Jerry Samples, University of Pittsburgh, Johnstown

DR. JERRY SAMPLES holds a BS Ch.E. from Clarkson College, MS and Ph.D. in ME from Oklahoma State University. Dr. Samples served at the United States Military Academy twelve years before assuming the position of Director of the Engineering Technology Division at the University of Pittsburgh at Johnstown in 1996. After a five year period as the Vice President for Academic and Student Affairs he returned to the Engineering Technology Division. He is a Fellow of the International Society for Teaching and Learning receiving that honor in 2007. In 2008, he received the American Society for Engineering Education National Outstanding Teaching Award.
Abstract

The purpose of this paper is to define the roles of the faculty member and to discuss philosophies that will lead to a relationship that ensures success of the graduate student and, ultimately, the faculty member – since success for both makes the team tremendously successful.

The faculty roles include guidance in course work, assignment of pertinent research, development of research skills, development of writing skills, development of presentation skills, and adherence to time management principles. The faculty member must assess these areas and concentrate upon the rapid development of weak skills and effective use of stronger skills to maximize the output of the faculty-student team. The team must buy-in to the philosophy that is discussed at the initial meeting, before the graduate student is selected and hired.

The faculty philosophy must be one of a business model with definite deadlines, in-progress reviews, clearly stated assignments, strict enforcement of deadlines, frequent observations of work habits, and, respectively, rewards and penalties when work is completed or deadlines are missed. It is important that a “contract” is agreed-upon and enforced by the faculty member and adhered-to by both parties. These are standard mentoring tools that are applicable in any organization, but are more important when the stakes are so high for both parties.

A comparison of the results of effective and ineffective mentoring will be described to illustrate the “best practices” that lead to success of the faculty member and the graduate student. Conclusions and recommendations for future work by offending parties will tie the comparison to the discussion of roles and philosophy.

Introduction:

The idea of mentoring faculty \(^{1,2,9}\) is a long standing practice that has been extended to graduate students.\(^{3-7,9}\) Some of the graduate student mentoring has been focused upon getting graduate students into STEM programs, while others focus on teaching and/or research. In each case, the fundamentals of mentoring have sound theoretical and practical underpinnings and sound much like the material presented by Samples\(^2\).

Mentoring should be a team event where each agrees to the relationship. This is usually decided during the interview process when graduate students are selected based on their background and desire to work in a particular field or on a specific research endeavor. A portion of the faculty mentoring material presented by Samples can be edited by replacing the word “faculty” with the phrase “graduate student” as seen below:

The mentor and the person being mentored need to be teamed up early on in the new graduate student’s time at the university, preferably immediately after the first term begins. Some of the keys to a good relationship are:

- The mentor and the person being mentored must agree to the arrangement
There must be a clear understanding of the needs of the graduate student and the abilities of the mentor to assist. Communication must be established and meeting times arranged. Collegiality is of great importance. Assessment and evaluation must be balanced and in the form of learning outcomes. Feedback needs to be immediate – for teaching, immediately after the class – for research, within a reasonable time period, in order to optimize its effect. It would help if another faculty member or administrator assessed the mentor/mentee relationship to determine if the direction of the relationship is a positive one.

Jessop, writes about Mentoring Tips for New Professors and provides a top-ten list for new assistant professors developed by the Committee on Science, Engineering, and Public Policy which includes:

1. Listen patiently
2. Build a relationship
3. Don’t abuse your authority
4. Nurture self-sufficiency
5. Establish “protected time” together
6. Share yourself
7. Provide introductions
8. Be constructive
9. Don’t be overbearing
10. Find your own mentors

Jessop continues with Rule #1: Don’t expect your graduate student to be just like you were as a graduate student. This is especially true when the student is just beginning since they seldom know what to expect in their new role. It is also important because faculty rarely remember those first days when they were new; rather, they remember how efficient and productive they were immediately before graduation. Clearly, these lists cover most of what we need to mentor graduate students, but how are they put into practice?

**Roles/Philosophy:**

As the mentor of a graduate student, a faculty member has the opportunity to assist the student in realizing their potential and guiding them as they begin their professional career. This is an effort that can only be accomplished if the parties involved work as a team. Thus, the first step is to develop a team environment. To do this there must be a clear understanding of individual goals: where the faculty member wants to be in three to five years and how the relationship will support the associated goals; and, where the graduate student wants to be at the same time and how the relationship supports their goal. Using the “rules” above, there must be an agreement as to what each member can add to the team, there must be communication between members, and both need to listen so that there is no misunderstanding about the direction of the team. The faculty member is responsible for having this meeting and, translating the discussion into a
written “agreement” of sorts that both members can post on the wall as a reminder of what they agreed to do. This sounds a little rigid, but we all know that as things get hectic, we often forget what we need to do for others in favor of what we have to do for ourselves. This “agreement” can be a living document that is amended as things change, and it can be amended at the urging of either member after a team discussion.

Once this team is formed, it is incumbent on the faculty member to always think ahead when it comes to the graduate student and their duties. The student will have classes, perhaps research or teaching assistant duties, and the need for some personal time. This means that the faculty member must get to know the student, and the student’s strengths and weaknesses. The faulty member should communicate with the graduate student often, and when there is something that must be accomplished, for example, a journal article, paper, presentation, or demonstration of the research, early notification is a must. As a rule, the faculty member should give the graduate student at least 60% of the time allotted to complete the task. This does not mean that the task is given and forgotten; rather, it is given, and in-progress-reviews are established, and communication is constant. There may be a need for technical guidance, assistance with writing, or other “teachable moments” during the progress of the task. The best faculty mentor I ever experienced was a master at assigning tasks, monitoring them, assisting with the work and listening to the graduate students. In his own way he was watching the growth of scientists and engineers and brought each one along at a rate that fit their ability to grow. When the team relationship works, it is a thing of beauty. It should be no surprise that students fought to be accepted into this team, and all of the team members were successful, especially the faculty member.

While all faculty members would like to be successful and have wonderful graduate students, there are times when things do not go as well as they should. In many cases, the faculty members just do the work themselves and offer the students a free ride. This is not a good idea since it develops bad habits and reinforces behaviors that may not be professional. Faculty members must not back away from confrontation and must let the students know what has been missed. If writing is a problem, get them enrolled in a course in technical writing. If there is a language problem, have them work with the communication specialists. If there is a weakness in their academic background, have them take courses that will strengthen their understanding of the field. If there is a motivation problem, then there will be a need to take this up with the department leadership. It is important that any and all of these weaknesses/problems be resolved quickly for the team to flourish. I have seen examples of this behavior set: with very bad results. The primary concern is that the faulty member not suffer burn-out, and become frustrated, and progress slows accordingly.

On the other hand, there are times when the faculty member does not get the desired results because they have violated some or all of the “rules” listed above. This is a very difficult circumstance for the graduate student since they are “employed” by the faculty member. As a mentor, it is the faculty member’s responsibility to be big enough to listen to concerns and criticism, and realize that the performance of the student is being hampered by the faculty member’s own leadership flaws. So, when there is a potential problem with a graduate student, it is important that the situation be realistically assessed before blame is laid. If the blame is that of the faculty member, bring in the student to discuss the situation and resolve it right away. It
may be surprising how well the student will respond when the faculty member admits to some level of culpability. Remember, both parties learn in a two person team, and both can develop in parallel.

One of the most important aspects of any team is recognition of the team member (graduate student) when something goes well. In the academic world we honor them by placing names on papers and articles. There are times when the faculty member is reporting on work accomplished by the team; this is an excellent opportunity to sing the praises of the graduate student. Again, the best mentor I have seen often mentioned his students when he was presenting. This was really good for the student’s reputations and put them into the network of scholars in their discipline. Not surprisingly, the members of that team were highly successful in industry and academe after graduation.

The last tip above, #10 is especially helpful for new faculty members who have never guided a graduate student through the process. Seeking assistance, guidance, and tricks of the trade, and talking about situations with more experienced faculty, are always good ideas. It should not be long after arriving at the new position that it becomes obvious who the best mentors are among your colleagues. Alternately, you may just want to be like your graduate school mentor, and if you have problems, call on that person for assistance. It is far better to ask for help early than to work several frustrating years and then try to fix a team. It is also possible to form a support group of faculty in similar situations, for example: new researchers and, first time mentors, with or without problems to discuss.

It is important to develop one’s own mentoring style and work with graduate students to build the strongest team. Furthermore, it is also of paramount importance that you succeed in your career; something that will always require a team approach. So, develop a leadership philosophy, learn the roles that must be assumed and then lead with conviction.

**Evaluation:**

The table below lists categories that have been discussed above or that may come up during the mentoring process. Next to each category are a few words to describe best and not so good practices. It is possible that such a table will be useful in determining your success as a mentor.

While this table demonstrates only the best practices versus very bad practices, it does show that there is a range of practices that could be applied within the team. Whenever the faculty member strays from the best practices column, it is probable that there will be tension within the team. Proper treatment of team members will foster a relationship that produces the best results. This will make the team look good, support the goals of team members, and lead to success of the faculty member and the graduate student. The best practices support the philosophy discussed above and indicates some of the roles that must be assumed by the faculty member.
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th><strong>“BEST” PRACTICES</strong></th>
<th><strong>“NOT SO GOOD” PRACTICES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Meeting</td>
<td>Discussion of goals and objectives for the team, individual goals, and means of achieving goals.</td>
<td>Showed the graduate student the office and told him/her to come around when questions arise.</td>
</tr>
<tr>
<td>Communication</td>
<td>Continuous, on a schedule, weekly meetings, more frequent during projects. Interchange of information early enough to allow adequate time for completion.</td>
<td>On an exception basis or when something needs to be done. Information passed haphazardly – sometime too late for proper action.</td>
</tr>
<tr>
<td>Assignments</td>
<td>Passed on early with sufficient details to allow student time and ability to get the project completed on time.</td>
<td>Passed on with short suspense. Student pressured – no plan to assist student with the project.</td>
</tr>
<tr>
<td>In-progress-Review</td>
<td>Frequently scheduled to keep the team on track. Has a feedback form to aid in evaluation.</td>
<td>Seldom accomplished because contact is infrequent.</td>
</tr>
<tr>
<td>Writing</td>
<td>Teaches the student to write technical material and provides instruction or method for improvement.</td>
<td>Writes for the student when the project is completed. No assistance provided.</td>
</tr>
<tr>
<td>Research</td>
<td>Explains the project, discusses the technical aspects, frequently visits research site to assist in developing methodology for data collection.</td>
<td>Gives the project and expects results. When results are not as expected, criticizes the student’s attempt to collect data.</td>
</tr>
<tr>
<td>Presentations</td>
<td>Provides guidance on what is expected along with a template. Discusses the results and provides constructive criticism.</td>
<td>Tells the student to develop a presentation and then changes it without telling student how to make it better.</td>
</tr>
<tr>
<td>Rewards/Punishments</td>
<td>Passes on compliments and helps students network whenever possible. If there are problems, they are addressed immediately, resolved and forgotten. Confrontation is always positive.</td>
<td>Is very critical of the student and only discusses the negative situations with no regard for assisting in the development of the student.</td>
</tr>
<tr>
<td>Know the student</td>
<td>Gets to know the graduate student to understand personal needs and schedule. This helps when assigning work.</td>
<td>Is not concerned with the student, and is more concerned with personal gain at the student’s expense.</td>
</tr>
</tbody>
</table>

Table 1. Comparison of “best” practice and “not so good” practices.

**Conclusions and recommendations:**

Success of the faculty member is directly tied to the success of the team. A poorly lead team will not be as successful as one led correctly. Faculty members need to realize that they are leaders and learn the principles of leadership and personal discipline. It is recommended that every
faculty member attend some leadership forum or seek the counsel of senior faculty members who have been successful. These skills, once learned, will be instrumental in future success as a leader within the discipline and the academic unit.

Bibliography: