

***Helping New Faculty Members
Get Off to a Good Start***

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Workshop Learning Objectives

By the conclusion of this workshop, you will be able to

1. Identify the attributes that characterize the new faculty members Robert Boice calls “*quick starters*,” who develop strong research and teaching records relatively early in their careers.
2. Describe an orientation program that has been found effective for supporting new faculty members.
3. List and describe ways department heads can support new faculty.
4. Describe several faculty mentoring models.
5. Identify characteristics of good mentoring and pitfalls mentors should avoid.
6. Select and implement interventions to help new faculty having difficulties in research and writing, teaching, and time management.
7. Itemize incentives to motivate new faculty members to make the effort to become effective professors and to motivate experienced faculty members to serve as mentors.

Resources for Mentors, Mentees, and Department Heads

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Workshop Faculty Biographies

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Dr. Brent is President of Education Designs, Inc., a consulting firm in Cary, North Carolina. She has 30 years of experience in education and specializes in staff development in engineering and the sciences, teacher preparation, evaluation of educational programs at both precollege and college levels, and classroom uses of instructional technology. She holds a Certificate in Evaluation Practice from the Evaluators' Institute at George Washington University. From 1997-2003, she directed the NSF-sponsored SUCCEED Coalition faculty development program, and she currently coordinates new faculty development activities for the North Carolina State University College of Engineering. She is program evaluator for the Advance 3-D program to foster leadership among women faculty and faculty of color. Prior to entering private consulting, she was an Associate Professor of Education at East Carolina University. She received the 1994 East Carolina University Outstanding Teacher Award.

Workshop Faculty Biographies

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Dr. Felder joined the N.C. State University faculty in 1969. He is a co-author of the book *Elementary Principles of Chemical Processes*, which has been used as the introductory chemical engineering text by over 100 universities in the United States and abroad, and he has authored or co-authored over 200 papers on chemical process engineering and engineering education. He has won the R.J. Reynolds Award for Excellence in Teaching, Research, and Extension, the Chemical Manufacturers Association National Catalyst Award, the University of North Carolina Board of Governors Award for Excellence in Teaching, the American Society for Engineering Education Chester F. Carlson Award for Innovation in Engineering Education, the American Institute of Chemical Engineers Warren K. Lewis Award for Contributions to Chemical Engineering Education, the ASEE Chemical Engineering Division Lifetime Achievement Award for Pedagogical Scholarship, and a number of national and regional awards for his publications on engineering education. At North Carolina State he has won the Sigma Xi faculty research award and has been designated a University Outstanding Teacher and Alumni Distinguished Professor.

Resources in Engineering and Science Education is Richard Felder's Web site.

http://www.ncsu.edu/effective_teaching

From the site, you can browse or download:

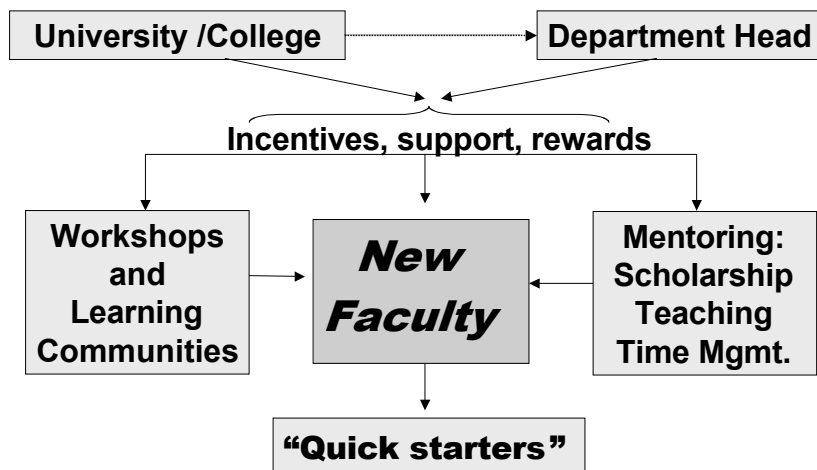
- A bibliography of Dr. Felder's publications with links to online versions of many of them
- Reprints of all of the *Random Thoughts* columns from *Chemical Engineering Education*
- The *Index of Learning Styles* (an on-line instrument students can use to determine their learning style)
- Information on teaching workshops given by Dr. Felder
- Handouts for students on a variety of topics
- Links to other web sites on engineering and science education

A. What do we know about new faculty?

WORKSHOP MESSAGE

- People are not born knowing how to be professors. Trial-and-error may not be the most efficient way to learn.
- Most professors take five years to reach full effectiveness. Some (*quick starters*) do it in 1-2. We know a lot about what makes the difference.
- Low productivity in research is costly. So is ineffective teaching. Quick starters are valuable.
- Research productivity and teaching effectiveness both involve teachable skills. Faculty development can produce quick starters.

Supporting New Faculty Members



Principles of Good Practice for Supporting Early-Career Faculty¹

Improving Tenure Processes

1. Good practice communicates expectations for performance
2. Good practice gives feedback on progress
3. Good practice enhances collegial review processes
4. Good practice creates flexible timelines for tenure

Encouraging Collegial Relations

5. Good practice encourages mentoring by senior faculty
6. Good practice extends mentoring and feedback to graduate students aspiring to be faculty members.
7. Good practice recognizes the department chair as a career sponsor

Easing Stresses of Time and Balance

8. Good practice supports teaching, particularly at the undergraduate level
9. Good practice supports scholarly development
10. Good practice fosters a balance between professional and personal life

General Support Requirements²

- **Transparency:** Making all kinds of information (e.g., expectations for research, teaching, and service; campus resources; administrative policies and procedures) available and easy to find
- **Uniformity:** Leveling the field and dealing equitably with all faculty
- **Assistance:** Attending to the needs of all faculty by offering mentoring and other kinds of help

¹ Sorcinelli, M. D. (2000). Principles of good practice: Supporting early-career faculty. In Rice, R. E., Sorcinelli, M. D., & Austin, A. E. (Eds.) *Heeding New Voices: Academic Careers for a New Generation*. Washington, DC: American Association for Higher Education.

² Waltman, J., & Hollenshead, C. (2005). Creating a positive departmental climate: Principles for best practices. Advance Program: University of Michigan.

Job Stresses for New Faculty

“Proactive steps by senior colleagues are essential—together with comprehensive self-help initiatives undertaken by the newcomers themselves.” (p. 11 of Moody³)

Typical Stresses⁴

- Not enough time
- Inadequate feedback and recognition
- Unrealistic expectations
- Lack of collegiality
- Balancing work and life outside work

Stresses Often Faced by Minority Faculty (Including Women in Engineering)³

- Chilly climate (“solo effect” where you may be judged more harshly, ignored, or expected to speak for your race or gender)
- Excessive committee assignments
- Excessive student demands (questioning of authority by majority students; more advising, particularly of non-majority students)
- Acute sting of negative incidents (particularly if already overstressed and overtaxed)
- Internalizing failure (women and minorities blame themselves for failure where white men tend to blame outside forces)
- Being discounted as an affirmative-action hire

³ Moody, J. (1997). Junior faculty: Job stresses and what to do about them. In *Demystifying the Profession: Helping Junior Faculty Succeed*. West Haven, CT: University of New Haven Press.

⁴ Sorcinelli, M.D. (1992). “New and junior faculty stress: Research and responses” (pp. 27–37). *New Directions for Teaching and Learning*, No. 50, San Francisco: Jossey-Bass.

New Faculty Members: Common Errors and Success Strategies

Boice⁵ found that 95% of new faculty members make certain mistakes that cost them time, productivity, and sanity. It typically takes them 4–5 years to become as productive in research and as effective in teaching as they ever become. The other 5%—the “quick starters”—meet or exceed their institution’s expectations for research productivity and score in the top quartile of teaching evaluations in their first 1–2 years on the faculty. Boice found things the quick starters do that the other new faculty don’t do, and he also found that those strategies can be effectively taught.

Mistake #1: Giving proposal and paper writing the highest verbal priority while spending relatively little time on them and producing relatively little. Concentrating on the most pressing tasks (e.g., preparing for tomorrow’s class) and waiting for “blocks of uninterrupted time” to do the “real writing.”

- *Consequences:* Lack of productivity, and anxiety about it. Long warm-up time when and if the blocks of time appear.
- *Success Strategy #1.* Schedule regular time—30–45 min/day, or 2–3 longer blocks weekly—for scholarly writing (proposals, papers, reports)
 - Make appointment with yourself
 - Work away from office
 - Freewrite first, then revise
 - Keep time log for a week (see how much time is spent on nonessential activities)
- *Results.*
 - Regular sessions → maintain momentum, less warm-up time
 - Steady progress → less anxiety

Mistake #2: Overpreparing for classes. Spending nine hours or more preparing for each lecture hour. Equating good teaching with complete & accurate notes. Attempting to be ready for any question.

- *Consequences:* Too much material. Rush to cover syllabus, little time for questions or activities in class. Little time for anything else, including scholarship & personal life.
- *Success Strategy #2.* Limit preparation time for class, especially after first offering. Shoot for 2 hours preparation per lecture hour. Often won’t make it, but if it’s 8–10, it’s a problem.
- *Results.*
 - Less material to cover → more time to cover it well, better learning.
 - Less preparation time → more time for scholarship & personal life.

⁵ Boice, R. (1992). *The New Faculty Member*. San Francisco, CA: Jossey-Bass, and Boice, R. (2000). *Advice for New Faculty Members*. Needham Heights, MA: Allyn & Bacon.

Mistake #3: Working non-stop and alone. Waiting for colleagues to come to them.

- *Consequences:* Failure to get available support. Failure to learn faculty culture. Sense of isolation.
- *Success Strategy #3.* Network with colleagues at least 2 hr/wk, & discuss research, teaching, & local culture. Go to lunch or for coffee, go to their offices or catch them in the hall.
- *Results.* Find resources. Learn & integrate into culture quickly. Cultivate allies and advocates.

Mistake #4. Working without clear goals and plans. Accepting too many commitments that don't help achieve long-term goals, and failing to take steps that *would* help.

- *Consequences:* Becoming spread too thin. Falling behind in tenure quest. Uncertainty, anxiety, stress.
- *Success Strategy #4.* Develop clear goals and specific milestones for reaching them (proposals, papers, conference presentations, new course preps,...). Get periodic feedback from department head and senior colleagues.
- *Results.* Make commitments wisely. Maximize chances of reaching goals.

How do you get new faculty to adopt the Boice strategies and other practices that will help them succeed?

1. New faculty orientation and ongoing faculty development
2. Appropriate department head intervention
3. Mentoring

B. How can orientation help new faculty get started effectively?

Effective New Faculty Orientation: Just-in-Time Skill Development

Principal Goal: Equip faculty members with the knowledge and skills they will need in their first two years to make good progress toward reappointment, promotion, and tenure.

Structure: Active & interactive, opportunities for practice, reflection, & networking. Accounts for cultural & methodological differences between STEM and H&SS in types of objectives, targeted skills, assessment methods, nature of research, role of funding and graduate students,....

Possible topics:

- Common mistakes made by new faculty members and strategies for avoiding them (based on work of Robert Boice).
- How to effectively design and deliver a course and assess the learning outcomes.
 - Conditions of instruction that lead to effective learning and hinder it (motivating students, accounting for variations in student backgrounds, developmental levels, and learning styles)
 - Writing and using learning objectives
 - Writing syllabi and establishing course policies and procedures
 - Getting a course off to a good start
 - Making new course preparations manageable
 - Effective lecturing and active learning
 - Assessing knowledge, conceptual understanding, skills, and values
 - Testing and grading
 - Classroom management and advising
 - Using instructional technology and teaching in a distance environment
- How to start, manage and build a research program. Possible topics:
 - Defining a broad research agenda and specific research topics
 - Getting funding (identifying and approaching potential sources, writing successful proposals)
 - Forming a team (faculty collaborators, postdocs and graduate students, undergraduates) and making it effective
 - Writing papers and books and getting them published
 - Dealing with crises
- How to learn the campus culture, balance competing time demands, make good progress toward RPT, and still have a life.

Traditional New Faculty Orientation: Just-in-Case Fact Presentation

Principal Goal: Acquaint new faculty members with university administrators, offices, and resources, and administrative regulations and procedures.

Structure: Presentations by campus administrators, program directors, and senior or recently promoted faculty, panels, Q&A, and possibly a campus tour. Addresses all disciplines simultaneously with no differentiation.

Possible topics (all important, but many could be effectively addressed with handouts): RPT process, employee benefits, campus student and research support facilities, minority support programs, parking, campus safety, effective teaching strategies (short session).

The N.C. State University Colleges of Engineering and Physical & Mathematical Sciences New Faculty Orientation Workshop

- Four days on building a successful research program, effective teaching, integrating into the faculty culture.
- Takes place 1–2 weeks before the start of the fall semester
- Interactive presentations by top researchers, teachers, administrators
- Participants can take 2 weeks of support from their startup packages
- Research
 - Choosing research topics
 - Identifying & approaching funding sources
 - Writing successful proposals
 - Attracting & mentoring graduate students
 - Publishing & presenting research findings
 - Dealing with miscellaneous problems (e.g., nonproductive graduate students, loss of funding, equipment breakdown,...)
 - Bi-disciplinary research proposal exercise. (Participants randomly paired across disciplines, given about 90 minutes to outline a project that involves the disciplines of both pair members.)
 - Mock review panel. (Participants review a proposal using NSF criteria; then several faculty members review it, simulating an NSF panel.)
 - Individual proposal planning. (Participants work on their own proposals.)
- Teaching
 - Learning and teaching styles
 - Course planning (writing learning objectives, Bloom’s Taxonomy, getting a course off to a good start)
 - Assessment & evaluation of learning (testing, other assessment methods, grading)
 - Lecturing & active learning methods, introduction to cooperative learning
 - Classroom management & advising
 - Individual course planning. (Participants work on their own courses.)
- Integrating into the campus culture and balancing competing demands
 - Setting priorities
 - Time management
 - Panel (Deans, Associate Deans, Department Heads) discussing & answering questions about tenure, promotion, and the campus faculty culture
- Evaluation of the workshop: In its 11 offerings since 2000, 88% of 213 respondents have rated it “Excellent,” 12% “Good”, and none Average,” “Fair,” or “Poor.”
- Follow-up sessions
 - Dealing with funding agencies
 - Teaching crisis clinic (discussions of problems participants have experienced)
 - How to win a CAREER Award

Alternative New Faculty Development Activities

- Shorter workshops & seminars during academic year
- Follow university orientation with college-specific workshop
- Learning communities made up of new and experienced faculty
- Mutual support groups—classroom exchanges in pairs, “teaching squares”
- Periodic gatherings of women or minority faculty for support and networking

TURNING NEW FACULTY MEMBERS INTO QUICK STARTERS*

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If you're like most faculty members, you began your academic career knowing very little about what you'd be doing for a living. You knew about working on a research project someone else had defined and gotten funded, but not about starting and managing a research program, planning and delivering courses, and dealing with the hundreds of technical and management problems that always crop up in research and teaching. No one told you much about those things after you showed up either, so you had to figure it all out yourself by trial-and-error.

This bizarre approach to career development has unfortunate consequences. Roughly 95% of new faculty members take an average of 4–5 years to meet or exceed their institution's expectations for research and teaching.^{1,2} The remaining 5%, however—the ones Robert Boice¹ calls “quick starters”—manage to do it in their first two years. Considering the enormous investment institutions make in each faculty member they hire, moving more of the new ones into the quick starter category would clearly be good for everyone—the new faculty, their institutions, and the students they will teach and mentor.

Converting new faculty members into quick starters is not impossible—it's not even difficult. You just give them early guidance on how to teach well, do good research, and balance the competing demands of teaching, research, service, and personal life, and supplement this orientation with one-on-one mentoring by skilled senior colleagues.

A program containing those elements has been in place since 2000 in the N.C. State University College of Engineering. We offer it as an example of what can be done—and in our opinion, what should be done—to help new engineering faculty make the transition to their new careers quickly and successfully. In this column, we briefly outline the program (Brent *et al.*³ provide more details) and summarize the lessons we have learned from our experience with it.

The NCSU New Faculty Support Program

The centerpiece of the NCSU program is a four-day orientation workshop held in mid-August. It covers grantsmanship, recruiting and working with graduate students, designing courses and getting them off to a good start, effective lecturing and active learning, advising, time management, and dealing with a variety of crises faculty members commonly encounter. All presentations are highly interactive, and the presenters include some of the best teachers and researchers on the faculty as well as key administrators and support staff. The workshop was first given in 2000 to new engineering faculty, and since 2001 it has been given jointly to new faculty in the Colleges of Engineering and Physical and Mathematical Sciences.

The orientation workshop is followed by a series of hour-long sessions during the academic year that reinforce workshop material and help maintain a sense of community among the participants. Topics addressed include troubleshooting teaching, dealing with funding agencies, and writing effective proposals for CAREER Awards. (Workshop alumni have an excellent record of landing them.) Another component of the support program is mentoring. In

**Chemical Engineering Education*, 41(1), 51–52 (2007). Reference 3 on p. 15 is an expanded version of this paper.

2000, all departments identified specific ways the department heads and senior faculty would provide support to their new hires, and formal mentoring programs have been initiated in several departments.³

The response of the new faculty has been overwhelmingly positive. The participants to date have given the orientation workshop 99 overall ratings of “excellent,” 12 “good,” and no “average,” “fair,” or “poor” ratings. Past workshop participants have given significantly higher ratings than non-participants to their career orientations, and preliminary assessments indicate that they have outperformed the non-participants in terms of both funded research activity and teaching evaluations. The program has maintained a high level of administrative support and has become a strong selling point for recruiting new faculty.

Recommendations

We have the following suggestions for schools planning their own new faculty support programs.

- *Keep the program at the school/college level rather than making it campus-wide.*

Many universities have teaching centers that provide new faculty orientation, but since the organizers have to address faculty in all disciplines, they generally limit the program content to such things as campus resources and employee benefits. As important as those topics may be, such programs don’t do much to convert new faculty into quick starters. When orientation is designed specifically for faculty in engineering and related disciplines, presenters can use research and teaching examples that are clearly relevant to the participants—and the greater the perceived relevance of presented material, the greater its likely impact on the recipients.

- *Get strong and visible support from the dean and department heads.*

If the director of a teaching center or the associate dean for academics invites new faculty members to attend a four-day workshop two weeks before the start of their first semester, few are likely to show up, while if the dean and department heads strongly encourage attendance and share positive evaluations from past workshop participants, most new faculty will attend.

- *Provide guidance on both research and teaching and discuss how to balance them.*

Most new faculty are nervous about meeting expectations for research productivity. Providing guidance on how to do it is an excellent way to persuade them that the workshop is worth their time. Presenters should also emphasize strategies for making teaching efficient as well as effective and for maintaining a balance of teaching, research, service, and personal life consistent with the institution’s expectations and the faculty members’ health and sanity.

- *Keep the presentations practical and interactive.*

A workshop that is mainly a parade of talking heads is generally not worth the time it takes to prepare and present it. If a designated presenter doesn’t know how to design and deliver an effective interactive presentation, someone else who does should provide some coaching.

- *Treat the participants well.*

The new faculty should feel welcomed into the academic community, and treating them well is one way to make that happen. Hold the workshop in a convenient, comfortable location and don’t skimp on the budget for meals and breaks. Provide useful resources in a well-organized notebook. Post lists of good local restaurants, parks and playgrounds, cultural

attractions, and automobile repair shops. End the workshop with a celebratory reception and invite all the department heads and mentors to attend and interact with the participants. Make sure mentoring in teaching and research is provided by skilled and supportive colleagues who know something about how to mentor.⁴

In summary, if the goal is to convert new faculty members into quick starters—productive in research and effective in teaching in their first two years—and the orientation that most of us got (i.e., none) is provided, there is a one-in-twenty chance of succeeding. The strategies we've proposed should improve the odds considerably.

References

1. R. Boice, *Advice for New Faculty Members*, Needham Heights, MA: Allyn & Bacon, 2000.
2. R.M. Felder and R. Brent, "The New Faculty Member," *Chem. Engr. Education*, 32(3), 206–207 (1998), <<http://www.ncsu.edu/felder-public/Columns/Boice.html>>.
3. R. Brent, R.M. Felder, and S.A. Rajala, "Preparing New Faculty Members to be Successful: A No-Brainer and Yet a Radical Concept," *Proceedings of the 2006 Annual ASEE Conference*, Washington, DC: ASEE (2006), <[http://www.ncsu.edu/felder-public/Papers/ASEE06\(NewFaculty\).pdf](http://www.ncsu.edu/felder-public/Papers/ASEE06(NewFaculty).pdf)>
4. R.M. Felder, "Teaching Teachers to Teach: The Case for Mentoring," *Chem. Engr. Education*, 27(3), 176–177 (1993), <<http://www.ncsu.edu/felder-public/Columns/Mentoring.html>>.

C. What can the department head/chair do to help new faculty?

Department Head Support of New Faculty⁶

Year 1

1. Give new faculty members copies of Boice's *Advice for New Faculty Member* and McKeachie's *Teaching Tips*.
2. Provide a list of university and community resources and services available (nearby daycare, exercise facilities, travel agent, health clinics). The University or local Chamber of Commerce may be able to provide these.
3. Provide research start-up funds, secretarial support, graduate research or teaching assistants, a computer, and technical support for putting course material online.
4. Pay professional society dues and provide travel funds for professional society meetings.
5. Preview required career documentation and provide samples (i.e., faculty activity report, reappointment papers, teaching portfolios)
6. Impose light teaching and service loads. Suggest appropriate service activities that will not take up a lot of time.
7. Tell them about Boice's findings regarding quick starters.
8. Introduce them to campus leaders and faculty with related research interests in other departments.
9. Make them aware of campus resources that identify relevant funding sources and provide other forms of support for research program development.
10. Initiate collaborations with experienced colleagues who can function as research mentors.
11. Set them up to succeed on their first proposal by making initial contacts and assuring a good match.
12. Arrange formal (*preferable*) or casual teaching mentorships. Encourage new faculty members who may not be inclined to undertake a mentorship to give it a try, reminding them of Boice's findings regarding quick starters.
13. Roughly once a month, schedule informal sessions over lunch or coffee to discuss how things are going. Provide informal feedback on their performance in teaching, research, and service.
14. Facilitate the preparation of an annual professional development plan to encourage attention to long-term and short-term goals. (A sample professional development plan is on p. 20.)
15. Encourage new faculty to make realistic time allotments and to eliminate unnecessary commitments. Often they need help in learning to say no (and whom not to say it to).

⁶ Adapted from Daniel W. Wheeler, "The Role of the Chairperson in Support of Junior Faculty" in *Developing New and Junior Faculty* by M. D. Sorcenelli and A. E. Austin (Eds.), *New Directions for Teaching and Learning*, No. 50, Summer 1992, San Francisco: Jossey-Bass.

Years 2-5

16. Once a semester schedule a session to discuss concerns, provide performance feedback, and encourage growth and development. Think about asking, “What do you want to do?” and “How can I help you do it?”
17. Give a lighter load one semester in the second or third year to encourage research program development after they have gotten some projects under way.
18. Nominate them (in moderation) for professional society positions and funding agency review panels. If necessary, continue to fund travel to meetings.
19. Encourage them to participate in faculty development activities, on and off campus, to strengthen their skills and expertise in selected areas.
20. Meet at the beginning of each year to formulate an annual plan and again at the end of the year to evaluate progress on the plan. (More detail is given on pp. 20 and 21.)

To support all faculty within the department:*

21. Meet early in the academic year with each faculty member to discuss professional goals.
22. Meet with faculty on their turf, particularly when discussing difficult issues or problems.
23. Have regular departmental seminars where faculty share their research *and* teaching innovations and problems.
24. Spend time in each faculty meeting talking about teaching-related topics or offering a practical classroom idea.
25. Recognize faculty teaching and research efforts on the departmental bulletin board, in a newsletter, and publicly at faculty and advisory board meetings
26. Have faculty who have attended conferences/workshops share what they learned with their faculty colleagues in seminars or by distributing information. Do this for education conferences as well as research conferences.
27. Maintain a departmental reading room of publications related to teaching as well as research.
28. Institute a voluntary program of visitation in one another’s classes and provide extra travel or supply funds to the faculty involved.

For more ideas on developing new faculty into teachers and scholars, see the Bensimon, Ward, and Sanders book and the Bland et al. books in the reference list on p. 2.

Sample Annual Plan for Faculty in Year 1⁷

Research Goals

- Establish a research agenda with a focused line of inquiry.
 1. Attend faculty development workshops on writing and research.
 2. Meet with department chair to discuss short- and long-term research publication goals and solicit suggestions on how to best meet these goals.
- Make connections to fellow faculty with similar interests to develop the potential for collaboration.
- Submit one conference proposal.
 1. Brainstorm proposal.
 2. Submit proposal.
- Submit one article for publication.
 1. Draw on dissertation to prepare article.
 2. Send drafts of article to three colleagues for feedback.
 3. Incorporate comments from colleagues and submit article for publication.
- Submit at least two grant proposals (one internal and one external).
 1. Collect information about grant opportunities.
 2. Write internal grant proposal, get feedback from three colleagues, revise, and submit.
 3. Write external grant proposal, get feedback from three colleagues, revise, and submit.

Teaching Goals

- Get feedback on teaching.
 1. Have at least one person come to class to do an informal evaluation of spring and fall courses.
 2. Conduct midterm student evaluation of fall courses and incorporate information into courses for fall and spring.
- Prepare for spring courses.
 1. Prepare syllabi for spring.
 2. Submit spring book requests.
- Say no to summer teaching for the first year.

Service Goals

- Collect information about departmental, college, and university priorities.
- Say no to non-departmental committee work for the first year.
- Meet with department chair to strategize service commitments.

⁷ Adapted from Bensimon, E. M., Ward, K., & Sanders, K. (2000). *Department Chair's Role in Developing New faculty into Teachers and Scholars*. Bolton, MA: Anker Publishing, pp. 117-118.

Providing Yearly Feedback to New Faculty

It is essential to tell new faculty members at least once a year how they are doing in their progression toward contract renewal, tenure, and promotion. It is also unethical not to do so. *Renewal, tenure, and promotion decisions should never come as a surprise.*

Who should provide the feedback?

- **Department head/chair.** Face-to-face annual review of new faculty activity report and future plans. Mandatory if head recommends T&P decision to Dean.
- **Feedback committee.** Several senior faculty who will be involved in the T&P decisions. Committee review is useful when the senior faculty and the head make separate recommendations. The committee also may offer a greater variety of good suggestions.
- **Mentor.** Faculty member who has been working with the new faculty member on teaching and/or research and/or integration into the campus culture.

Sample Schedule of Department Chair, Senior Faculty Committee, or Mentor Meetings with Untenured Faculty

- Within the first two weeks, meet with new faculty member to go over orientation information and answer questions. Have the faculty member leave with the assignment of developing a list of goals for the year for research, teaching, and service.
- Several weeks later, meet to go over the goals and finalize the first year's annual plan. Find out if the new faculty member has questions about the tenure and promotion process or any other topic. Talk about how well the faculty member is maintaining a balance among research, teaching, and other responsibilities.
- During the second semester, touch base to see how things are progressing with research and teaching.
- At the end of the first year, conduct the first annual review and develop teaching and research goals for the summer and Year 2.
- At the outset of Year 2, meet to assess the summer's progress and to go over plans for the coming year.

Department Head Planning Checklist

	Doing Now	Plan to Do
• Assign formal mentors to first-year faculty	_____	_____
• Assign senior faculty feedback committee to review new faculty activities and plans annually	_____	_____
• Give mentors incentives/rewards (e.g., travel funds, service load relief, extra TA)	_____	_____
• Meet with new faculty early to discuss dept., college, and university expectations	_____	_____
• Meet with untenured faculty once a year or more to provide feedback on performance in research, teaching, and other responsibilities and to discuss annual plan	_____	_____
• Encourage new faculty to attend workshops and seminars on teaching, research and campus resources	_____	_____
• Provide incentives/rewards for new faculty to work on their teaching (e.g. summer support for course design, travel to education conferences)	_____	_____

Additional ideas to try:

D. How can mentoring programs help new faculty?

Mentoring New Faculty

In every skilled profession but one, experienced practitioners (mentors) provide guidance to newcomers to the profession (apprentices, mentees). The one exception is college teaching. Most new professors must therefore learn by trial-and-error. The result is Boice's 4–5 year learning curve.

Mentoring works. *Most great scientists served as apprentices to other great scientists.*

Mentorship models

- Each new faculty member who wants a mentor is assigned either (a) one mentor for both research and teaching, or (b) a research mentor and a teaching mentor. Mentors may be in the mentee's department or another department.
- *Research mentorship.* Most effective approach is for the mentor and mentee to collaborate on a research project, so the mentee can see first-hand how the experienced researcher plans a study, secures funding, works with graduate students, publishes results, and deals with problems. Mentee takes increasingly large share of project leadership as time goes on. Less effective (but still extremely valuable) is for the mentor to meet regularly with the mentee to offer advice and help with the different stages of the mentee's research.
- *Teaching mentorship.* Most effective approach is for mentor and mentee to co-teach a course in one section or parallel sections. Initially mentor does most of the lesson planning, assignment & test writing, and lecturing; mentee observes classes. Review class at weekly debriefing meetings. Gradually mentee assumes more of the responsibility, mentor becomes more of an observer, debriefing meetings continue. Next semester, mentor periodically observes mentee's class & subsequently offers comments.
- Mentors should introduce mentees to Boice's success strategies for new faculty.
- Teaching mentorships last 1 year, research mentorships 1 year to the life of the joint project. Over time, mentee assumes more leadership, mentor's role changes from leader to consultant.
- *A key to successful mentorship is regular meetings, whether or not the mentor and mentee feel a strong need for it.* Most mentorships that fail do so because the meetings diminish in frequency and then just stop.

Additional ideas

- *Group mentoring.* This approach recognizes that not all career advice requires one-on-one interaction. Groups of early career faculty could meet with one or two senior colleagues to talk about specific topics of interest to all such as policies on tenure, teaching evaluations, how to develop a new course, or time management.
- *Expert consulting.* If there are individuals with certain areas of expertise (successful grant writing, excellent teaching, contacts with a particular funding agency), those individuals may serve as designated resources for individual new faculty members or groups.

Effects of mentoring⁸

Research on junior faculty development suggests that mentoring can contribute significantly to faculty effectiveness. Benefits include

- greater research productivity
- better student evaluations
- greater success in coping with challenges
- less social isolation and stress
- higher job and career satisfaction

Lessons learned from research⁹

- Mentors & mentees paired by the department head work as well as mentee-selected pairs.
- Intradepartmental and interdepartmental pairings work equally well.
 - Advantage of within department pairing: mentor more likely to be familiar with mentee's research interests & courses and with department culture.
 - Advantage of out-of-department pairing: mentee can speak more freely, knowing that mentor won't later be evaluating him/her for tenure & promotion.
- Women & minorities least likely to be mentored informally.
- Having all mentor-mentee pairs meet together occasionally increases effectiveness of mentorships.
- Mentors often resist taking action (critiquing mentees' lectures or proposal drafts, initiating meetings) and may need encouragement to do so.
- Meeting regularly is more important than any personal characteristics of mentors.

Selecting mentors¹⁰

Good mentors are

- politically aware — familiar with department, college, & institution culture
- positive about their positions & colleagues
- effective as teachers and/or scholars (whichever they are mentoring)
- aware of challenges facing new faculty
- willing to spend considerable time with mentees
- good listeners

Once a mentor is chosen:

- Provide some initial training (~2 h)
 - Information on new faculty challenges, Boice's work on quick starters
 - Expectations for mentoring
 - Suggested activities, interventions, resources
- Provide compensation and recognition. At the very least, mentoring should count as a significant service contribution.

⁸ From Menges & Associates [1999], reference on p. 3.

⁹ Boice, R. (1992). "Lessons learned about mentoring." *New Directions for Teaching and Learning*, No. 50, pp. 51–62.

¹⁰ From Bensimon, Ward & Sanders (2000), reference on p. 2.

THINGS I WISH THEY HAD TOLD ME¹¹

Richard M. Felder
North Carolina State University

Most of us on college faculties learn our craft by trial-and-error. We start teaching and doing research, make lots of mistakes, learn from some of them, teach some more and do more research, make more mistakes and learn from them, and gradually more or less figure out what we're doing.

While there's something to be said for purely experiential learning, it's not very efficient. Sometimes small changes in the ways we do things can yield large benefits. We may eventually come up with the changes ourselves, but it could help both us and our students immeasurably if someone were to suggest them early in our careers. For whatever they may be worth to you, here are some suggestions I wish someone had given me.

- *Find one or more research mentors and one or more teaching mentors, and work closely with them for at least two years.* Most faculties have professors who excel at research or teaching or both and are willing to share their expertise with junior colleagues, but the prevailing culture does not usually encourage such exchanges. Find out who these individuals are, and take advantage of what they have to offer, if possible through collaborative research and mutual classroom observation or team-teaching.
- *Find research collaborators who are strong in the areas in which you are weakest.* If your strength is theory, undertake some joint research with a good experimentalist, and conversely. If you're a chemical engineer, find compatible colleagues in chemistry or biochemistry or mathematics or statistics or materials science. You'll turn out better research in the short run, and you'll become a better researcher in the long run by seeing how others work and learning some of what they know.
- *When you write a paper or proposal, beg or bribe colleagues to read it and give you the toughest critique they're willing to give.* Then revise, and if the revisions were major, run the manuscript by them again to make sure you got it right. Then send it off. Wonderful things may start happening to your acceptance rates.
- *When a paper or proposal of yours is rejected, don't take it as a reflection on your competence or your worth as a human being. Above all, don't give up.* Take a few minutes to sulk or swear at those obtuse idiots who clearly missed the point of what you wrote, then revise the manuscript, doing your best to understand and accommodate their criticisms and suggestions.

If the rejection left the door open a crack, send the revision back with a cover letter summarizing how you adopted the reviewers' suggestions and stating, *respectfully*, why you couldn't go along with the ones you didn't adopt. The journal or funding agency will usually send the revision back to the same reviewers, who will often recommend acceptance if they believe you took their comments seriously and if your response doesn't offend them. If the rejection slammed the door, send the revision to another journal (perhaps a less prestigious one) or funding agency.

- *Learn to identify the students in your classes, and greet them by name when you see them in the hall.* Doing just this will cover a multitude of sins you may commit in class. Even if you have a class of over 100 students, you can do it—use seating charts, labeled photographs, whatever it takes. You'll be well compensated for the time and effort you expend by the respect and effort you'll get back from them.
- *When you're teaching a class, try to give the students something active to do at least every 20 minutes.* For example, have them work in small groups to answer a question or solve a problem or think of their own questions about the material you just covered.¹² In long class periods (75 minutes and up), let them get up and stretch for a minute.

¹¹ Revised version of *Chem. Engr. Education*, 28(2), 108-109 (1994).

¹² See R.M. Felder, "Active Learning: An Introduction," <[http://www.ncsu.edu/felder_public/Papers/ALpaper\(ASQ\).pdf](http://www.ncsu.edu/felder_public/Papers/ALpaper(ASQ).pdf)>.

Even if you're a real spellbinder, after approximately 10 minutes of straight lecturing you begin to lose a fraction of your students—they get drowsy or bored or restless, and start reading or talking or daydreaming. The longer you lecture, the more of them you lose. Forcing them to be active, even if it's only for 30 seconds, breaks the pattern and gets them back with you for another 10 to 20 minutes.

- *After you finish making up an exam, even if you KNOW it's straightforward and error-free, work it through completely from scratch and note how long it takes you to do it, and get your TA's to do the same if you have TA's.* Then go back and (1) get rid of the inevitable bugs and busywork, (2) make sure most of the test covers basic skills and no more than 10–15% serves to separate the A's from the B's, and (3) cut down the test so that the students have at least three times longer to work it out than it took you to do it.
- *Grade tough on homework, easier on time-bound tests.* Frequently it happens in reverse: almost anything goes on the homework, which causes the students to get sloppy, and then they get clobbered on tests for making the same careless errors they got away with on the homework. This is pedagogically unsound, not to mention unfair.
- *When someone asks you to do something you're not sure you want to do—serve on a committee or chair one, attend a meeting you're not obligated to attend, join an organization, run for an office, organize a conference, etc.—don't respond immediately, but tell the requester that you need time to think about it and you'll get back to him or her. Then, if you decide that you really don't want to do it, consider politely but firmly declining.* You need to take on some of these tasks occasionally—service is part of your professorial obligation—but no law says you have to do everything anyone asks you to do.¹³
- *Create some private space for yourself and retreat to it on a regular basis.* Pick a three-hour slot once or twice a week when you don't have class or office hours and go elsewhere—stay home, for example, or take your laptop to the library, or sneak into the empty office of your colleague who's on sabbatical.

It's tough to do serious writing or thinking if you're interrupted every five minutes, which is what happens in your office. Some people with iron wills can put a “Do not disturb!” sign outside their office door, let their secretaries or voice mail take their calls, and Just Do It. If you're not one of them, your only alternative is to get out of the office. Do it regularly and watch your productivity rise.

- *Do your own composing on a word processor instead of relying on a secretary to do all the typing and correcting.* If you're a lousy typist, have the secretary type your first draft but at least do all the revising and correcting yourself.

Getting the secretary to do everything means waiting for your job to reach the top of the pile on his desk, waiting again when your job is put on hold in favor of shorter and more urgent tasks, waiting yet again for the corrections on the last version to be made, and so on as the weeks roll merrily by. If a job is really important to you, do it yourself! It will then get done on *your* schedule, not someone else's.

- *Get a copy of McKeachie.¹⁴* Keep it within easy reach. You can open it to any page and get useful suggestions about every aspect of teaching and research backing for them.
- *When problems arise that have serious implications—academic misconduct, for example, or a student or colleague with an apparent psychological problem, or anything that could lead to litigation or violence—don't try to solve them on your own. The consequences of mistakes could be disastrous.*

There are professionals at every university (academic advisors, trained counselors, attorneys) with the knowledge and experience needed to deal with almost every conceivable situation. Find out who they are, and bring them in to either help you deal with the problem or handle it themselves.

¹³ If your department head or dean is the one doing the asking, however, it's advisable to have a good reason for saying no.

¹⁴ W.J. McKeachie, *Teaching Tips*, 11th Edn., Boston, Houghton Mifflin, 2002.

Mentoring for Effective Scholarship

- Ask questions to find out what the problem is
- Ask to see work in progress and share your own work
- Encourage mentee to schedule regular times for scholarly writing
- Show mentee successful and unsuccessful proposals and talk about them
- Discuss possible sources of funding and encourage mentee to contact program director
- Get mentee involved in joint research projects with other faculty
- Make sure mentee knows about campus resources and support staff (grants office, reference librarians).

Steps to Helping Faculty Establish and Maintain a Research Agenda¹⁵

Step 1: Know the faculty member's research history. When a new faculty member is hired, the department head and mentor should become familiar with his or her experience level in research, grant acquisition, and publication. This knowledge will help determine how much help will be needed.

Step 2: Help create a research agenda. Depending on the faculty member's research history, help him/her create an agenda that should lead to appropriate levels of productivity to meet the institution's expectations for tenure.

Step 3: Meet regularly about research. Meetings to discuss research will give the dept. head/mentor a chance to monitor progress and clarify expectations regarding research.

Step 4: Pinpoint problems. Often problems are related to writing. The following writing tips may be helpful:

- *Make writing regular activity.* Allocate brief intervals (1-2 hours) to scholarly writing at least 3 times a week.
- *Write when you are fresh.*
- *Compliment and reward yourself when you meet writing goals.*
- *Establish or join a writing support group.*
- *Get into the habit of sharing work with colleagues even if it is in outline or draft form.* This habit will help de-emphasize the private side of writing and will establish a network of colleagues who are familiar with your work.
- *Develop a portfolio of research that includes completed projects, writing in progress, and plans for the future.* The portfolio can become a focus of discussion for annual reviews and provides a way to monitor progress in establishing a research agenda.

Step 5: Help with grant proposals. The department head/mentor might show the new faculty member examples of funded proposals and provide feedback on drafts. If more than one faculty member is experiencing difficulty, schedule a topical workshop using campus or college resources.

Additional suggestions for all aspects of research including supervising graduate students, getting funding, writing research papers, reviewing research proposals and papers, presenting talks on research results, and conducting graduate seminars can be found in the Davidson and Ambrose book listed in the references on p. 2.

¹⁵ Bensimon, E. M., Ward, K., & Sanders, K. (2000). Reference on p. 3, pp. 151–155.

Early Research Options for New Faculty Members.* Three basic approaches:

1. **Staying the course:** Continuing to work in the area of the Ph.D. dissertation and/or postdoctoral research.
 - a. *Best Case Scenario:* You develop real expertise in your research area and find funding easily because of your strong track record and reputation in the professional community. If you're in a really hot or highly productive area, you build a strong program centered around related work making it easier to have your research team help each other and piggyback on each other's work.
 - a. *Worst Case Scenario:* If you stay in exactly the same track as your earlier work, you may be accused of simply re-doing your dissertation, and you will probably find yourself competing with your former advisor and other well-established faculty for research funding. The research landscape may change leaving you stuck with only one area of expertise.
2. **I've got what you need:** Taking specific tools used in your earlier work (like Java programming or statistical expertise) and applying them in a variety of collaborative projects.
 - a. *Best Case Scenario:* You can explore a variety of fields and projects with collaborators. You develop expertise using your tools and understand them in a deep way because of experience with different applications. You take the lead in larger scale projects by assembling a diverse team.
 - b. *Worst Case Scenario:* You could always be a junior collaborator and fail to develop your own program. Since collaboration is challenging, you could have trouble finding good people to work with. It could be more difficult to get your students working together productively since their projects may be very different from each other.
3. **Changing horses:** Moving into a new research area.
 - a. *Best Case Scenario:* You get some initial funding in the areas related to your previous work to capitalize on your experience. You find a mentor with experience and a track record in the research area you want to go into giving you the chance to build up your expertise and credentials. Eventually you are independently able to secure funding and pursue research in the new area.
 - b. *Worst Case Scenario:* You try to break into the new area on your own or with a weak collaborator. You find yourself unable to secure funding because of your lack of a track record, and you can't establish your program quickly enough for career success.

Some viable options.

- Initially stay the course, but gradually move into other areas after 2-3 years
- Change horses, but begin in collaboration with an established expert. Progressively differentiate your work & take leadership in projects.
- Bring your tools to other projects, but make sure you take the PI role in some of them.

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HOW TO WRITE ANYTHING*

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I write when I'm inspired, and I see to it that I'm inspired at nine o'clock every morning.
(Peter De Vries)

Here's the situation. You're working on a big writing project—a proposal, paper, book, dissertation, whatever—and in the last five weeks all you've managed to get done is one measly paragraph. You're long past the date when the project was supposed to be finished, and you just looked at your to-do list and reminded yourself that this is only one of several writing projects on your plate and you haven't even started most of the others.

If you're frequently in that situation (and we've never met a faculty member who isn't) we've got a remedy for you. First, though, let's do some truth in advertising. Lots of books and articles have been written about how to write clear and persuasive papers, proposals, dissertations, lab reports, technical memos, love letters, and practically everything else you might ever need to write. We're not going to talk about that stuff: you're on your own when it comes to anything having to do with writing quality. All we're going to try to do here is help you get a complete draft in a reasonable period of time, because that usually turns out to be the make-or-break step in big writing projects. Unless you're a pathological perfectionist (which can be a crippling obstacle to ever finishing anything), once you've got a draft, there's an excellent chance that a finished document suitable for public consumption won't be far behind.

We have two suggestions for getting a major document written in this lifetime: (1) commit to working on it regularly, and (2) keep the creating and editing functions separate.**

Dedicate short and frequent periods of time to your major writing projects

See if this little monologue sounds familiar. *"I don't have time to work on the proposal now—I've got to get Wednesday's lecture ready and there's a ton of email to answer and I've got to pick the kids up after school tomorrow...BUT, as soon as fall break (or Christmas or summer or my sabbatical) comes I'll get to it."*

It's natural to give top priority to the tasks that can be done quickly or are due soon, whether they're important (preparing Wednesday's lecture) or not (answering most emails), and so the longer-range projects keep getting put off as the weeks and months and years go by. If a major project has a firm due date, you panic when it approaches and quickly knock something out well below the best you can do. If it's a proposal or paper, subsequent rejection should not

* Chemical Engineering Education, 42(3), 139-140 (2008).

** We didn't invent either technique—you can find variations of both in many references on writing. A particularly good one is Robert Boice, *Professors as Writers*. Stillwater, OK: New Forums Press, 1990.

come as a surprise. If there is no firm due date, the project simply never gets done: the book you've been working on for the last ten years never gets into print, or your graduate students leave school with their research completed but without their Ph.D.s because they never finished their dissertations.

The strategy of waiting for large blocks of time to work on major writing projects has two significant flaws. When you finally get to a block, it's been so long since the last one that it can take hours or days to build momentum again and you're likely to run out of time before much gets written. Also, as soon as the block arrives other things rush in to fill it, such as your family, whom you've been neglecting for months and who now legitimately think it's their turn.

A much more effective strategy is to *make a commitment to regularly devote short periods of time to major writing projects*. Thirty minutes a day is plenty, or maybe an hour three times a week. One approach is to designate a fixed time period on specified days, preferably at a time of day when you're at your peak, during which you close your door, ignore your phone, and do nothing but work on the project. Alternatively, you might take a few 10–15 minute breaks during the day—times when you would ordinarily check your email or surf the Web or play Sudoku—and use them to work on the project instead. Either way, when you start to write you'll quickly remember where you left off last time and jump in with little wasted motion. When you've put in your budgeted time for the day, you can (and generally should) stop and go back to the rest of your life.

These short writing interludes won't make much difference in how many fires you put out each day, but you'll be astounded when you look back after a week or two and see how much you've gotten done on the project—and when a larger block of time opens up, you'll be able to use it effectively with very little warm-up. You can then be confident of finishing the project in a reasonable time...provided that you also take our next suggestion.

Do your creating and editing sequentially, not simultaneously

Here's another common scenario that might ring a bell. *You sit down to write something and come up with the first sentence. You look at it, change some words, add a phrase, rewrite it three or four times, put in a comma here, take one out there...and beat on the sentence for five minutes and finally get it where you want it. Then you draft the second sentence, and the first one is instantly obsolete and you have to rewrite it again...and you work on those two sentences until you're satisfied with them and go on to Sentence 3 and repeat the process...and an hour or two later you may have a paragraph to show for your efforts.*

If that sounds like your process, it's little wonder that you can't seem to get those large writing projects finished. When you spend hours on every paragraph, the 25-page proposal or 350-page dissertation can take forever, and you're likely to become frustrated and quit before you're even close to a first draft.

At this point you're ready for our second tip, which is to *keep the creating and editing processes separate*. The routine we just described does the opposite: even before you complete a sentence you start criticizing and trying to fix it. Instead of doing that, write whatever comes into your head, without looking back. If you have trouble getting a session started, write *anything*—random words, if necessary—and after a minute or two things will start flowing. If you like

working from outlines, start with an outline; if the project is not huge like a book or dissertation and you don't like outlines, just plunge in. If you're not sure how to begin a project, start with a middle section you can write easily and go back and fill in the introduction later.

Throughout this process, you will of course hear the usual voice in your head telling you that what you're writing is pure garbage—sloppy, confusing, trivial, etc. Ignore it! Write the first paragraph, then the next, and keep going until you get as much written as your budgeted time allows. Then, when you come back to the project the next day (remember, you committed to it), you can either continue writing or go back and edit what you've already got—and then (and *only* then) is the time to worry about grammar and syntax and style and all that.

Here's what will almost certainly happen if you follow that procedure. The first few sentences you write in a session may indeed be garbage, but the rest will invariably be much better than you thought while you were writing it. You'll crank out a lot of material in a short time, and you'll find that it's much easier and faster to edit it all at once rather than in tiny increments. The bottom line is that you'll find yourself with a completed manuscript in a small fraction of the time it would take with one-sentence-at-a-time editing.

We're not suggesting that working a little on big projects every day is easy. It isn't for most people, and days will inevitably come when the pressure to work only on urgent tasks is overwhelming. When it happens, just do what you have to do without beating yourself up about it and resume your commitment the next day. It may be tough but it's doable, and it works.

SO YOU WANT TO WIN A CAREER AWARD¹⁶

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The NSF Early Faculty Development (CAREER) Program Award is the most sought-after recognition a new faculty member can receive. Besides being an impressive addition to the recipient's resume, the award gives major bragging rights to his or her department and institution. As soon as most new assistant professors move into their offices and boot up their computers, they are expected to begin work on their CAREER proposals—and if they don't make it on the first attempt they are expected to keep plugging away until they either win the award or are no longer eligible.

When I recently had the pleasure of serving on an NSF review panel,¹⁷ I noticed that certain common mistakes tended to land proposals in the “Sorry—good try, but not quite good enough to get funded” category. If you're a new faculty member planning to go for a CAREER award, you might consider taking several precautions to avoid these mistakes.

According to the NSF program solicitation,¹⁸ CAREER proposals must include “creative, integrative, and effective research and education plans,” and show “excellence in both education and research.” The most common mistake I've seen is discounting the importance of the education part. It appeared that many of the authors of proposals I reviewed worked long and hard on their research plans, then thought briefly about their education plans and wrote one or two cursory paragraphs about sponsoring undergraduate research projects or developing a new graduate course related to the proposal topic. With very few exceptions, those proposals were not funded.

This outcome makes sense if you think about it. Most CAREER applicants have spent at least four years thinking about the research topic of their proposals and are also smart enough to get knowledgeable senior colleagues to review their research plans. Those plans are consequently excellent in most proposals that make it past the first cut, which means that the education plans often determine who gets the awards. If the education plans are hastily or unimaginatively written, the proposals are not likely to be competitive.

Here are several more specific suggestions.

- *Read the program solicitation carefully and follow all instructions.* When the solicitation says that the program wants an integrated plan of research and education, provide exactly that. When it tells you that you must obtain the written endorsement of your department head and your bio must contain no more than 10 references and your project description has a 15-page maximum and you may submit letters of support from prospective collaborators but not reference letters, believe it.
- *After you have outlined your plans, run your ideas by the CAREER contact person in the NSF division or program to which you plan to submit.* This is legal; in fact, NSF program officers expect it. You will find them extremely helpful—they don't want you to waste your time, reviewers' time, and ultimately their time by writing a proposal that doesn't fit their program's goals and guidelines. They might recommend modifications that would make your proposal more suitable for them, or they might suggest sending the proposal to another program for which it would be a better fit.

¹⁶ Revised version of *Chemical Engineering Education*, 36(1), 32-33 (Winter 2002).

¹⁷ I'm sincere about calling the experience a pleasure—sitting in a room full of exceptionally talented people and discussing the pros and cons of clever scholarly ideas for two days is truly enjoyable. If you are ever invited to do it, I'd advise accepting.

¹⁸ <<http://www.nsf.gov/pubs/2005/nsf05579/nsf05579.htm>>.

- *Do a thorough literature review and make sure you cite the most important theoretical and experimental work and most important researchers in the areas covered by the proposal.* Search the literature in the area of the education part as well: if you're proposing a new approach to cooperative learning or distance education or K-12 outreach or the undergraduate laboratory, be sure to find the relevant published work and cite it. Ignoring important research in your proposal reflects poorly on your expertise and looks like you haven't done your homework, and omitting an important researcher will also do very little for your cause, especially if he or she turns out to be a reviewer. Try to avoid negativity in your citations, proposing to build on previous work rather than correcting it: "*Frobish [1998] attempted something similar but got it all wrong—my work will repair his blunders*" is likely to backfire on you. You'd be surprised at how often those important people will get to review your proposals and how surly they can become if they don't see their names in the reference list or their work is trashed.
- *Pay attention to assessment, especially in the education plan.* Be specific about how you will know whether your research and education plans were successful. State your hypotheses, itemize the data you plan to collect, and make explicit connections between the hypotheses and the data. If you're trying something novel in your education plan (or if your research involves teaching and learning) and your "assessment" consists only of surveying students to see how they liked it, you will not get a warm reception from the reviewers. What they want to know is how you plan to demonstrate that your intervention improved learning or skill development or retention in engineering or science.
- *Don't overreach.* If you submit a proposal for a five-year \$400,000 study and propose to do research that would clearly require a large team of investigators and a much higher level of funding, it will probably not be funded, especially if you're also going to be teaching three courses a semester throughout the award period. You're much better off proposing something of more limited scope that you have a reasonable chance of accomplishing.
- *Don't forget that you're writing a career development plan and not just a research proposal.* In the project description and/or the biographical sketch, take a little time to spell out your long-range goals and how the proposed work will further them.
- *Push your credentials.* A biography in a proposal is not a good place to be modest. Include anything that suggests your ability to carry out your plans successfully—prior job and research experience, publications (summarize the relevant findings if they're not in your project description), awards, collaborations with leaders in the field, and so on. Since you can't include reference letters in the proposal, the only one in a position to blow your horn is you—and you can be sure that your competitors will be blowing theirs.
- *Get internal feedback before submitting the proposal.* Beg, bribe, do whatever it takes to get knowledgeable colleagues to act like picky NSF reviewers and bleed red ink all over your proposal draft. Ask them to focus on the things that the real reviewers will be rating: (a) the "intellectual merit of the proposed activity," (b) the "broader impacts of the proposed activity," (c) the level of integration of research and education, and (d) the degree to which the work will "broaden opportunities and enable the participation of all citizens—women and men, underrepresented minorities, and persons with disabilities."¹⁹ Revise the proposal to take into account the criticisms and suggestions you get, and *then* send it in.

Doing all these things may not make your proposal a guaranteed winner, but it will unquestionably improve your odds. Good luck.

Mentoring for effective teaching

Why spend time on teaching improvement?

- It's a crucial part of the university mission
- Improve recruitment and retention
- Improve student ratings, minimize complaints
- Improve alumni and industrial relations
- Better meet ABET criteria
- Effective teaching is less stressful than ineffective teaching
- Effective teaching may not require much more time than ineffective teaching
- Good habits acquired in the first few years of teaching tend to stick

Mentoring tips

- Visit mentee's class. Don't rescue.
- Invite mentee to observe your class.
- Arrange for mentee to observe good teachers in and out of your department.
- Debrief observations in regular meetings.
- Provide feedback on tests and assignments. (Watch out for tests that are too long.)
- Share your class materials and talk about what you do.
- Encourage mentee to use variety in class activities (see "Learning by Doing," <<http://www.ncsu.edu/felder-public/Columns/Active.pdf>>).
- Suggest a visit to the campus teaching center.
- Direct mentee to useful book on teaching (such as some of the references on p. 2).
- Suggest a mid-semester evaluation of the class. (Mentees are likely to wait until the end of the semester, at which point it's too late to get corrective feedback.)
- Suggest videotaping a lecture and reviewing the tape with a consultant.

Debriefing a classroom visit

- Ask the mentee how he/she thinks the class went. Listen carefully to the response.
- Often mentees will be supercritical of themselves. Point out the things that *did* work if they don't mention them.
- Ask the mentee "What could you do differently to improve the class?" Help him/her focus on one or two things to work on. Tell about similar problems you've had in your teaching.
- End on a positive note with an encouraging comment.

Teaching resources

Resources in Engineering and Science Education is Rich Felder's homepage. Go to <<http://www.ncsu.edu/felder-public>> and click on "Education-Related Articles" to find articles on a whole range of teaching topics, including articles specifically addressed to new faculty members. Also see

TEACHING TEACHERS TO TEACH: THE CASE FOR MENTORING¹⁹

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Teaching—like medicine, auto mechanics, professional basketball, and chemical engineering—is a craft. There are distinct skills associated with its practice, which people are not born knowing. Some people are naturals (in education, the so-called “born teachers”) and seem to develop the skills by intuition; most are not, however, and need years of training before they can function at a professional level. Doctors, mechanics, basketball players, engineers, and teachers at the K-12 level routinely get such training—but not college professors, most of whom get their Ph.D.'s, join a faculty, and set off to teach their first course without so much as five seconds on how one does that.

Not realizing that there are alternatives, new professors tend to default to the relatively ineffective teaching methods they experienced as students. Although they work hard to make the course material as comprehensible and interesting as they can, many of them consistently see only glazed or closed eyes during their lectures, terrible test grades, and evaluations suggesting that the students liked neither the course nor them. Some of them eventually figure out better ways to do their job; others never do, and spend their careers teaching ineffectively.

The absence of college teacher training is not an unrecognized problem, and at least some institutions are trying to address it. Various schools offer graduate courses on teaching, hold faculty teaching workshops lasting anywhere from one morning to several days, and provide teaching consultants to critique end-of-course evaluations and videotaped lectures. However, while such programs are worthwhile and should be standard on every campus, there are limits to what they can accomplish. You can't turn someone into a skilled professional in a one-semester course, much less a three-day workshop or a two-hour consultation. True skill development only occurs through repeated practice and feedback.

Fortunately, the resources needed for effective training of college teachers are readily available on every campus. Most academic departments have one or more professors acknowledged to be outstanding teachers by both their peers and their students. They have learned how to put together lectures that are both rigorous and stimulating and homework assignments and tests that are comprehensive, challenging, instructive, and fair. They have found ways to motivate students to want to learn, to co-opt them into becoming active participants in the learning process, to help them develop critical and creative thinking and problem-solving abilities.

Unfortunately, under our present system, faculty members may collaborate on research but generally don't even talk to each other about teaching. Most professors must therefore plod through the same lengthy trial-and-error process when learning how to teach, seldom benefiting from the knowledge and experience of their colleagues.

Here is a proposal for what I believe might be a better way.

- *All new professors should team-teach their first two courses with colleagues who have earned recognition as excellent teachers and who agree to function as mentors.*
- *The first course would begin with the mentor taking most of the responsibility for laying out the syllabus and instructional objectives, planning and conducting the class sessions, and constructing the homework assignments and tests. Both professors would attend most classes and have regular*

¹⁹ *Chem. Engr. Education*, 27(3), 176–177 (1993).

debriefing sessions to go over what went well, what didn't go so well and why, and what to do next. The protégé would gradually take over more of the course direction, ending up with primary responsibility by the end of the course

- *In the second course, the protégé would take sole responsibility for planning and delivering the course. The mentor (who may be the mentor from the previous semester or a different professor) would function entirely as a consultant, observing class sessions and participating in debriefing meetings.*
- *When planning teaching assignments, the department head should recognize that team-teaching a course and serving as a mentor to a new instructor is a heavier time burden than simply teaching a course alone, and should provide a suitable reduction in the mentor's other responsibilities. Ideally, the mentor would get additional compensation like a summer stipend, release time, or a travel grant.*

The potential benefits of this plan are evident. New professors would get a jump-start on learning their craft rather than having to rely entirely on painfully slow self-teaching. The experience would likely energize the mentors as well, stimulating them to reexamine and improve their own teaching as they provide active guidance to their junior colleagues. The overall quality of the department's instructional program would inevitably improve. Caution, however—mentoring is also a craft, with its own assortment of skills and pitfalls. As it happens, teacher educators have explored this subject for decades and have developed a variety of methods to make mentoring successful.²⁰ If you find yourself serving as a mentor, formally or informally, consider the following guidelines:

- *When you teach, you often do subtle things that you learned by experience and you also occasionally make errors in judgment when handling classroom situations. The inexperienced observing protégé is likely to miss it all. Go over items in both categories during debriefings*
- *When protégés get into trouble in class, fight off the temptation to rescue them immediately. Instead, prompt them in debriefings to figure out for themselves what went wrong and how to fix it.*
- *Offer suggestions, not prescriptions. What you lay out for protégés explicitly is unlikely to stick. What they discover for themselves with your help, they will own.*
- *Don't try to turn your protégés into clones of you. Instead, help them find the teaching style best suited to their own strengths and personalities and encourage them to develop and perfect that style.*

Only one step remains to complete the process. When a department colleague—perhaps one of your protégés—starts to win teaching awards, talk her into serving as a mentor for the next faculty hire. When she protests that she doesn't know how, pass along this column and add that while she's figuring it out you'll be happy to be her mentor.

²⁰I am indebted to Dr. Rebecca Brent, my mentor on all matters related to teacher education, for many of the ideas that follow. See also T.M. Bey and C.T. Holmes, *Mentoring: Contemporary Principles and Issues*, Reston, VA, Association of Teacher Educators, 1992.

HOW TO PREPARE NEW COURSES WHILE KEEPING YOUR SANITY*

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Think of a two-word phrase for a huge time sink that can effectively keep faculty members from doing the things they want to do.

You can probably come up with several phrases that fit. “Proposal deadline” is an obvious one, as are “curriculum revision,” “safety inspection,” “accreditation visit,” and “No Parking.” (The last one is on the sign posted by the one open space you find on campus minutes before you’re supposed to teach a class, with the small print that says “Reserved for the Deputy Associate Vice Provost for Dry Erase Marker Procurement.”)

But the phrase we have in mind is “new prep”—preparing for and teaching a course you’ve never taught before. This column describes the usual approach, which makes this challenging task almost completely unmanageable, and then proposes a better alternative.

Three steps to disaster, or, how not to approach a new course preparation

1. *Go it alone.* Colleagues may have taught the course in the past and done it very well, but it would be embarrassing to ask them if you can use their materials (syllabi, learning objectives, lecture notes, demonstrations, assignments, tests, etc.), so instead create everything yourself from scratch.
2. *Try to cover everything known about the subject in your lectures and always be prepared to answer any question any student might ever ask.* Assemble all the books and research articles you can find and make your lecture notes a self-contained encyclopedia on the subject.
3. *Don’t bother making up learning objectives or a detailed syllabus—just work things out as you go.* It’s all you can do to stay ahead of the class in your lectures, so just throw together a syllabus that contains only the course name and textbook, your name and office hours, and the catalog description of the course; invent course policies and procedures on a day-by-day basis; and decide what your learning objectives are when you make up the exams.

Here’s what’s likely to happen if you adopt this plan. You’ll spend an outlandish amount of time on the course—ten hours or more of preparation for every lecture hour. You’ll start neglecting your research and your personal life just to keep up with the course preparation, and if you’re unfortunate enough to have two new preps at once, you may no longer have a personal life to neglect. Your lecture notes will be so long and dense that to cover them you’ll have to lecture at a pace no normal human being could possibly follow; you’ll have no time for interactivity in class; and you’ll end up skimming some important material or skipping it altogether. Your policies regarding late homework, absences, missed tests, grading, and cheating will be fuzzy and inconsistent. Without learning objectives to guide the preparation, the course will be incoherent,

* *Chem. Engr. Education*, 41(2), 121–122 (Spring 2007).

with lectures covering one body of material, assignments another, and tests yet another. The students' frustration and complaints will mount, and the final course evaluations will look like nothing you'd want to post on your blog.

There's a better way.

A rational approach to new course preparation.

1. *Start preparing as soon as you know you'll be teaching a particular course.*

Dedicate a paper file folder and a folder on your computer to the course and begin to assemble ideas and instructional materials. While you're teaching the course, continue to file ideas and resources as you come up with them.

2. *Don't reinvent the wheel.*

Identify a colleague who is a good teacher and has taught the course you're preparing to teach, and ask if he/she would be willing to share course materials with you. (Most faculty members would be fine with that request.) In addition, try finding the course on the MIT OpenCourseWare Web site (<http://ocw.mit.edu>) and download materials from there. Open courseware may contain visuals, simulations, class activities, and assignments that can add considerably to the quality of a course and would take you months or years to construct from scratch. The first time you teach the course, borrow liberally from the shared materials and note after each class what you want to change in future offerings. Also consider asking TA's to come up with good instructional materials and/or inviting students to do it for extra credit.

3. *Write detailed learning objectives, give them to the students as study guides, and let the objectives guide the construction of lesson plans, assignments, and tests.*

Learning objectives are statements of observable tasks that students should be able to accomplish if they have learned what the instructor wanted them to learn. Felder and Brent recommend giving objectives to students as study guides for tests^{21,22} and show an illustrative study guide for a midterm exam.²³

Before you start to prepare a section of a course that will be covered on a test, draft a study guide and use it to design lessons (lectures and in-class activities²⁴) and assignments that provide instruction and practice in the tasks specified in the objectives. As you get new ideas for things you want to teach, add them to the study guide. One to two weeks before the test, finalize the guide and give it to the students, and then draw on it to design the test. The course will then be coherent, with mutually compatible lessons, assignments, and assessments. Instead of having to guess what you

²¹R.M. Felder and R. Brent, "Objectively speaking," *Chem. Engr. Education*, 31(3), 178–179 (1997), <http://www.ncsu.edu/felder-public/Columns/Objectives.html>.

²²R.M. Felder and R. Brent, "How to teach (almost) anyone (almost) anything," *Chem. Engr. Education*, 40(3), 173–174 (2006), <http://www.ncsu.edu/felder-public/Columns/TeachAnything.pdf>.

²³R.M. Felder, Study guide for a midterm exam in the stoichiometry course, <http://www.ncsu.edu/felder-public/cbe205site/studyguides/studyguide2.htm>.

²⁴R.M. Felder and R. Brent, "Learning by doing," *Chem. Engr. Education*, 37(4), 282–283 (2003), <http://www.ncsu.edu/felder-public/Columns/Active.pdf>.

think is important, the students will clearly understand your expectations, and those with the ability to complete the tasks specified in the objectives will be much more likely to do so on the test. In other words, more of your students will have learned what you wanted them to learn. The objectives will also help you avoid trying to cram everything known about the subject into your lecture notes. If you can't think of anything students might do with content besides memorize and repeat it, consider either dropping that content or cutting down on it in lectures, giving yourself more time to spend on higher-level material.

4. *Get feedback during the course.*

It's always a good idea to monitor how things are going in a class so you can make mid-course corrections, particularly when the course is new. Every so often collect "minute papers," in which the students anonymously hand in brief statements of what they consider to be the main points and muddiest points of the class they just sat through. In addition, have them complete a survey four or five weeks into the semester in which they list the things you're doing that are helping their learning and the things that are hindering it. Look for patterns in the responses to these assessments and make adjustments you consider appropriate, or make a note to do so next time you teach the course.

5. *Do everything you can to minimize new preps early in your career, and especially try to avoid having to deal with several of them at a time.*

Some department heads inconsiderately burden their newest faculty members with one new prep after another. If you find yourself in this position, politely ask your head to consider letting you teach the same course several times before you move on to a new one so that you have adequate time to work on your research. Most department heads want their new faculty to start turning out proposals and papers in their first few years and will be sympathetic to such requests. It might not work, but as Rich's grandmother said when told that chicken soup doesn't cure cancer, it couldn't hurt.

Faculty Guide to Time Management²⁵

or

How to simultaneously write proposals, do research, write papers, teach classes, advise students, grade papers, serve on committees, eat, sleep, and occasionally visit your family.

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- Set 2–3 year goals along with reasonable steps necessary to reach them. For example
 1. Stay in good health
 - Exercise 3 times a week
 - Get sufficient sleep
 - ...
 2. Get promoted to associate professor
 - Write __ papers in refereed journals
 - Write __ proposals.
 - ...
 3. Learn to wind-surf
 4. Remain married
- Prioritize goals. Find an order that satisfies you now—you can always change it. *Suggestion:* Make staying in good health top priority—it will make the others possible.
- Develop a Gantt chart to track your progress in meeting your professional productivity goals.
- Create and frequently update a to-do list. Use a 4-quadrant system²⁶:
 - I. Urgent and important. (Deadline-driven activities that further your goals.)
 - II. Important but not urgent. (Long-term professional, family, and personal activities that further your goals.)
 - III. Urgent but not important. (Much e-mail, many phone calls and memos, things that are important to someone else but don't further your goals.)
 - IV. Neither urgent nor important. (TV, computer games, junk mail.)Commit to several hours a week on Quadrant II items, and cut down on time spent in Quadrants 3 and IV.
- Work on Quadrant I and II items when you're at peak efficiency.
- If you're trying to write a book, put it on the Quadrant II list, otherwise it will never get written.
- Keep a log for time spent writing (30-45 minutes daily or longer blocks 2-3 times a week) and preparing for lectures (2 hours or less for each lecture hour) until the work pattern becomes a habit.²⁷

²⁵ P.C. Wankat & F. S. Oreovicz, *Teaching Engineering*, New York: McGraw-Hill, 1993. Chapter 2 contains excellent ideas on efficiency, some of which are included in this list.

²⁶ S.P. Covey, A.R. Merrill, and R.R. Merrill, *First Things First*, New York: Simon & Schuster, 1994.

²⁷ R. Boice, *Advice for New Faculty Members*, Boston: Allyn and Bacon, 2000.

Office hours and mail

- Set office hours and let students know you will be faithful in keeping them. When students come to see you outside of office hours and you're busy, ask them if they can come back during office hours or make an appointment.
- Be mindful of time spent reading and responding to email. Limit response to email to one or two time periods each day. If you encourage email from students, have a special address set up for each class. Read and respond to student email no more than once or twice a day and let students know when you are likely to respond.
- Learn how to get people out of your office when you don't have the time to spend. ("Good talking to you, but I've got something I need to attend to now.")
- Meet in the other person's office, not yours. (Easier to get away.)
- Handle each mail item once, if possible. Open, respond, file, or discard.

Working smarter

- Schedule blocks of uninterrupted time to complete larger tasks. If necessary, work at home, in the library, or at an out-of-the-way desk in the department.
- Learn to type if you don't know how already and do your own manuscript composing on a word processor.
- Avoid perfectionism—don't keep revising until the deadline, and don't revise unimportant letters and memos at all. Be aware of the point of diminishing returns.
- Be careful of computer graphics—they're a time sink.
- Piggyback work—use the same notes or manuscripts for multiple applications.
- Keep research projects in the pipeline. Well before a project ends, start writing the next proposal.
- Reward yourself—take breaks.

Learn how and when to say no!

- Always give yourself a chance to think about a commitment overnight before agreeing to it. The time will give you a chance to see if it fits in with your goals and priorities.
- Keep an updated list of all your service responsibilities. Refer to it when the next request comes in.
- Check out service requests with your mentor or department head. Consider showing the latter your list if he or she is the one making the request.
- Practice declining requests:
 1. "That sounds interesting, but can I call you back tomorrow? I need a little time to think about it before I can decide."
 2. "I'm sorry, but I've just got too many other commitments right now."
 3. "I'd love to help, but I really don't have time for a formal commitment. Maybe we could just talk once or twice."
 4. "I'm afraid I'm not the best person to help you with this. Have you thought about asking _____?"
(Penny Gold)