ExCEEd Teaching Workshop: Taking it on the Road

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Abstract
In response to its membership’s call for faculty training, the American Society of Civil Engineers has developed the ExCEEd (Excellence in Civil Engineering Education) Teaching Workshop. A successor to T^E (Teaching Teachers to Teach Engineering), developed under the auspices of NSF at the United States Military Academy at West Point. This paper discusses the evolution of the ExCEEd Teaching Workshop (ETW) since its inception and describes the measures taken by the ASCE Committee on Faculty Development to transport the program to other institutions. The ETW, held at the University of Arkansas in the summer of 2000, was intended to be a companion to the workshop presented at the Military Academy. The Arkansas version represented the first occurrence of this workshop, in any of its variations, at a location other than West Point. This venue was a calculated experiment taken by ASCE with the intent of increasing the availability of the workshop to more participants. In the process of planning and executing the Arkansas workshop a number of lessons were learned and are presented here. The focus is on variations in content and structure between the two workshops and the logistics required to conduct a weeklong workshop that is faculty and facility intensive. The efforts involved in selecting program mentors, developing program content and orchestrating the content of the workshop are described. In addition, pre and post participant assessment of the workshop is presented. Recommendations are made regarding the future of ETW.

Introduction
Students perceive engineering faculty as the archetypical example of the profession. As a result, it is engineering faculty who overwhelmingly represent the student’s first contact with the profession. Hence, faculty are the front line in displaying a professional, knowledgeable and ethical image of the profession. Unfortunately, research has shown that one of the primary reasons students leave engineering programs is due to the quality of teaching⁴. It is clear that a program is needed that can facilitate the development of faculty who are:

- effective teachers, who can articulate complex technical concepts and ideas to diverse groups
- effective teachers who can motivate students to think critically and creatively about engineering problems
- role models of the civil engineering profession demonstrating leadership, teamwork, and communication skills.
Unfortunately, many engineering educational communities have not implemented faculty development programs to improve teaching and learning. Few universities have implemented a program for graduate students preparing for academia. The need for effective teaching in classrooms is great for many reasons that are not specifically identified here and reports from many sources, including the NSF coalitions, stress the need and the fact that faculty desire for this training appears to be strong.\textsuperscript{2}

In recognition of this fact the American Society of Civil Engineers (ASCE), Education Activities Committee (EdAC) established as a priority the need to support the development of Civil Engineering faculty as effective teachers. EdAC tasked the Committee on Faculty Development (CFD) to create a plan for an ASCE-sponsored faculty development program for C.E. faculty. The CFD was expected to create a high quality faculty development program to improve the teaching effectiveness of civil engineering faculty.

Starting in fall of 1998, the CFD met and developed a plan for a quick start and planned for a long-term comprehensive program. The quick start consisted of delivering a workshop at the United State Military Academy at West Point during the summer of 1999 known as the ExCEEd Teaching Workshop 99 (ETW99). The starting point for the WestPoint ETW program was the highly successful T^E (Teaching Teachers to Teach Engineering) program, which was developed at the U. S. Military Academy and sponsored by the National Science Foundation. The ETW99 was a modified version of the T^E model. This workshop was the first in what is expected to be a series of annual teaching workshops for C.E. faculty.

In order to create a long-term plan, a group of nine senior educators who were skilled in teaching and actively involved with faculty development participated in what was known as the Program Design Workshop (PDW). This workshop ran concurrently with the 1999 ExCEEd Teaching Workshop (ETW99). The PDW participants were charged with the design of future ExCEEd Teaching Workshops and the development of a plan for delivering up to two workshops in 2000. At least one of the programs would be delivered at a site other than West Point. Attendance at ETW99 provided the PDW first-hand experience that formed the basis for their assessment of the ETW99 and the development of a plan for ExCEEd Teaching Workshops in 2000.

**ExCEEd Teaching Workshop Objectives and Outcomes**

ASCE charged the PDW with the development of an implementation plan for providing up to two ExCEEd Teaching Workshops during the summer of 2000. At least one of the summer workshops would be held at a site other than West Point. ASCE established the following constraints and requirements for ExCEEd Teaching Workshops:

- First and foremost the program must be of very high quality.
- The program must not run longer than 5 days.
- The participants must have multiple times to practice effective teaching techniques.
- The program must target civil engineering faculty with 1-4 years teaching experience.
- The participants should learn principles of good practice in teaching and learning.

Based on the guidance provided to the PDW, many possible objectives for the ETW were identified. The PDW participants considered the ETW99 to be an excellent faculty development
workshop for the improvement of teaching and learning. The final program proposed by the PDW used the ETW99 format as a basis for future workshops. All proposed changes kept the fundamental ETW99 program, with its vital practice classes, demonstration classes, and stimulating environment, intact. The proposed focus of the ETW continued to emphasize basic teaching improvements for junior faculty, and hence, the resulting objectives reflect this focus and remained similar to the objectives of the 1999 ExCEEd Teaching Workshops.

- Mentors teach and demonstrate best methods of teaching and learning;
- Participants apply the best methods of teaching and learning in practice sessions;
- Mentors teach and demonstrate learning assessment skills;
- Program fosters a passion for teaching; and builds a learning community of civil engineering educators.

The faculty participants who attended previous T^4E and the ETW99 have demonstrated a substantial improvement in their teaching techniques at the workshop. Anecdotal information suggests that many past participants have successfully implemented the skills learned at the workshop to improve their teaching at home institutions. This improvement in teaching effectiveness is the goal and expected result of this workshop. Specifically, the faculty who attend ExCEEd Teaching Workshops are expected to:

- Demonstrate, at the workshop, the principles of effective teaching.
- Apply, at the workshop, lesson assessment techniques.
- Implement, at their home institutions, concepts and strategies of effective teaching.
- Participate in future activities to enhance teaching and learning.
- Provide appropriate leadership at their home institutions to foster effective teaching and learning.

The University of Arkansas was selected as the first site to test the portability of the program. The major concern of the PDW in porting the program to other institutions was the resource intensiveness of the workshop, both in terms of personnel and facilities. The Military Academy supported this workshop with over 25 classrooms and at least as many program faculty. It was unlikely that any other institution could support the workshop with the same level of resources.

**Program Staff-University of Arkansas ETW**
The task of the ETW-2000 coordinator was to develop a program, within the physical constraints of the host institution, which effectively implemented the directives of the PDW. Those directives, reduced to a teaching and learning model highlighted in Figure 1, are the defining characteristics of the ExCEEd Teaching Workshop. Briefly stated, participants will see examples of effective teaching, receive instruction on the principles of effective teaching and learning, and most importantly, practice the principles of effective teaching under the mentorship of a seasoned teacher. In order to implement these directives adequate personnel and facilities had to be assembled.

**Personnel**
The workshop coordinator is the central cog in the planning and execution of the workshop. The key tasks of the coordinator are to secure the entire workshop staff, assign tasks to the mentors,
review workshop content to insure adequate coverage and a minimum of overlap between content providers, arrange hotel accommodations for every one involved in the workshop, secure classrooms, purchase all teaching and administrative supplies, create participant notebooks, coordinate refreshments breaks and host two social events. Over the space of a 15 month period, both before and after the workshop, the coordinator must be able to devote approximately six weeks of full time effort to planning, executing and assessing the workshop activities.

Using the format of the 1999 ETW, one mentor and one assistant mentor were required for each four participants. Given that the workshop has 24 participants, six mentors and assistant mentors were required. The mentors are the key to the success of the workshop and should be seasoned teachers who have an intimate understanding of the precepts of the ExCEEd program philosophy. The major duties of the mentors include, facilitation of practical exercises, providing guidance for the participant’s practice class preparation, assessing participant teaching effectiveness and conducting a workshop post mortem. In addition to the above duties, the mentors at the Arkansas workshop were also responsible for developing and delivering up to three hours of instructional content relating to teaching and learning activities. Because of the requirement to deliver content the mentors had to be selected early and given specific tasks and deadlines.

Figure 1  Teaching and Learning model for the ExCEEd Teaching Workshop.
All of the mentors for the Arkansas program were selected from the pool of participants of the Program Design Workshop. Once the date of ETW-2000 was finalized in early September 1999, the potential mentors were alerted and asked to clear their calendars for the week of the workshop. The first 6 respondents who indicated availability during that week were unofficially selected as mentors. However, a formal agreement between the mentors and ASCE was not executed until March of 2000. Work assignments for all of the mentors were developed and distributed by the program coordinator in early January 2000.

The principal activities of the assistant mentors are to reinforce mentor activities, provide audio-visual support, wrestle with minor logistics issues and participate in the workshop seminars. The original intent of the PDW was to select assistant mentors from a pool of previous ETW or T’E participants. Assistant mentor selection did not occur until April 2000 and not all assistant mentors came from the pool of previous participants. At least two of the assistant mentors were actually applicants for the 2000 workshop who were considered by the selection committee to be too senior to be eligible as a participant. However, the committee noted that these individuals had excellent credentials to be assistant mentors and were invited to participate in that capacity.

A full time administrative assistant was hired for two weeks before the start of the workshop to copy the materials necessary to assemble the participant notebooks, to create welcome packets and name badges, purchase supplies and negotiate with caterers. In retrospect, this assistant should have been retained during the week of the workshop as well, to coordinate refreshments and purchase last minute supplies.

**Facilities and Support**

The major support requirements can be broken into on and off-campus venues. On-campus facilities include classrooms, seminar rooms, storage and break facilities, audiovisual equipment, computers with Internet connection, office equipment and copy services. Off campus facilities include hotel accommodations, convenient locations for lunch, locations for an ice-breaker and end of workshop social. Contracted services included catering and administrative support for assembling participant notebooks, copying, etc.

Ideally, each participant in the workshop would have their own dedicated classroom for the preparation and presentation of their three practice classes. This would facilitate rehearsal during class preparation and the pre-positioning of materials in the classroom. The reality is that few institutions can provide 24 classrooms, in a central location, for an entire week during a summer semester. At the Arkansas workshop classroom requirements were satisfied with 6 dedicated classrooms (one per mentor) seating at least 25, a large seminar room capable of seating 70, and a combination break/storage room. All of these facilities were centrally located on the ground floor of the Bell Engineering Center, which is conveniently located next to an accessible parking lot. In order to secure these facilities, arrangements had to be made in the early fall of 1999, before course scheduling for the summer sessions began. Additionally, access to computers, copiers, and video equipment was made available, even after normal working hours, through the graciousness of the Civil Engineering Department.

The hotel was selected based on cost, convenience to campus and ancillary facilities like meeting rooms, free breakfast and health club membership. A block of forty rooms was reserved in
November 1999 with a release date of 1 June 2000. By 1 June all participants in the workshop had booked a room at this hotel, which facilitated transportation to and from campus.

**Conduct of the Workshop**

By the first week in June all of the mentors had provided their seminar content to the workshop coordinator for review. The coordinator reviewed each presentation to assure complete coverage of the material and to insure there was no major overlap in content between two or more mentors. Only one or two seminars had to be revised as a result of content overlap. All of the implied tasks of the PDW were assembled into a five-day schedule shown in Figure 2. This schedule integrated 12 seminars, 2 demonstration classes, 3 practice classes per participant and 2 social events into a logical sequence. The coordinator, mentors and assistant mentors met the day before the start of the workshop to iron out administrative details and to conduct some “train-the-trainer” activities in preparation for a smooth kick–off of the workshop.

**Workshop Assessment**

A defining feature of the Arkansas workshop over previous workshops held at West Point was the icebreaker, which integrated some team building competitions into a relaxed social atmosphere. All mentors were in agreement that the participants really came together into teams.

![Figure 2. Schedule of events for the University of Arkansas ExCEEd Teaching Workshop.](image-url)
and seemed more relaxed during their practice teaching sessions than in previous workshops as a result of this activity. The actual workshop is an intense 12-14 hr per day experience. While formal activities are schedule for only 8 hours per day, informal mentoring and class preparation went on well into the evening hours everyday. Even though the workshop was intense, few participants complained. On the contrary, most felt the pace of instruction was right on track and every participant felt they took something from the workshop that would improve their teaching.

The formal workshop assessment was conducted in three phases. A pre-workshop questionnaire was distributed prior to the actual workshop in an attempt to get some baseline data on the participant’s self-assessment of their teaching abilities. The results of that survey are illustrated in Fig. 3. It is interesting to note that participants at the Arkansas workshop had higher self assessment scores on every question than the participants at the West Point workshop.

![Figure 3. Results from the Arkansas pre-workshop assessment questionnaire.](image)

The only areas which participants felt a particular weakness were in addressing student learning styles, developing lesson objectives and using classroom assessment techniques. In fact, many participants had never heard of learning styles or classroom assessment technique (as distinguished from quizzes or examinations). This baseline data was collected only to obtain participant perceptions of their teaching preparedness prior to any exposure to teaching and learning concepts presented in the workshop. IN some respects this questionnaire served as a
“background knowledge probe”, a classroom assessment technique first presented by Angelo and Cross. Participants also completed an assessment vehicle at the conclusion of the workshop in which they rated each major activity of the workshop in terms of its value to them in improving their teaching and the actual conduct of the activity. The results of that assessment are given in Fig. 4. Participants uniformly rated all activities high, however the defining features of the ExCEEd workshops, practice classes and demonstration classes received the highest overall ratings.

![ETW Assessment (U of A ’00)](image)

Figure 4. Participant ratings of workshop activities at the University of Arkansas.

Significantly, areas relating to the mechanics of teaching such as, questioning, creating objectives and board notes, were rated higher than the theoretical aspects of teaching like learning styles or classroom assessment. Participants were also asked to provide some written feedback on how they expected this workshop to improve their teaching. Comments like those below were typical of participant responses to the workshop assessment:

- “Before attending the workshop I was wondering if I could become and effective teacher. Now I believe I can. The workshop has given me the tools to succeed.”
- “My attitude changed from total frustration [with teaching] to excitement. Life changing experience as an educator I’m a “reborn” teacher.”
• “Having someone finally explain a proven way to organize a class and engage students is the
single most significant event in improving my professional career (10 years). I am only sorry
I did not find the information sooner.”

A post workshop assessment will be conducted in the spring of 2001 to determine how
effectively participants were able to implement new teaching concepts into their courses at their
home institution. As part of that assessment the participants will be asked to fill out the same
pre-workshop questionnaire they completed previously (Fig. 3). This time, however, they will
be asked to rate both their pre and post workshop preparedness. They will do this without
reference to their original pre-workshop responses. This assessment will give a direct measure
of their perceived improvement, as a result of the workshop. It will also allow comparison to
their original pre-workshop answers to see if there has been a scale shift as a result of different
evaluation standards.

Areas for Improvement
As a result of conducting a workshop post mortem among the workshop providers and evaluating
the workshop assessments, completed by everyone, a couple of areas stood out as needing
improvement. Most felt the number of different people providing seminar content should be
reduced to insure better integrity of the content. Some felt that transportation to and from
campus could be managed more efficiently. More access to VCRs was required to view practice
classes. Many felt that the teams should be scrambled at least once so that participants could
interact with more mentors and peers through out the workshop. These shortfalls will be
addressed in future versions of the ETW.

Conclusions
Based on participant responses it is clear that the ExCEEd Teaching Workshop can be
successfully ported to different institutions. The key to creating a successful workshop is in
assembling a seasoned faculty who subscribe to the basic precepts of ExCEEd. Participants
agreed with the PDW in that the defining features of this teaching workshop over all other
teaching workshops are the demonstration classes, given by exemplary teachers, and the practice
classes which force participants to employ concepts taught in the workshop to an audience of
their peers in a high challenge-low threat environment.

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