Faculty Development – The Future of Engineering Education

Noel N. Schulz and Kirk H. Schulz
Bagley College of Engineering
Mississippi State University

ABSTRACT
The economic woes of the last several years have hit universities hard. Endowments have little or no return. Corporate funding is harder to get. More and more people are competing for National Science Foundation dollars where supply is not meeting this increased demand. Operating budgets have been reduced providing little or no travel funds for faculty. Senior faculty who often teach multiple classes are retiring and are replaced with new assistant professors that teach a much lighter teaching load. Due to other budget constraints, some positions are not filled. At the same time multimedia resources for improving teaching and learning continue to expand in scope. So faculty are being asked to use new technologies in the classroom, often with a heavier teaching load; continue or increase their research activities, and provide outreach and service activities with less colleagues, less staff and few economic resources. New faculty face the challenges of the tenure process; associate professors look toward promotion and senior faculty and administrators try to figure out how to do "more with less".

With all the busyness of grading papers, writing grants, reviewing proposals and working with students, most faculty members take very little time out for personal professional development. Universities in general do not promote professional development activities. While sabbaticals are part of the academic opportunity, very few faculty take advantage of this opportunity. With all these constraints universities need to develop programs that help their faculty advance professionally in all areas of their profession including teaching, research, outreach/service and administration. An effective faculty development program can be a win-win for the university and faculty. Through these activities, faculty can improve their methods, reduce stress and increase their morale. Additionally these activities should provide a happier faculty who will be more productive toward the university goals. This paper and presentation will discuss two levels of professional development –departmental and college-level. The Bagley College of Engineering at Mississippi State is developing a comprehensive set of faculty development programs. The programs include activities for new faculty, untenured faculty, all faculty, committee chairs and administrators. Activities also cover areas related to teaching and learning, research and outreach/service. Departmental level activities include mentoring by faculty and more formally, the department head.

Introduction

Employee training is one of the most overlooked aspects in many organizations. Collins and Porras, in their exhaustive examination of the most successful visionary companies, advocate that training programs and orientation programs are part of what make many companies great [1].   Additionally, Bolman and Deal, in their book on Reframing Organizations, discuss the necessity of investing in people by providing excellent training opportunities [2]. They advocate that while there is some cost involved in training programs, that in the long run, organizations that pay attention to their employees are higher performing than those who regard training as an expensive liability.   Most, if not all organizations will advocate that "people come first", but often, organizations do not act in ways that demonstrate this as a core value.

Unfortunately, many universities often do a very poor job at faculty resource development. William Tierney lists nine ways in which universities often derail their commitment to the university [3]. Number 8 on his list of 9 is, "Assume that leadership and administrative skills cannot be learned and provide no seminars or workshops for faculty in new leadership positions".

Feedback and mentoring are two key areas in faculty development, and ultimately, faculty success.   Phillips and Cheatham suggest that the department chair has a significant amount of influence on helping a new faculty member successfully start their career, and that chairs should take an active role in working with their new faculty [4].

Other references on faculty development and mentoring are available from ASEE and other sources [5-15].   This paper will discuss the authors' activities in the Bagley College of Engineering at Mississippi State University.

Departmental Activities

This perspective is written from that as a Department Head, which one of the co-authors has done for six years. Over this period of time, I have been directly involved with formally mentoring five new Assistant Professors in Chemical Engineering Research clearly shows that mentoring is especially critical for new faculty members to allow them to successfully initiate their careers.

I meet with the new faculty members on an average of twice per month during their first year. These meetings are held in my office, and I tell the new faculty member that they can ask anything they want to, and the question and answer "stays in my office". I find it helpful to lay this down as a ground rule from the beginning, as my purpose is to ease their transition into academia, and I don't want to hesitate to discuss difficult political questions that might arise.   Additionally, I also point out that there is no set agenda which must be followed each time we meet, but rather, if there is something which has come up which the faculty member wants to talk about, we simply defer our discussion on the chosen topic to the next session, and discuss the new topic during that time. Many

times these alternative topics had to do with how universities function, which can seem very bewildering to faculty members who are new to academia.

In general to guide our discussion, I use two books for reference, and provide these to new faculty upon their arrival. Rick Reis's book [16] does a terrific job at introducing the university, preparation for an academic career, finding a suitable academic position, and how to successfully jumpstart your academic career. Additionally, there are some very good appendices with information on what to ask before accepting an academic job, and some helpful hints on successful proposal writing. There is some variation in what material is discussed based on the new faculty member's background and interest areas. Table 1 gives a general idea of the chapters that we discuss.

Table 1: Discussion Topics for Department Head/New Faculty Meetings

Session #	General Topics	Reference Materials Used
1	Introduction to University	Reis (Chapters 1,2)
2	Balance Teaching, Research, Service	Reis (Chapter 3)
3	Time Management	Reis (Chapter 10), 7 Habits of Highly Effective People
4	Teaching	Reis (Chapter 11)
5	Research	Reis (Chapter 12)
6	External Service	Reis (Chapter 13)
7	Tenure Process	Reis (Chapter 14)
8	NSF Proposal Process	Copy of Unsuccessful and Successful NSF Proposals with Reviews
9	Teaching Evaluations	Copy of Teaching Evaluations from first semester of teaching

An additional resource I provide to new faculty is Wilbert McKeachie's book on teaching tips [17]. We do not directly cover this material, but use this on an "as-needed basis". This book is written with short chapters on everything from meeting a class for the first time to handling cheating and the assignment of final grades. Since the teaching experience of new Assistant Professors is so varied, the usefulness of this book during the first year has more to do with prior experience in the classroom than anything else.

College of Engineering Level Activities

Starting in the summer of 2003, the Bagley College of Engineering decided to consolidate its faculty development activities. A faculty member was appointed part-time as Director of Women in Engineering and Faculty Development. While initial efforts for the development were to focus on new faculty, the idea was to develop programs to provide professional development for various faculty within the college. Additionally the Director for Faculty Development would work with the Offices of the Provost and Vice President for Research to coordinate faculty development activities to reduce duplication and enable multi-college participation where appropriate.

Figure 1 provides a summary diagram of the faculty development program designed for the 2003-2004 academic year. The program provides professional development opportunities for all faculty as well as four special groups: new faculty; untenured faculty; research faculty and staff; and committee chairs and department heads. Within these special groups there were unique needs that dictated specific programs for professional development.

All Faculty

1-2 Sessions Per Semester
On Research-Related Topics

Brown Bag Teaching & Learning
Lunches

Untenured Faculty

1-2 Sessions
Per Semester
On Topics of
Interest

**New Tenure-
Track
Faculty**
Mentor Program

Monthly Meetings

**Research Faculty
& Staff**

1-2 Sessions
Per Semester
on Topics of
Interest

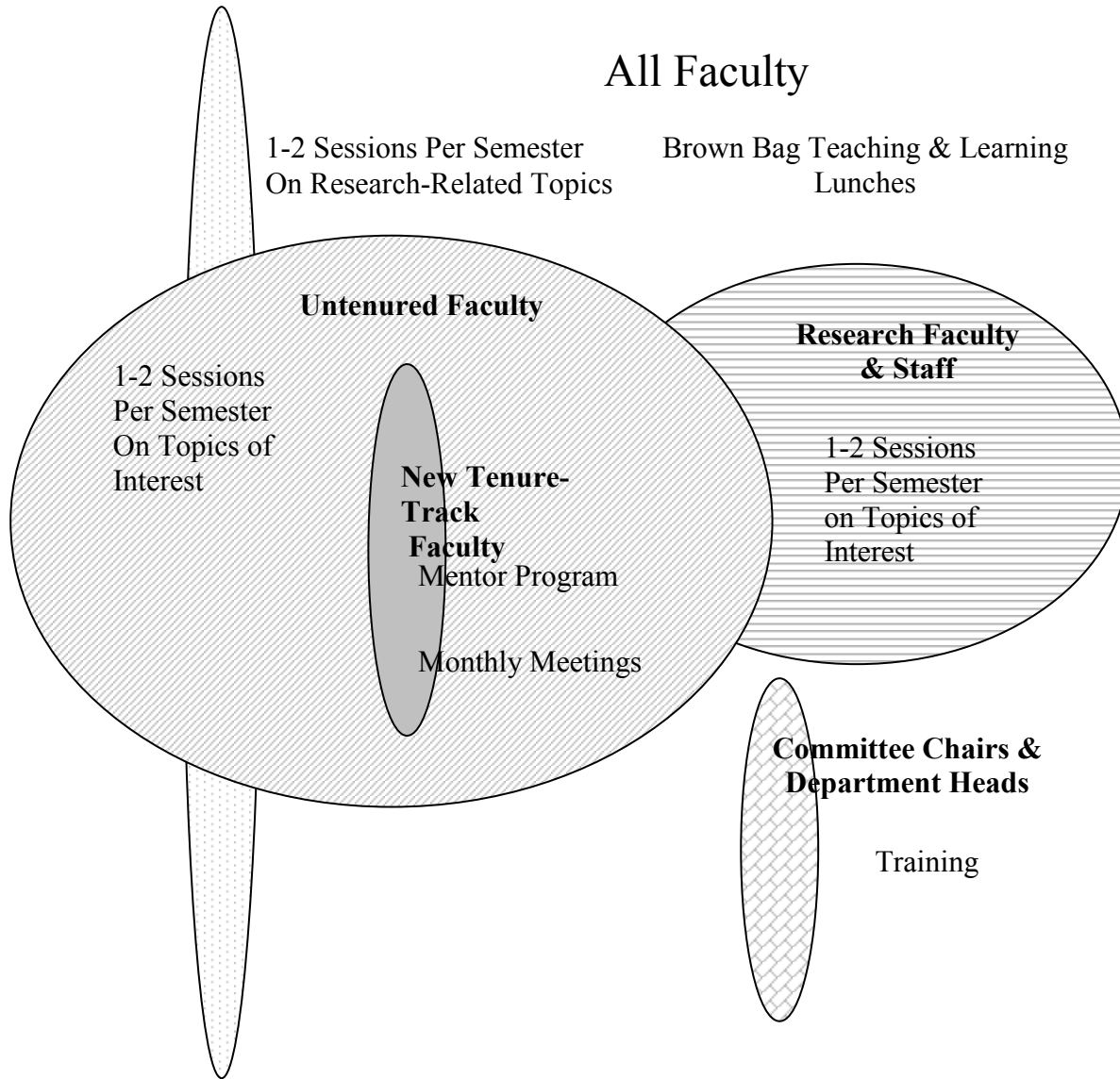**Committee Chairs &
Department Heads**

Training

Figure 1: Faculty Development Program at Mississippi State University

Faculty Development for All Faculty

Many faculty development programs are focused toward untenured and new faculty. Mid-career faculty members are often left without opportunities to expand or hone their professional skills. For the Faculty Development Program at Mississippi State we have worked to develop activities for all faculty within the College. This year we have developed a monthly "Brown Bag Teaching & Learning" session where nationally or locally recognized outstanding teachers here at Mississippi State discuss topics on "tricks of the trade" in the classroom and current trends in the engineering education literature. Additionally we have planned one to two sessions per semester on other professional development topics. Sessions have included panels on "Learning about Engineering-Related Research Centers on Campus" and "Expanding Your Research Program".

New Faculty Programs

At Mississippi State, the size of our departments means that there may be anywhere between one and three new faculty hired each year. By combining new hires from all departments, the BCoE New Faculty Program provided a critical mass for networking, discussions and interactions. Twelve new tenure track faculty started during the fall semester. There were two parts to the New Faculty Program. The first part was a one-on-one mentoring program with a senior faculty member within his/her department. In addition to the one-on-one groups, three new faculty and their mentors in related fields were also grouped into a cluster that meets once a semester to talk about topics of interest for the group. The Dean's office provided funds for the clusters to have one off-campus lunch per semester.

The second part of the program was the New Faculty Network. This involved monthly meetings as well as socials to help the new faculty jumpstart their careers. Some topics included in session were:
- Start-Up Issues for New Faculty: MSU Policies
- Networking with Other New Faculty
- Meet Sponsored Programs
- Working with Mentors
- Jumpstarting your career with the Provost
- Planning your academic career
- Proposal Writing
- Preparing for a Visit to NSF or other Sponsor
- Managing Graduate Students

. Additionally the program took advantage of informal and formal socials to provide networking for the group. In the fall, the new faculty and their guests mixed with their mentors, department heads and the Dean's Office staff at an event at the Dean's home. In the spring semester, a picnic for the faculty and their guests was at the Director's home. At the request of the new faculty, they also had several happy hours where an e-mail was sent to the list and those interested met at a local bar for appetizers and drinks.

Besides the activities, a list server was created for the new faculty where they could exchange ideas as well as get communications on opportunities and meetings. Additionally a new faculty booklet was put together that included a one page summary on each faculty member including contact information; degrees and schools; companies for industrial experience; teaching interests; research interests and key words; and software and hardware needs for their research activities. This booklet was distributed to the new faculty, department heads and Dean's office staff and will be posted on the faculty development web page.

Additionally the New Faculty Network was an outstanding avenue to discussing ASEE and how membership provides professional development through its publications and meetings. All new faculty were encouraged to participate in the ASEE Dean's Program and we had 100% participation for all eligible faculty.

Untenured Faculty Programs

For the untenured faculty, several sessions were combined with the new faculty network and they were also encouraged to attend the other faculty functions. In December, the untenured faculty were invited to a mini-workshop on "Developing and Sustain a Research Program". Also in May they will join the new faculty for a session on "Tenure and Promotion" with the Provost.

Research Faculty and Staff

Mississippi State has several research centers that are affiliated with the College of Engineering. In these centers there are doctoral and masters trained engineers and scientists who perform research activities and sometimes teach courses within the BCoE departments. While some of their activities are similar to the tenure track faculty, the research faculty and staff also have some unique professional development needs. In the spring semester, a committee of the research faculty and staff began working with the Director of Faculty Development to determine an appropriate set of seminars or workshops to help these faculty advance within their professional ranks.

Committee Chairs and Department Heads

The Director for Faculty Development is also working on seminars and workshops to help various senior faculty in their professional development toward leadership within their departments. During the fall semester, she has had individual meetings with department heads and search committee chairs to discuss strategies for diversifying their faculty applicant pools. Additional activities are planned to provide faculty members on tenure and promotion committees some formal training on evaluation and feedback mechanisms to provide constructive feedback to untenured faculty and those seeking promotion. The Director is also working with the Provost's office to develop workshops on evaluation for department heads.

An additional benefit for the faculty development programs is acknowledging the accomplishments of your existing faculty. By using senior faculty to sit on panels and

lead discussions on teaching and research, you are acknowledging and recognizing their contributions in these areas. This provides a win-win scenario where senior faculty are glad to be recognized for their accomplishments and junior faculty learn from the successes and mistakes of others.

Summary

This paper has discussed efforts at Mississippi State University in the Bagley College of Engineering to develop a comprehensive professional development program to help faculty improve in all three areas of our mission—teaching, research and service/outreach.   Besides college-wide efforts, it has also discussed how department heads can provide professional develop for junior faculty to help jumpstart their careers. The goals are to provide additional training and professional development on campus to help untenured faculty get tenure and promotion; associate professors get promoted; mid-career and research faculty restart or extend their scholarship activities; teaching faculty improve their teaching; senior faculty and department heads improve their mentoring and evaluation and overall faculty to be better prepared to make professional advances.

To date, most of the assessment has been anecdotal. As this is the first full year of this comprehensive faculty development program, end-of-the-year assessment is planned as well as some longitudinal studies to see how this group of new faculty does. Faculty development programs can help every campus.   While the exact programs may be different from campus to campus, a survey of faculty as well as administrators should provide some low-cost opportunities for advancing the faculty professionally.

Bibliographic Information

1. J.C. Collins and J.I, Porras, <u>Built to Last: Successful Habits of Visionary Companies</u>, Harper Business, New York, NY, 1997.
2. L.G. Bolman and T.E. Deal, <u>Reframing Organizations: Artistry, Choice, and Leadership</u>, Jossey-Bass, San Francisco, CA, 1997.
3. William Tierney, "The Responsive Campus: Nine Ways to Weaken Faculty Commitment to the University", *The Department Chair*, Vol. 13, No. 3, 2003, pp. 7-9.
4. E. Ray Phillips and Thomas J. Cheatham, "Focused Recruiting and Mentoring of Faculty by Chairpersons", *The Department Chair*, Vol 12, No. 1, 2001, pp. 26 – 28.
5. J.C. Cavanaugh, "Broadening Faculty Mentoring Programs", *The Department Chair*, Vol. 12, No 3, 2002, pp. 1 – 3.
6. J. Solti et. al, "Getting from Here to There" A Self-Diagnostic for Stimulating Faculty Development", *Proceedings of the 1999 Annual American Society for Engineering Education Conference*, Session 1675.
7. R.M. Felder and Rebecca Brent, "Faculty Development: Getting the Sermon Beyond the Choir", *Proceedings of the 1998 Annual American Society for Engineering Education Conference*, Session 1213.
8. C.E. Brawner, R.M. Felder, R.H. Allen and R. Brent, "The Impact of Faculty Development Activities on Engineering Faculty Teaching Practices," *Proceedings of*

the 2001 Annual American Society for Engineering Education Conference, Session 1630

9. C. Fulton and B.L. Licklider, "Re-Engineering Faculty Development: Lessons LEA/RNed", *Proceedings of the 1998 Annual American Society for Engineering Education Conference*, Session 1213.

10. R.M. Marra and Thomas A. Litzinger, "Learning to Juggle: A Model for New Engineering Faculty Development*, Proceedings of the 2000 Annual American Society for Engineering Education Conference*, Session 3575.

11. R.Brent et. al, "Engineering Faculty Development: A Multicoalition Perspective", *Proceedings of the 2000 Annual American Society for Engineering Education Conference*, Session 2630.

12. W. Campbell, "Mentoring of Junior Faculty", *American Journal of Pharmaceutical Education*, Vol. 56, No. 1, Spring 1992, pp. 75-78.

13. P. Boyle and B. Boice, "Systematic Mentoring for New Faculty Teachers and Graduate Teaching Assistants," *Innovative Higher Education*, Vol. 22, No. 3, Spring 1998, pp. 157-179.

14. A. Lowe et. al, "Mentoring and Pretenure Faculty Development", *Journal of Dental Education*, Vol. 55, No. 10, 1991, pp. 675-678.

15. F.M. Perna, B.M. Lerner and M.T. Yura, "Mentoring and Career Development Among University Faculty", *Journal of Education*, Vol. 177, No. 2, 1995, pp. 31-45.

16. Richard M. Reis, Tomorrow's Professor: Preparing for Academic Careers in Science and Engineering, IEEE Press, 1997.

17. Wilbert J. McKeachie, Teaching Tips: Strategies, Research, and Theory for College and University Teachers, 10th Edition, Houghton Mifflin Company, Boston, MA, 1999.

Biographical Information

Noel N. Schulz. Professor Schulz is an Associate Professor of Electrical & Computer Engineering at Mississippi State University and Director of the Women in Engineering and Faculty Development in the Bagley College of Engineering at Mississippi State University. Prior to teaching at Mississippi State, she was on the faculty at Virginia Tech, the University of North Dakota, and Michigan Technological University. She is active in the IEEE Power Engineering Society, where she serves as Secretary. She is also very involved with ASEE.

Kirk H. Schulz. Professor Schulz is the Director of the Dave C. Swalm School of Chemical Engineering at Mississippi State University, and is the holder of the Earnest W. Deavenport Jr. Chair in Chemical Engineering. Prior to teaching at Mississippi State, Dr. Schulz was on the faculty at Michigan Technological University and the University of North Dakota. He can be reached via email at schulz@che.msstate.edu.