

Learning to Juggle: A Model for New Engineering Faculty Development

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Introduction

New faculty are faced with many challenges, not the least of which is learning to juggle the many aspects of their new careers. While many universities and colleges offer new faculty orientations, many such activities feature an endless array of “talking heads” from administrators, or perhaps “how to” lectures on the mechanics of pedagogy. Having discussed such workshops with other new faculty (and, we admit, even having delivered portions of them – guilty!) we have anecdotal data that indicate such workshops are generally tedious and not useful.

New faculty, of course, need many things to be successful but there is strong evidence to suggest that many of these needs are not met by a traditional faculty orientation. Austin and Sorcinelli [1] tell us that the biggest gaps are related to needing to develop teaching skills, finding colleagues and learning to juggle the multiple demands of their new positions.

At Penn State’s college of engineering, we have modified our new faculty development activity away from the “talking head” model to a streamlined set of discussions amongst the new faculty and selected college faculty. This format allows for both the new faculty and the experienced faculty to share useful tactics regarding all aspects of their new careers (not only teaching, but with an emphasis on teaching), as well as providing the new faculty a leg up on establishing colleagues in their new work environment.

This paper describes the faculty development model we have developed at PSU, including detailed descriptions of each workshop segment. We will also discuss several of the guiding philosophies for the workshop; namely, use the workshop as a way to introduce resources rather than provide endless details on “how to” do this and that; keep it streamlined and “leave them wanting” more; and follow up with activities sprinkled throughout the academic year.

Guiding Assumptions

The faculty development model we present is based upon a set of assumptions that apply to our institution. In section “Getting Started : A Framework for Developing Your Faculty Development Model” of this paper we discuss a general approach to creating a faculty development model at your own institution.

1. We define new faculty as any faculty member, tenure-track or otherwise, in our college who has joined the college at any of our university’s locations in the year prior to the workshop date. We also include “new faculty” from the prior two years who did not attend the new faculty workshop in their initial years. The vast majority of these faculty are at the assistant professor level, however we invite all faculty regardless of level and encourage them to attend. As the reader will see in our section “Workshop Goals”, even an experienced faculty member can benefit from parts of our agenda.
2. As at most institutions classified in the Carnegie Systems as “Research University I” [2], faculty must learn to operate in three areas in order to be successful at our institution: teaching, research and service. Perhaps one of the most difficult aspects of a faculty member’s career is learning to balance the demands of these responsibilities. Further, recent research tell us that more and more new faculty are part of dual-career couples, each struggling and trying to address the demands of their positions [3]. An obvious implication for our workshop was to address this issue of balance – not only amongst these three aspects of career, but also between career and personal matters [4].
3. New faculty at our institution begin their careers with greater knowledge about and experience with teaching and learning than new faculty that we encountered as few as three and four years ago. We do not intend to indicate any sort of general trend with this statement, but only mean to describe the new faculty in our college. More and more of these faculty – including the assistant professors -- come to us with one or two years teaching experience, even at the university level. This of course doesn’t preclude the need to address teaching and learning during the workshop, however knowing that many of our attendees have that experience allows us to take a different approach to the workshop than we might otherwise.

First, because faculty have practice in the classroom we can purposefully create workshop activities that build upon their prior knowledge of and classroom experiences. A faculty member who has tried collaborative experiences in his or her own classroom is much more likely to be interested in and retain useful strategies from our workshop’s discussion of creating and managing effective collaborative learning experiences than one who has not. Secondly, because so many of these faculty have teaching experience, we can consistently call upon them to share their experiences and ideas with other attendees thus creating a more active learning environment as well as enriching the content beyond what the presenters bring.

4. Any faculty development activity must take into consideration the characteristics of its audience. New faculty members tend to be highly motivated and accomplished professionals. These are individuals who have not only completed a Ph.D. but also have chosen to go against the grain and pursue an academic position when positions in industry abound and generally pay better [3]. Given these characteristics, a faculty development curriculum should be designed to be challenging and stimulating. This provides us with an even stronger reason to structure faculty development so we solicit and build upon the thoughts, ideas and opinions of this highly talented group.
5. At a research university such as ours, new faculty will have opportunities beyond this new faculty workshop to educate themselves and be educated about conducting research successfully. Our college's office of research and graduate studies offers an annual daylong workshop that addresses funding sources, proposal writing, grant management and other pertinent research topics. With these resources available and knowing that a great deal of time is required to address this topic adequately, we can choose to spend much less time on research and more on teaching and service.
6. Conversely to the previous item, this workshop may be one of the few times that we can address matters of teaching and learning with faculty. Our college offers many other faculty development opportunities that address current teaching and learning topics. However, the new faculty workshop offers a unique opportunity to discuss teaching and learning topics in an environment before these faculty are embroiled in the day-to-day concerns that often prevent them from attending other development activities. In other words, because the attendance rate for the new faculty workshop is so high – and we'll discuss how we achieve this in section "Credibility" – we have more or less a captive audience and we should take advantage of it!

There are other good reasons for us to focus the workshop on teaching and learning. In a study on new faculty careers from the late 1970's Fink found that new faculty were often overwhelmed by their teaching responsibilities [5]. And over a decade later, another study found that there was no significant change for the better [6]. Both studies indicated that faculty wished to teach well, but the latter study in particular found that new faculty tended to teach by lecturing, feel concerned about getting the content right, and worried about teaching evaluations. Overall, Boice found new faculty were running hard just to stay in one place, especially in terms of their teaching responsibilities. Such research seems to indicate that new faculty need tools to help make their teaching activities more fulfilling and successful; this tenet has been critical in our planning and implementation of the new faculty workshop.

7. A new faculty workshop cannot possibly address *all* the concerns that new faculty have regarding their positions. After several iterations, we have adopted a one and a half-day format for our workshop. Even if we scheduled a three or four-day workshop, it seems unlikely that we could adequately address all the concerns raised in the literature regarding new faculty [3, 4, 7]. And of course, even if we tried the faculty would be so beaten down

by such an experience, they would most likely not benefit from all this so-called valuable information. So, we plan our agenda realizing it is fruitless to try and “cover” it all. With that in mind, we set priorities, choose agenda topics appropriate to those priorities, and focus our remarks and the workshop supporting materials on resources that faculty may use and call upon once the workshop is finished.

Workshop Goals

The goals for this new faculty workshop stem directly from the above assumptions and are as follows.

1. Faculty will be aware of resources available throughout the college and university to aid them in all aspects of conducting successful faculty careers (e.g. college resources for finding research funds, college and university funding sources for teaching innovations, where to go to learn more about various teaching and learning topics, library researching capabilities).
2. Faculty will meet and have the opportunity to network in both professional and informal settings with college personnel from many positions and disciplines. Specifically:
 - other new faculty who are in similar situations as theirs,
 - faculty who are engaged in teaching and learning innovations,
 - experienced faculty members from many departments throughout the college, and
 - the college’s deans and key administrators.
1. Faculty will be able to effectively implement basic teaching activities for the following strategies and skills:
 - Writing course syllabi including specific statements of student learning objectives
 - Collaborative learning,
 - Project-based learning
1. Faculty will learn strategies for balancing the demands of their careers as well as their careers and personal lives.

Agenda, Workshop Format & Logistics

Fink [7] describes several models for conducting faculty “orientations”. One criterion by which these models vary is when they are held during the academic year. Our workshop is offered just prior to the beginning of the fall semester for a day and a half. We chose this timing as most of our new faculty positions begin in August. Other institutions validly choose to offer new faculty orientations in an ongoing fashion throughout a first term or academic year. Such programs have the advantage of more frequent and ongoing contact with new faculty. Our decision to offer the workshop prior to the semester is based upon the increased time constraints that are

introduced during the course of the semester. Prior experience with other during-semester faculty development activities indicate it is both difficult to choose a time when the targeted audience can attend (assuming you wish to avoid weekends), and even when a time is determined, faculty find it difficult to break away from other demands to attend these sessions.

We purposively choose workshop meeting locations that will expose new faculty to different portions of the college and the campus. We have held sessions in one of the college's main conference rooms, one of the university teaching and learning centers, academic computing labs, and special college teaching and learning locations. We hope that by familiarizing the new faculty with a variety of campus facilities, they will be more aware of what is available to them for their own activities.

A Sample Agenda

The complete agenda for our most recent workshop is shown in Figure 1¹. The intent of this paper is not necessarily to suggest the exact topics one should address in a new faculty workshop, but rather to describe a process for developing a workshop that meets your institution's needs. Nevertheless, for completeness sake we briefly describe each session's contents. Note that all sessions are structured to employ active learning techniques such as role play, discussion, small groups, and problem solving.

- “What do you want for your students?”
There are so many aspects to creating a good learning situation for students, but one aspect that most experts agree upon is that teaching and learning will be improved if faculty members set clear learning objectives for their courses. This session is designed to get new faculty to think about their learning objectives for the courses they will teach. We ask faculty to think about and record what they want their students to be able to do when they finish their course. We use the answers to these questions to describe the process of writing good instructional objectives [8] and then discuss and develop examples of how this guides both teaching and testing. Additionally, we provide faculty with many examples of good instructional objectives, and course syllabi.
- “Teaching and Learning Styles”
There are many different ways to describe an individual's learning styles [9]. In this session, we introduce participants to the concept of learning styles by having them complete a learning style indicator from Kolb or Felder [10]. We then use this as a basis for discussing how knowledge of learning styles should influence ones teaching. We emphasize that, as a teacher one cannot cater to every learning style all the time – nor should one even try. But rather an awareness that these different styles exist can help us to understand the need to vary our teaching strategies to appeal to the various styles at different times.
- “Getting Started: Tips on Balancing Your Job and Your Life”
While our new faculty workshops have varied some, we have included some version of this session in every instance. Our panels always include faculty members with a variety of

¹ The agenda includes the titles of all the presenters, however we have removed their names to preserve privacy.

backgrounds and experience levels. Faculty panel members represent many departments; some are tenured others are pre-tenure, and the panel always includes at least one department head or associate dean. Panel members are asked to come prepared to discuss the session topic. Each panel member makes a brief introductory statement and then we open the session up to questions and comments from our new faculty participants. In this particular session, the panel shared tips and discussed strategies for not only juggling the responsibilities of one's job but also balancing professional and the personal lives. Past panel sessions have addressed such topics as creating synergy between teaching and research, and balancing all aspects of ones' professional career.

- “Advising Students”

While advising duties vary across our departments, we felt it was important for our new faculty to at least know where to go with advising questions they may have. In our college, during the first two years of their programs students are advised at the engineering advising center. Once students enter a major, they are assigned an advisor in that department. For this session, we ask a representative from the general engineering advising center as well as one departmental advisor to address student advising needs.

- “Research and Graduate Studies”

As previously mentioned, faculty attend a full day workshop on building a successful research program later in the fall semester. The purpose of our “Research” session during the new faculty workshop is to announce and promote the full-day workshop and allow the new faculty to meet the important college personnel for obtaining and managing funding and conducting research.

- “Engineering Education Walk-About”

This roving session allows the new faculty to see the various educational facilities and programs that exist in our college. By providing new faculty with a tour of some of these sites, we hope to make them aware of innovative teaching and learning activities that have succeeded and perhaps give them ideas of how they can “bootstrap” on some of these existing programs and facilities.

- “Creating and Managing Effective Collaborative and Active Learning Experiences”

In this session, we address many methods for creating active and collaborative learning activities. While we specifically set aside this time to explore these topics thoroughly, in actuality active and collaborative learning techniques are always discussed in prior sessions (e.g. Learning Styles and Engineering Education Walk-About). For active learning, we focus our time on modeling specific examples of active learning techniques such as question-asking, small-group problem solving and conducting in-class discussions. For collaborative learning, new faculty work through an activity where they must create teams from a fictional class list and then discuss the issues they uncover in this process. This exercise leads to discussions on the factors one must consider when creating teams (such as issues associated with differences in team member motivation levels, and gender balancing) as well as designing projects appropriate for teamwork. We then work with faculty to help them be able to “teach” their classes how to work effectively in teams, emphasizing the point that just because we put them in groups, they won't necessarily work as a “team”. We recognize that we can only scratch the surface of these topics in this session, so all session

activities are accompanied with many examples and references to further resources on the topic.

- “Classroom Learning Environments”

This session is centered around the Penn State produced "In Their Own Words" video and is designed to engender discussion, thought and action among faculty members on what engineering students experience in the classroom, what responsibility faculty members have for the learning environment, and how faculty can positively impact the learning environment. “In their own words” aims to improve the learning environment and is designed to help faculty identify and address "underground" climate issues.

Establishing Credibility

An important contributor to the success of our new faculty workshops has been our effort to establish workshop credibility in the eyes of new faculty. We worked on establishing credibility in a variety of ways.

- It is pretty safe to assume that a new faculty member’s life will be somewhat crazy just before he or she starts the fall semester. Moving, settling oneself (and potentially a family), preparing for a new semester at a new place all make for a busy time. A day and a half workshop seems like a big time commitment in the midst of these other pressures and obligations. To boost the priority of the new faculty workshop in this scheme, our dean of the college invites the new faculty to attend the workshop. In this invitation the dean describes the workshop, the dates and times and introduces the recipient to the main workshop coordinators. All subsequent correspondence comes from the workshop coordinators.

In addition to his initial invitation, the dean delivers a welcome message to new faculty to begin the workshop, and continues to participate in workshop events throughout the day and a half. Additionally, the associate deans of undergraduate studies and graduate studies and research also participate in workshop activities. Of course this not only lends credibility to the activity but provides an important opportunity for new faculty to interact with these key college players.

- As previously described, the workshop is coordinated and primarily delivered by directors of two teaching and learning oriented centers in the college of engineering. These individuals bring a combined set of qualifications that strengthen the workshop’s overall credibility. One co-coordinator is the director of Instructional Services for our college. This individual brings with her a combination of professional education and engineering experiences. Her Ph.D. in education means that she is able to discourse on various areas of educational research to support the workshop’s pedagogical discussions and activities. This combination of coordinators for the workshop provides the necessary expertise to conduct such an activity while also bringing the credibility to help establish the activity (by way of its deliverers) as a meaningful one.

The other co-coordinator is the director of the Leonhard Center for the Enhancement of

Engineering Education is a tenured full professor in mechanical engineering who has over 10 years experience in creating and implementing innovative educational experiences in our college. Thus he brings not only a great deal of interest and expertise in teaching and learning, but also has a highly respected and lauded technical research agenda. This research qualification is critical as this makes it less likely that this individual would be dismissed as “one of those educational specialists who couldn’t possibly know anything about teaching engineering”.

- Finally, we round out our credibility efforts by including a variety of well-established and respected faculty from many of the college’s disciplines as co-presenters. New faculty see in these presenters that faculty from multiple areas are engaged in concerted efforts to improve teaching and learning, have the opportunity to meet numerous established faculty members and establish potentially useful contacts, and gain broader perspectives on agenda topics than would be available from simply the main presenters.

Getting Started : A Framework for Developing Your Faculty Development Model

The new faculty development workshop we have described is one that seems to be working for us. At your institution, you may need a different model – we aren’t suggesting that you can or should adopt this one lock, stock and barrel. We are suggesting, however, that you consider similar factors as the ones we have described in this paper. Namely,

- Who are your new faculty and what characteristics do they have? Do they come in knowing a lot about teaching already?
- What sort of institution is yours? Ours is a large, research institution, thus we could correctly assume that faculty would have other opportunities to prepare themselves for a research career, or else they have already started one (and that’s one of the reasons they were hired here). The other side of that coin is that this is definitely a prime opportunity to let these folks know, that a: teaching is important too, b: here’s a “primer” on teaching and learning, and c: that there are resources available to you to help with your teaching.

Your institution’s priorities may be totally different, and thus your new faculty workshop would undoubtedly have a different look than ours – and that’s as it should be.

- What do new faculty need? Chances are you won’t have the luxury of being able to ask the incoming set of new faculty this exact question before they arrive, but you can query recent hires as well as recently tenured faculty as to what would have been most useful for them when they began. While such data may be gathered via a survey, conducting one or more focus group sessions with targeted faculty members may provide richer answers to these questions.

While other faculty who have fairly recently been in the “new hire’s” shoes offer an invaluable perspective on new faculty needs other individuals in your organization may also have useful information. Think about your organization and include dean’s and department heads that can contribute to your understanding of new faculty needs.

- What programs already exist to support or orient new faculty either for your college or department or perhaps for the university as a whole? New faculty can possibly get “over-oriented” – especially during the week or two just prior to the beginning of the term. On our campus all new faculty are invited to university-wide orientation sessions and additionally are required to attend a session to familiarize them with their benefits. Find out what happens in these sessions. Once you have determined what new faculty needs are already being met by these other opportunities, then you can decide if something else is needed, and if so design it so it fills a unique need.
- What are the overall priorities of your organization in terms of faculty roles and responsibilities? These certainly may have come up as you addressed the questions posed above, however, if not they should be considered as you develop your agenda.

Workshop Impact and Future Possibilities

By considering the questions we outlined above, we have developed the described new faculty workshop. Our decision to continue to pursue this basic model is based not only upon our satisfaction with the workshop, but from workshop evaluation data as well. The assessment results from the most recent workshop (August 1999) indicate a high rate of satisfaction amongst the twenty-four attending faculty.

To assess the workshop, we asked participants to rate the usefulness of each session on a scale of one to five. A rating of one indicated the participant had “no impression” of the session (and may not have been present for that session), two meant the session was considered “not useful”, three indicated “mildly useful”, four indicated “useful”, and a five -- the highest rating – meant the participant found the session to be “very useful”. Nine of the ten sessions assessed were rated four or higher meaning that participants found the sessions somewhere between “useful” and “very useful”. The overall range of session ratings was 3.5 (“Research and Graduate Studies”) to 4.6 (“Zeroing in on Learning”). Written comments indicated that participants felt that the session on research was too rushed and at too high a level to be very useful. We will, of course, consider this feedback for next year’s workshop.

We realize, of course, the limitations of any new faculty experience that occurs once prior to the beginning of the semester. Workshop timing is a major differentiating component of the new faculty orientation models described by Fink [7]. We’ve already described our reasoning for holding the workshop before the semester begins – essentially it is a question of when new faculty would have the time to attend. The downside of our model is that it occurs before faculty are actually in ongoing contact with students and actively addressing and solving teaching and learning problems. New faculty, however, are provided with many other opportunities for continued professional development for teaching and research both within the college and also at the university level. The co-sponsors of the engineering workshop, the Leonhard Center and Instructional Services, offer ongoing professional development workshops throughout the academic year. These workshops are offered to all college faculty and recently have addressed such topics as “Grading and Assessment” and “Effective Uses of Technology in the Classroom”. Additionally, university-level organizations such as the Center for Excellence

in Teaching and Learning and the Schreyer Institute for Innovations in Learning offer ongoing faculty development activities.

Faculty who are just beginning their careers can benefit from faculty development opportunities [6]. In this paper, we have described a model for new faculty development from Penn State's College of Engineering. Our goal is not necessarily for the reader to adopt our model as is, but rather to raise awareness of the criteria and characteristics one should consider when creating new faculty development activities, and to provide an example of a model that has worked in our university environment. Assessment results indicate the workshop is useful to new faculty. However, in order to maintain that level of usefulness we must continually re-evaluate the changing needs of our new faculty population, adjust our pedagogy and re-measure our effectiveness.

References

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ROSE M. MARRA

Rose M. Marra completed her Ph.D. in Educational Leadership and Innovation at the University of Colorado at Denver in 1996. In her current role as the Director of Engineering Instructional Services and Assistant Professor of Engineering, Dr. Marra serves as the college's "educational consultant", running faculty and TA workshops on teaching, introducing effective uses of technology into the classroom, and assessing the impact of educational change. She may be reached at rmarra@psu.edu.

THOMAS A. LITZINGER

Thomas A. Litzinger is currently Director of the Leonhard Center for the Enhancement of Engineering Education and a Professor of Mechanical Engineering at Penn State, where he has been on the faculty for the past 14 years. Prior to his appointment as Director of the Leonhard Center, he was ECSEL local principal investigator and the Coalition-PI for Student and Faculty Development. His work in engineering education involves curricular reform, teaching and learning innovations, faculty development and assessment. He has received the Eisenhower Award for Distinguished Teaching at Penn State as well as the Distinguished and Outstanding Teaching Awards from the Penn State Engineering Society (PSES). He has also received an Outstanding Research Award from PSES and an NSF Young Investigator Award.

Day 1

9:00	Introductions	Tom Litzinger; Director Leonhard Center Rose Marra, Director Engineering Instructional Services
9:15	Welcome	Dean College of Engineering
9:30	What do you want for your students? Zeroing in on Learning <i>Objectives, Syllabi, Testing</i>	Rose Marra & Tom Litzinger
10:30	Teaching and Learning Styles	Rose Marra & Tom Litzinger
11:30	“Getting Started: Tips on Balancing Your Job and Your Life”	College of Engineering Faculty Panel
12:30	Lunch – Foundry Park	
1:30	Advising Students	Assistant Dean of Student Services Associate Professor of Mechanical Engineering
2:15	Research and Graduate Studies	Associate Dean of Graduate Studies and Research Coordinator of Research Programs Director of Industrial Relations
3:00	Engineering Education “Walk-About”: Interactive Dynamics (3:10 – 3:40) Learning Factory (3:50 – 4:15) CAC Lab (4:25 – 4:55)	Assistant Professor of Engineering Science: Interactive Dynamics (124 Hammond) Learning Factory Tour Engineering Library Head Librarian Using PSU’s Online Resources, 64 Willard

Day 2

8:15	Breakfast with Women Engineering Orientation Students (Ballroom C)	Director of Women in Engineering Program
9:00	Creating and Managing Effective Collaborative and Active Learning Experiences	Rose Marra and Tom Litzinger
10:45	Break	
11:00	Classroom Learning Environments	Director of Women in Engineering Program
	Introductions to Minority Engineering and Women in Engineering Programs	Director Minority Engineering Program
12:10	Workshop Wrap-Up	
7 pm	New Faculty Dinner	Home of Rose Marra

Figure 1. Sample New Faculty Workshop Agenda