not prescriptive nor is it meant to substitute the role that an ombudsman or similarly appointed representative can play. Rather the protocol is meant to both help the reader gain awareness into the process of mediation and meant to serve as a training tool by which departments can use to help both graduate students and their faculty advisors learn about the mediation process, practice conflict resolutions strategies, and encourage both faculty and students to include or discuss expectations for communicating concerns pro-actively before a matter cannot be resolved, impacting the success both the laboratory and members of its team.

For this research-to-practice paper, three time periods were selected: (1) before mediation, (2) during mediation; and (3) post-mediation. These timelines can help further discussions of the steps needed for mediation as well as the ethical responsibilities of the mediator, the graduate students, and faculty advisor. All items below are based on a hypothetical scenario but informed by the literature aforementioned [1]-[19]. For this research-to-practice paper, the author premises a case study around internal department-level mediation requests. As stated previously, not all items in the case may apply to a particular situation and the affected party is encouraged to first find out what resources and its connected procedures are available at their home department, college, and/or institution.

Table 1. Hypothetical case study (Part I- Before mediation meeting) that is used to highlight need for mediation between a faculty advisor and their graduate student

Case Study Topic	Issue of Cultural Miscommunication
Involved Parties	- Dr. Smith (faculty advisor) - Michael (graduate student)

	- Graduate Coordinator (department representative and assigned mediator)
Description of Case:	
<p>Graduate student XYZ is starting their second year in their Ph.D. program. They are concerned about the overall conduct of their faculty advisor. The faculty advisor pushes the graduate student to stay in the lab for extended periods of time, is constantly micromanaging them and asks them to artificially represent data that only demonstrates statistical significance (almost to the point of data fabrication). When a graduate student proposes an idea, they are quickly dismissed and told in lab meetings to stick to the program. The graduate student XYZ is thinking of leaving the laboratory but because they are an international student, they are afraid moving labs will impact their VISA student status. Upon insistence from another graduate student in their lab, they have decided to contact their department representative (Graduate Coordinator) to find out more about what to do. You (Graduate Coordinator) said you would investigate the matter and assessed if they would be interested in a mediated conversation with the faculty advisor. After some explanation of what mediation entails, the graduate student accepts.</p> <p>You (Graduate Coordinator) asked the faculty advisor about what may be happening with graduate student XYZ as you are concerned about their overall well-being. Faculty advisor shares that the graduate student has motivational issues and that they are not performing according to their minimum 20 hours a week work requirement. The faculty advisor acknowledges that they have been forced to micromanage the graduate student in order to get them to work and be held more accountable for their work output. The faculty advisor also communicated a concern about the student not understanding basic statistics and how despite having taken courses, they are still not performing well. After some explanation of what mediation entails, the graduate student accepts.</p> <p>At your home institution, there is no Ombuds office or college representative. You (Graduate Coordinator) talks to the department head who recommends that you seek out a mediation resource and protocol to use. To your dismay, you do not find much information other than some YouTube videos. You decide to do a quick literature search and create your own. From this investigation, you learn that pre-mediation, it will be important to speak individually with both parties and explain the steps to follow....</p>	

A. Before mediation stage

Before a mediation meeting, it will be important that the matter is raised to the awareness of the appropriately appointed person in your department, college, or institution who handles graduate students and/or faculty affairs. It is advisable that there is at least a mechanism or procedure by which a graduate student and/or faculty can request a private, confidential, or anonymized form of communication (e.g., online request/FAQ form) along with proper links on steps to follow if mediation is of interest. There are usually many campus resources available across different offices (e.g., Human Resources, Police Department,

Student Affairs, Counseling) that can be consulted with previously. There may be mechanisms, forms, and procedures that a mediator may need to be trained on or aware of before taking on the role.

Once a mediator becomes versed on the procedures and is appointed to a department or college, information about their roles should be advertised in graduate students manuals, department meetings, and research seminars along with resources at the campus level. If a graduate student and/or faculty prefer to resolve the matter internally (department or college), there should be information on the process of mediation and internal and external resources available as well as information on how the process will maintain their confidentiality.

As a mediator identifies what to discuss with the impacted parties, it will be important to first identify the nature of the problem. The mediator (either appointed or requested) will need to classify if the issue at hand poses ethical or legal ramifications prior to beginning. The mediator needs to ensure that they are being compliant to university policies and procedures. The mediator should properly document all the steps taken in the process as well as the types of questions, rules, and expectations of the mediation meeting. In order to identify the issue at hand and the type of conflict resolution to take, the mediator should ask each party individually and confidentially questions designed to properly classify the nature of the conflict. Some example questions are listed in Table 2 that considers the HC and ethical mentoring principles previously discussed. Intrapersonal conflicts will not be covered as it only involves one individual and outside of the scope of this work.

Table 2. Prompting questions a mediator can ask privately and confidentially to each party to classify nature of conflict

Conflict Types	Hidden Curriculum-Informed	Ethical Mentoring-Informed
Intrapersonal	<ul style="list-style-type: none"> - Tell me how the mentoring started. - Did you discuss the expectations of the mentoring relationship and your roles? If so, what was discussed? If not, why not? - What is your expected outcome from this mediation? 	<ul style="list-style-type: none"> - Do you consider your role in the mentoring relationship is to be a mentor or mentee? - Do you consider that your roles are equal? Why or why not? - What is your expected outcome from this mediation?
Intra-Group	<ul style="list-style-type: none"> - Name two things your teammate(s) has done to support the project/lab goals? - Name two things that your teammate(s) could 	<ul style="list-style-type: none"> - Name two things that you have done to ethically ensure that the project/labs are conducted successfully. - Name two ethical concerns that

	<ul style="list-style-type: none"> do to further support the project/lab goals? - Name 2 strengths and 2 areas that can be strengthened on your part to help meet the goals of the project/lab. - What is your expected outcome from this mediation? 	<ul style="list-style-type: none"> currently could be addressed to ensure successful and reliable outcomes for the project/lab? - What is your expected outcome from this mediation?
Inter-Group	<ul style="list-style-type: none"> - Describe what the roles of each group has for the research project. - What strengths does each group bring to the project/labs? - What areas could improve the effectiveness of all teams contributing to the project/lab goals? - How can mediation support the teams and the overall goals? 	<ul style="list-style-type: none"> - How would you categorize the ethics of each group? - What areas within ethics of each group or the whole group be strengthened? - How can mediation support the teams and the overall goals?

Upon receiving the input from the affected parties and answering any questions the individuals may have, the mediator should identify the salient themes, or talking points, for the mediation meeting. From that, the mediator should establish some guidelines for the meeting date.

B. During the mediation stage

As shown in Table 3, it is recommended that a protocol with the guidelines and expectations of the meetings are shared with all affected parties and that it is documented during the meeting.

Table 3. Example overview for a mediation meeting

General Emailed Introduction by the Mediator:

Thank you for speaking with me individually (by phone, Zoom, in-person) about your perspectives on the matter at hand. As indicated, the details of what you have shared will remain confidential. My role is to be an impartial, neutral, third-party during this process and help guide the discussion towards a solution. In preparation for the mediation meeting on DATE/TIME/LOCATION, I ask that you:

- BRING a pen or pencil
- DO NOT bring laptops, cell phones, or any other electronic device. If you bring them by mistake, it will be placed in a corner to avoid any distractions.

Rules and Expectations for the Mediation Meeting:

- Follow the instructions provided by the mediator and keep your assigned time limits. The mediator will bring a time to ensure that the assigned speaking times are equal.
- All individuals will conduct themselves professionally, objectively, respectfully, and responsibly.
- Avoid emotionally-driven behaviors and actions as they may lead to misunderstandings rather than a solution.
- All individuals participating agree to work towards a resolution and a future-oriented plan. In other words, there is no dwelling on things that did not work in the past but instead focus on the future that is desired.
- All affected individuals should come to the meeting with an attitude to listen, learn, and improve.
- Each person's turn to speak is decided on a flip of a coin.
- When it is the turn for the person to speak, they should be allowed to speak without interruptions on the talking points and any other matter, if time allows.
- Each person should make a conscious, sincere effort to refrain from unproductive arguing, venting, body gestures, sounds, eye rolling, or any other acts or behaviors of defensiveness, even if one party does not agree with the other's perspective.
- Each person agrees to work hard towards what they perceive is the fairest and most feasible agreement possible.
- Each party is to refrain from discussing the matter after the mediation meeting.

Conflict Resolution Plan Expectations:

- A portion of the meeting will be dedicated towards all parties coming to a collective resolution strategy. The mediator will begin by summarizing the salient themes identified and if needed, come prepared with a list of campus resources or offices.
- Once a resolution is established by both parties, the mediator will ask the individuals to indicate their willingness and commitment to enact the plan with a 'clean-slate' mentality and approach.
- Remind the affected parties that the role of the mediator is to be a neutral, third-party, neutral aimed to help guide the involved individuals towards a future-oriented, objective, and feasible solution and a corresponding plan of action. Remind the parties that the mediator is not taking sides and that to ensure accountability for both parties, a series of follow-up meetings agreed upon by the mediator and affected parties will be scheduled to ensure proper accountability of the conflict resolution plan.
- Depending, on the severity of the situation, the mediator will discuss with the affected parties the need to share the main discussion points of the mediation meetings and overall conflict resolution strategy moving forward.

Lessons Learned Discussion:

- The mediator will culminate the discussion with space for all affected parties to reflect upon what they learned in that meeting.

- The mediator will collect input from both parties (either in the meeting or after) about what each party discovered and what actions they will take (or avoid) moving forward.

C. After the mediation stage

Soon after the conflict resolution plan has been established, the mediator should summarize the talking points of the mediation meeting and share the communication with all individual parties. Upon approval, and if necessary, an emailed summary communication will include any leadership on the summary email sent to the affected parties.

The mediator is recommended to keep a well-documented journal or log of all the events that transpired from beginning to end of the process as well as ensure that if needed, proper department, college, or campus resources are maintained informed throughout the process.

Table 4. Summary example of a post-mediation meeting

Mediator Gratitude:

Thank you kindly for today's mediation meeting. I truly appreciate the candidness and trust in my mediation of the meeting.

Attitudes of Faculty Advisor and Graduate Student:

To summarize, as a faculty advisor and graduate student, you have conducted yourselves ethically, professionally, and conscious towards each other's needs.

Summary of Conflict Resolution Plan:

At the end of our meeting, you have mutually agreed to follow the next steps (outline of what each party agreed to do and include details of any department, college, or university personnel or office that may need to be involved).

Summary of Lessons Learned:

As a general recommendation moving forward, it was mutually discussed that to support future faculty advisors and graduate student mentees, both of which have responsibilities and roles, that they need to:

1. Example 1: Clearly communicate expectations related to deliverables and provide recommendations on how to address them
2. Example 2: Respect and acknowledge needs and desires of each party
3. Example 3: Address issues directly, constructively, and honestly as they are happening to the other party
4. Example 4: Other discussed lessons

Details about Follow-up Scheduled Meetings:

The mediator will plan to meet with each of the affected parties at the agreed upon times to follow-up on the conflict resolution plan as well as your relationship as a faculty advisory and graduate student. Include additional details and expectations here.

It is important to note that there are instances where parting ways between a faculty advisor and a graduate student is the best resolution for the conflict. In situations like this, the conflict resolution plan is centered on a departure plan. Topics of discussion can include but are not limited to when the graduate

student will cease funding from the faculty advisor that may include involvement of human resources, data collected and authorship agreements, identification of a substitute faculty advisor and/or graduate student, re-appointment of a graduate student status (if the student is international or if they decide to switch departments), among others.

Finally, the appointed mediator should consider providing language to the lab, department, and/or college about what the process of mediation entails if handled internally as well as recommendations for campus resources. Regardless, of the approach, it is important that faculty advisors and graduate students understand the process and potential outcomes that are expected from such a mediated meeting and discussion.

IV. CONCLUDING THOUGHTS

The process of mediation is one of great importance to resolve conflicts that may arise between graduate students and their faculty advisors. Typically, most institutions of higher educators have a designated Ombuds expert or office or equivalent services across campus such as counseling services, student services, or similar.

However, there are times when either an institution of higher education, college, or department does not have the monetary means to facilitate such services or that there is a desire by both a faculty advisor and graduate student to resolve the matters internally.

Based on principles of conflict resolution [1]-[8], ethical mentoring [12]-[15], and hidden curriculum [16]-[19], a protocol is proposed to support internal mediation processes for faculty advisors and graduate students in engineering and science as well as other STEM disciplines. The readers are cautioned that these procedures are hypothetical and not prescriptive, and that any mediator should ensure that the adaptations to their protocols meet department, college, and university policies and procedures. However, including these forms of research to practice considerations serves to better inform faculty advisors and graduate students of what to expect in these types or similar forms of mediation discussions to ensure an equitable and feasible conflict resolution.

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