

ExCEED Teaching Workshop: Fulfilling a Critical Need

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Abstract

In response to the need to develop Civil Engineering faculty as effective teachers, the American Society of Civil Engineers developed the landmark faculty development initiative ExCEED (Excellence in Civil Engineering Education) which includes the ExCEED Teaching Workshop (ETW). The ETW is an intense, hands-on, high quality five-day workshop consisting of seminars, demonstrations, practice classes, critiques, and social events. Three ETWs have been conducted in 1999 and 2000 on the campuses of the U.S. Military Academy and the University of Arkansas – Fayetteville. The feedback has been overwhelmingly positive where participants cite substantial improvements in their class organization, presentation skill, and rapport with students as a result of ETW. This paper summarizes the content of the ExCEED Teaching Workshop (ETW), assesses its effectiveness, highlights changes in the program as a result of the assessment, and outlines the future direction of the program.

I. Introduction

Many new engineering faculty members at major institutions are assigned a classroom, a course of instruction, and students to teach without any formal training on how to teach. The result is often a trial and error approach where real students suffer the consequences. Seymour and Hewitt¹ concluded in a study of 355 students at seven institutions that poor teaching (inadequate organization, ineffective presentation, inaccessible faculty) was the most common student complaint and was a cause for many to leave math, science and engineering programs. In response to the clear need for faculty training, the American Society of Civil Engineers has developed the ExCEED (Excellence in Civil Engineering Education) Teaching Workshop (ETW) which is entering its third year of existence. The ETW was developed from the Teaching Teachers To Teach Engineering (T⁴E) originated at United States Military Academy (USMA) and sponsored by the National Science Foundation². In 1999, a group of nine educators formally evaluated ETW as part of a Program Design Workshop³. The ETW continues to develop and improve as a result. This paper summarizes the content of the ExCEED Teaching Workshop, assesses its effectiveness, highlights changes in the program as a result of the assessment, and outlines the future direction of the program.

The ETW is a highly intensive, hands-on, five-day workshop consisting of seminars, demonstration classes, and small group labs. The focus of the workshop is basic teaching skills and the goal is to improve teaching and learning in civil engineering programs. The ETW philosophy is to learn by doing. As such, most of the workshop consists of small group labs in which each attendee teaches and is critiqued on three separate classes. The workshop objectives are to teach and demonstrate the best methods of teaching and learning; have participants apply the best methods of teaching and learning in practice sessions; teach and demonstrate learning

assessments skills; foster a passion for teaching; and build a learning community of civil engineering educators.

II. Who May Attend

Because of the amount of small group work and the large degree of personalized feedback provided in the ETW, attendance is limited to 24 participants per workshop. The ETW is currently designed for civil engineering educators with less than ten years of teaching experience at the college level. Each candidate submits an application which includes a statement of teaching philosophy, a letter of support from the participant's Department Chair, a resume, a description of what the participant hopes to achieve from the workshop and a contract in which the attendee agrees to complete all activities of the workshop. The workshops have typically received 70-80 applications. In the first two years, ASCE has subsidized the ETW by waiving conference registration fees and paying a stipend to those ASCE members who are chosen to attend. Five women and 19 men from colleges and universities as diverse as Cornell, Louisiana Tech, U.C. Berkeley, and Virginia Military Institute attended the ETW 2000 at USMA.

III. Workshop Content

The grueling schedule for the five-day workshop is shown in Figure 1. The workshop activities can be sub-classified into seminars, demonstration classes, laboratory exercises, and social events.

Seminars: The course schedule for the 2000 ETW contained 13 Seminars which varied in content and were designed to provide theoretical background, teaching hints, organizational structure, and communication techniques. A brief description of the seminars is offered in Table 1. The format for the seminars is lecture, small group activities, and collaborative discussion with an ExCEED faculty member acting as presenter and moderator.

Demonstration Classes: ExCEED faculty members teach sample engineering classes where the workshop participants are role-playing as students. The demonstration classes are intended to illustrate active engagement with students and reinforce the methods of teaching covered in the seminars in a realistic classroom environment. The demonstration classes are deliberately spaced at intervals throughout the workshops so that participants can better observe and appreciate different aspects of teaching as the workshop progresses. Afterward, student groups formally critiqued the strengths and weaknesses they observed in the demonstration classes.

Laboratory Exercises: Between a third and a half of the ETW is spent in small group laboratory assignments. A group consists of four workshop participants, a junior mentor (usually a recent graduate of a teaching workshop program) and a senior mentor (a veteran instructor with many years of successful teaching experience). Each student will teach three classes (25 minutes, 55 minutes, and 25 minutes, respectively) in his or her area of expertise while the other members of the group role-play as students. Afterward, each class is critiqued. Initially the critiques are provided by the senior mentor, but as the workshop progresses, the fellow students provide the critiques. Ultimately, the participant who taught the class provides a self-assessment. Each

participant receives videotape containing all of his or her classes and critiques recorded for future reference.

Social Events: While much of the evening time is spent in class preparation, social events were deliberately planned to promote interaction, collaboration and the sharing of ideas. An introductory banquet, a Hudson River cruise, student skits, morning/afternoon snack breaks and lunches are designed as important learning activities.

ExCEED Teaching Workshop Seminars	
I	Learning to Teach: Justifies importance of formally learning to teach and introduces a model instructional strategy that will be a road map for the ETW
II	Principles of Effective Teaching and Learning: Introduces Lowman's ⁴ two-dimensional model of teaching and provides a compendium of learning principles
III	Teaching Assessment: Covers student, peer and self assessments and separates myth from fact regarding their usefulness
IV	Introduction to Learning Styles: Examines Felder's Learning Style Dimensions ⁵ and examines how to accommodate all styles of learners
V	Learning Objectives: Introduces Bloom's taxonomy ⁶ of educational objectives and show how to write appropriate and useful learning objectives
VI	Planning a Class: Offers a structured methodology for organizing a class with emphasis on constructing an outline, board notes, and out-of-class activities
VII	Speaking and Writing: Covers fundamentals of communication skills with emphasis on speaking to a group and making written presentations using the chalk board, vu-graphs, and Powerpoint slides
VIII	Questioning Techniques: Examines different student questioning techniques and discusses effective strategies for their use
IX	Classroom Assessment Techniques: Introduces techniques such as muddiest point paper, preconception check, minute paper, and approximate analogy as potential means of assessing student comprehension ⁷
X	Teaching with Technology: Focuses on effectively incorporating the computer and various types of software into classroom instruction
XI	Systematic Design of Instruction: Introduces a model for designing a course in an established curriculum and examines the role of classroom teaching in that model
XII	Making It Work at Your Institution: Discusses how the techniques and principles covered at ETW can be incorporated under conditions that exist at other institutions such as larger class sizes, no blackboards, etc.
XIII	Developing Interpersonal Rapport: Offers useful techniques for building an effective rapport with students; discusses student personality types and offers hints to avoid chill in the classroom

Table 1. Content of the ExCEED Teaching Workshop Seminars

COURSE SCHEDULE						
	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:00		Admin & Gift	Admin & Gift	Admin & Gift	Admin & Gift	Admin & Gift
		Demo Class I	Lab II Practice Class 1	Lab III Practice Class 2	Lab IV Practice Class 3	Seminar XIII Interpersonal Rapport
10:00		Seminars II, III, IV Teaching & Learning				ASCE Programs
						ETW Assessment
12:00		Lunch	Lunch	Lunch	Lunch	Graduation
		Seminars V, VI Organizing A Class	Demo Class II	Lab III (continued)	Seminar XI Design of Instruction	
2:00			Seminars VII, VIII, IX Communication Skills	Demo Class III	Seminar XII Making It Work	
4:00	Intro To ETW	Lab I Organizing A Class		Seminar X Technology		
	Seminar I Learning To Teach	Working Dinner & Class Prep (optional)				
6:00					Hudson River Cruise	
	Reception and Dinner					

Figure 1. ExCEED Teaching Workshop Course Schedule

IV. Short and Long Term Assessment

ETW participant received a complete assessment worksheet on the first day of the workshop and are encouraged to review and comment on the individual activities as they occur rather than waiting until the final day of the workshop. Participants rated each major activity on both its value and conduct on a scale of 1 (unsatisfactory) to 5 (excellent). Figure 2 shows the composite ratings on each activity by the ETW 2000 participants. The demonstration classes and practice classes were clearly rated as the most valuable activities which validates the “learn by doing” philosophy. No activity received a composite rating less than 4. Written comments were highly encouraging and most were overwhelmingly positive:

“A great job! Thanks for taking the education of our engineering students so seriously”.

“After I was accepted to the workshop, I kept wondering if losing a week of work at my institution was worth it. It definitely was! I was hired to teach engineering (as well as research), and I now realize that I had no idea how to effectively teach.”

“15 lbs. of great stuff in a 10 lb. Box!”

“This has been an extremely broadening experience – I will carry it with me forever! Thanks.”

“One of the top 3-4 workshops of all kinds that I have ever participated in!”

“Overall I felt this was an EXCELLENT workshop. I wish I had this 3 years ago when I just started my teaching career. Even now it is not too late and I hope to make effective use of what I gained during this workshop.”

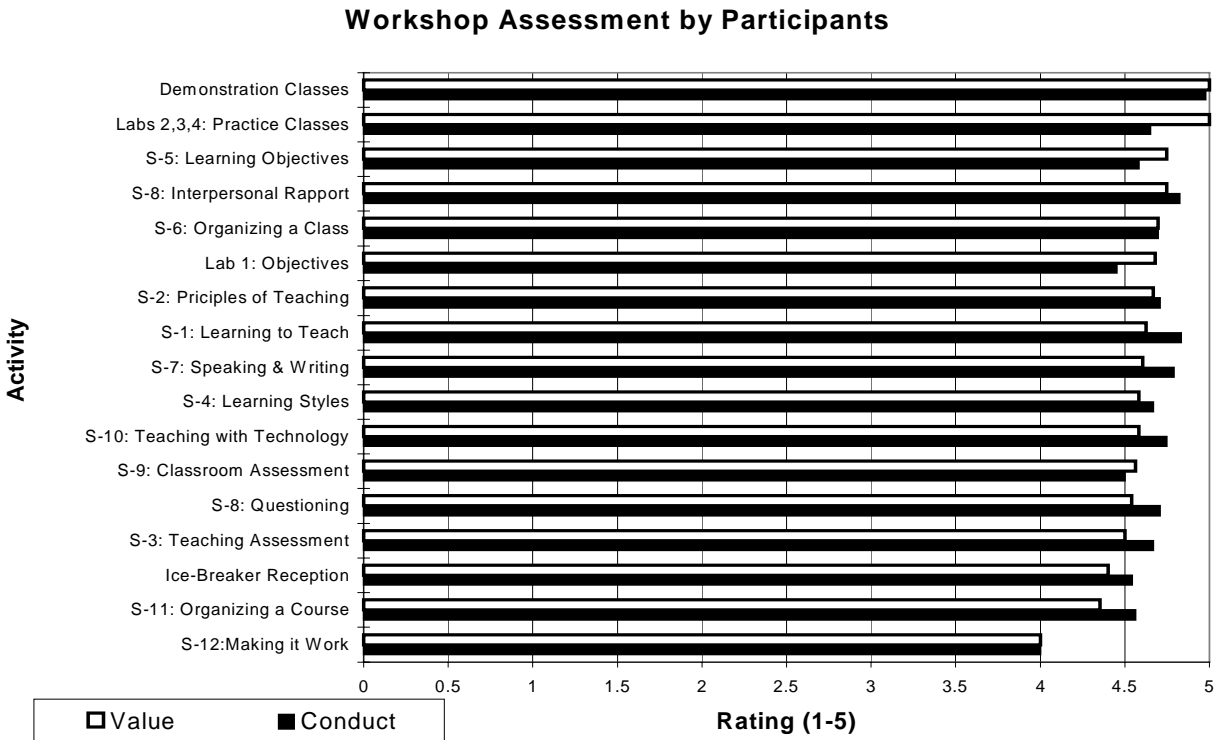


Figure 2. Composite Ratings from Participants at ETW 2000 at USMA

During ETW 1999, one of the senior mentors had his group maintain a diary⁸ throughout the workshop which reflected thoughts, emotions, and perceptions on a daily basis through the workshop. This provided keen insight into the progress made, skepticism felt, and the immediate effectiveness of individual activities.

To assess the longer-term effects of the ETW, participants completed a follow-up survey a full semester after the workshop. The questions included a self-assessment of teaching ability by rating 10 different aspects of teaching on a scale of 1 (unsatisfactory) to 5 (excellent). The post-course survey also asked for feedback on what should be improved, what ETW aspect helped the most, and whether they would recommend ETW to others.

A summary of the long-term feedback from ETW 2000 is shown in Figure 3. The participants assessed improvement in virtually every category questioned from their confidence as a teacher and interaction with students to the lesson organization and level of student learning. The survey response rate was 75% which itself is an indicator of the long-term effect of the program. On average, the improvement per category was +0.81 on a scale of 1 to 5 – essentially a 20% improvement in every area. Participants cited that ETW contributed most to their improvement in lesson organization, confidence, and presentation of the material. While there were individual suggestions for improvement, there was no consistent trend. Since the ETW program and its predecessor T⁴E have been formally assessed over a five-year period, any major deficiencies have already been addressed.

ExCEED 2000 Long Term Self Assessment Feedback

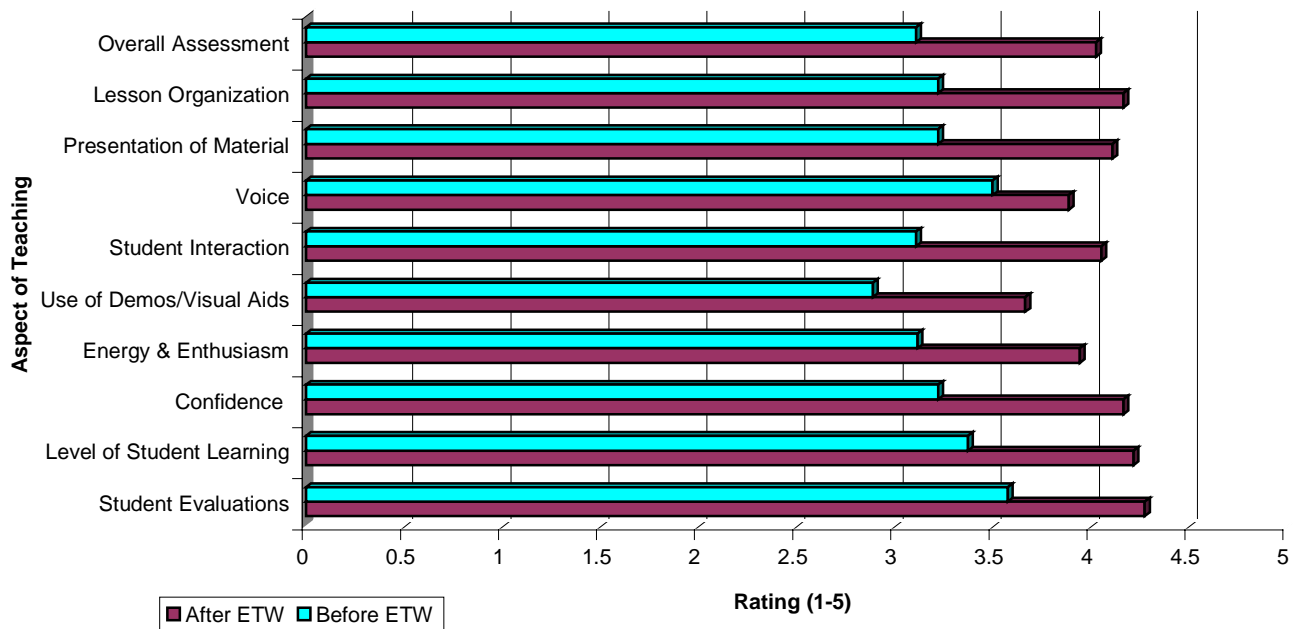


Figure 3. Long Term Self Assessment Feedback From ExCEED 2000 Participants

V. Responses to the Assessments and the Future of ETW

The participant assessments have been tremendously valuable for revising and improving the ETW. The inclusion of the seminar on System Design of Instruction was largely in response to previous feedback that such a class was needed to provide a broader perspective on the role of classroom teaching and instruction preparation in the larger topic of curriculum development. In the 1999 ETW, the seminars were all conducted early in the workshop and during the morning hours. The ETW 2000 schedule was revised based on feedback that the seminars should be spread throughout the week and that participants preferred to teach classes in the morning when they were fresher. In the past, the three demonstration classes were on diverse topics and each stood alone. All three of the demonstration classes in ETW 2000 were on trusses and built on each other to illustrate the concept of a lesson block. The block of classes demonstrated how the role of the teacher can transition from lecturer to facilitator as students become more familiar with the material. Based on ETW 2000 feedback, we are currently considering a seminar on diversity and gender issues in the classroom.

The ETW appears to be fulfilling a genuine need in providing new civil engineering educators with high quality instruction and practice in the art of teaching. The feedback from participants and department chairs has been tremendously positive. During ETW 2000, representatives from three other professional societies (ASME, IEEE, and AIChE) observed the workshop to assess whether they should join in this effort. ETW 2001 will be held for the third consecutive year at

the United States Military Academy from July 29 to August 3 and for the second consecutive year at the University of Arkansas – Fayetteville from July 8 to July 13. As a result, the civil engineering profession will gain 48 educators who are better able to engage students in the classroom, provide high quality instruction, and motivate students to a career of lifelong learning.

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