

AC 2008-1639: EXCEED TEACHING WORKSHOP: TENTH YEAR ANNIVERSARY

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ExCEED Teaching Workshop: Tenth Year Anniversary

Abstract

In response to the need for faculty training, the American Society of Civil Engineers developed and funded the ExCEED (Excellence in Civil Engineering Education) Teaching Workshop that is today – the summer of 2008 – celebrating its tenth year of existence. For the past decade, nineteen ExCEED Teaching Workshops (ETW) have been held at the United States Military Academy, the University of Arkansas, and Northern Arizona University, with two more workshops scheduled for this summer for a total of 21 offerings. ETW has realized 449 graduates from 203 different U.S. and international colleges and universities. This paper summarizes the content of ETW, assesses its effectiveness, highlights changes in the program as a result of the assessment, and outlines future directions. The assessment data were obtained from multiple survey instruments conducted during each workshop, surveys taken six months to a year after the workshop, and a ten year longitudinal survey.

I. Introduction

Many new engineering faculty members at major colleges and universities are assigned courses 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 can 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 need for faculty training, the American Society of Civil Engineers developed and funded the ExCEED (Excellence in Civil Engineering Education) Teaching Workshop that is today – in the summer of 2008 – celebrating its tenth year of existence. For the past decade, twenty-one ExCEED Teaching Workshops (ETW) have been or will be held at the United States Military Academy, the University of Arkansas, and Northern Arizona University. The program has 449 graduates from over 203 different U.S. and international colleges and universities. The program has evolved from one initially relying on the dedication of its faculty and ASCE staff champions to one that is supported and embraced by department heads and deans.

The ETW is a highly intensive, hands-on, five-day workshop consisting of seminars, demonstration classes, and small group labs. The workshop focuses on basic teaching skills with the objective of helping participants improve their approach to teaching and their understanding of student learning. The overarching goal is to ultimately improve teaching and learning in civil (and related programs) programs nationwide. The ETW strategy relies on learning by doing. As such, most of the workshop consists of small group labs in which each attendee teaches three classes while receiving guidance and feedback from his or her group and mentor team. The workshop is designed to review and demonstrate the best methods of teaching and assessment, to integrate the latest in learning theories, and to provide ample opportunities for participants to apply and practice methods and theories. ETW has encouraged the development of a community of engineering educators passionate about teaching and learning in civil engineering.

In the end-of-workshop assessment survey, participants provide their numerical ratings and written comments on the value and content of the major activities. A follow-up assessment is conducted six months to a year after the workshop to evaluate longer-term effectiveness. In addition, the ASCE Committee on Faculty Development has conducted a longitudinal survey of all participants over the past decade to gain a broader perspective of the contribution made by the ETW. Participants consistently cite substantial improvements in their class organization, presentation skill, and rapport with students as a result of ETW. This paper summarizes the content of ETW, assesses its effectiveness, highlights changes in the program as a result of the assessment, and outlines future directions.

II. History of the Workshop

Because the faculty at the United States Military Academy (USMA) at West Point consists predominately of military officers who teach for three years and return to the field Army, there is a substantial turnover of instructors every summer. To maintain an effective educational program, new faculty members with no teaching experience need to be taught how to teach in a hurry. The USMA Department of Civil & Mechanical Engineering (CME) has met this need over the past fifty years by conducting a rigorous annual six-week teacher training program, known as the Instructor Summer Workshop (ISW), for its incoming faculty. In the mid-nineties, a group of civilian and military CME faculty developed a proposal for a one-week external version of ISW and received National Science Foundation (NSF) funding for the effort. The result was the Teaching Teachers To Teach Engineering (T⁴E) workshop conducted at United States Military Academy (USMA) in 1996, 1997 and 1998². The 1998 version of the workshop included six senior observers who examined how this workshop might be transported to other institutions.

As the NSF grant expired, the American Society of Civil Engineers funded and supported the highly successful workshop as part of its larger ExCEED faculty development initiative. Supported by a grant from the Bechtel Corporation, the first ExCEED teaching workshop was held at West Point in the summer of 1999 with 24 participants using the T⁴E format as a model. In 1999, a group of nine educators formally evaluated ETW as part of a Program Design Workshop³. As a result, the curriculum of the ETW was refined and formalized and the program was successfully transported to the University of Arkansas in the summer of 2000. By 2002, there were ExCEED Teaching Workshops offered at West Point, the University of Arkansas and Northern Arizona University. Those three institutions have provided the home of the ETW ever since as shown in Table 1, although ASCE is always considering new locations.

In the summer of 2004, the United Engineering Foundation funded these workshops and the other professional societies (ASME, IEEE, AIChE) sent participants to what became the ExcEEd (Excellence in Engineering Education – with a small “c”) teaching workshops. By 2005, ASCE reclaimed sponsorship of ETW, and the participants ever since have come from those civil, environmental, architectural and construction engineering and engineering technology programs that the society supports. ASCE has offered two of these workshops per year ever since. At the time of this writing, there have been 19 ETWs which have been attended by 449 participants from 203 different colleges and universities. International universities such as Durban Institute

of Technology, Hong Kong Polytechnic University, University of Limerick and Universidad del Norte have sent participants. The tenth anniversary will occur in the summer of 2008 with workshops at both West Point (July 23 – 28) and the University of Arkansas (July 13 – 18). While the number of colleges and universities that have participated is substantial, many universities have sent multiple members and have made the ExCEED Teaching Workshop an integral part of their faculty development program. Texas A&M leads the way having sent 11 different participants. Table 2 shows the other leaders. In addition, there are ten universities that have sent five participants and 17 universities that have sent four.

Year	United States Military Academy	University of Arkansas	Northern Arizona University
1999	X		
2000	X	X	
2001	X	X	
2002	X	X	X
2003	X	X	X
2004	X	X	
2005	X	X	
2006	X	X	
2007	X		X
2008	X	X	

Table 1. A decade of ExCEED Teaching Workshops and their locations

11 ETW Participants
<ul style="list-style-type: none"> • Texas A&M
8 ETW Participants
<ul style="list-style-type: none"> • Washington State University • University of Texas at Austin • Clemson University
7 ETW Participants
<ul style="list-style-type: none"> • University of Wisconsin at Platteville • California Polytechnic State University at San Luis Obispo
6 ETW Participants
<ul style="list-style-type: none"> • Virginia Polytechnic Institute • Vanderbilt University • University of Kentucky • University of Kansas • Southern Illinois University at Carbondale

Table 2. The ExCEED Participant Board – those institutions that have the greatest number of ETW graduates

III. 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. While the ETW is currently designed for civil engineering educators with less than ten years of teaching experience at the college level, a few veteran instructors with over 20 years teaching experience have participated. 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 typically received 70-80 applications each year. Applications are due in mid-February. The ASCE Committee on Faculty Development (CFD) reviews the files and selects the participants as part of their Spring meeting. ASCE staff collect the registration fees and coordinate with the applicants. Eventually, the program directors from the host institutions provide the detailed workshop schedule and instructions. The 24 participants for each site are divided into six teams created to maximize diversity in subject matter expertise, teaching experience, gender and geographic location.

Participant to ETW staff ratio is no greater than two; effectively supporting the personalized nature of the feedback and mentoring provided at ETW. As a result, ETWs are more expensive than most other workshops with the cost to ASCE at approximately \$60,000 per workshop. In the first two years of the program, ASCE subsidized the ETW by waiving conference registration fees and paying a stipend to those ASCE members who were chosen to attend. As the program gained greater acceptance and recognition, as well as greater support from department heads who were seeing tangible results, ASCE passed more of the cost onto the participating universities. Currently, the registration fee is \$425 per participant and the university pays the travels costs for their participants. ASCE still heavily subsidizes the workshop by awarding \$2300 fellowships to each participant to cover the remaining ETW costs.

IV. Workshop Content

The schedule for the 2005 USMA five-day workshop is shown in Figure 1 and is representative of all the other workshops. The workshop activities can be sub-classified into seminars, demonstration classes, laboratory exercises, and social events.

Seminars: The course schedule for the 2005 ETW contained 12 Seminars which varied in content and were designed to provide theoretical background, teaching hints, organizational structure, and communication techniques. All 24 participants (6 teams) are together but sit with their team members. A brief description of each seminar is offered in Table 3. The seminars are presentations given by senior ETW faculty and include small group activities and facilitated collaborative discussions. The seminars may vary slightly from year to year and site to site as the workshop is always developing new content. Additional seminars not shown in Table 3 have included Creating a Syllabus, Group Projects, Managing Student Teams, Active Learning, Gender and Diversity, and Teaching with Technology.

Demonstration Classes: ExCEEEd faculty members teach example engineering classes where the workshop participants are role-playing as students. These demonstration classes are intended to

role model exemplary teaching, to illustrate active engagement with students, and to 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, the participants formally assessed the class strengths and areas for improvement.

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	Introduction to Learning Styles: Examines Felder's Learning Style Dimensions ⁵ and examines how to accommodate all styles of learners
IV	Learning Objectives: Introduces Bloom's taxonomy ⁶ of educational objectives and shows how to write appropriate and useful learning objectives
V	Planning a Class: Offers a structured methodology for organizing a class with emphasis on constructing an outline, board notes, and out-of-class activities
VI	Chalkboard: Covers fundamentals of making written presentations using the chalk board, vu-graphs, and Powerpoint slides
VII	Teaching Assessment: Covers student, peer and self assessments and separates myth from fact regarding their usefulness
VIII	Communications: Covers fundamentals of communication skills with emphasis on speaking to a group and generating positive emotion from students. This block also 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	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
XI	Non-Verbal Communication: Offers useful insights and techniques for understanding how an instructor communicates non-verbally and for interpreting non-verbal cues from students.
XII	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
XIII	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.

Table 3. Content of the ExCEED Teaching Workshop Seminars

Laboratory Exercises: The participants spend close to half of their ETW time in small group laboratory assignments. A team consists of four workshop participants, a junior mentor (usually a recent graduate of ETW) and a senior mentor (a veteran instructor with many years of

successful teaching experience who is also well-versed in the methods of ETW). Each participant teaches 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 assessed. Initially the critiques are provided by the senior mentor, but as the workshop progresses, the fellow participants provide the assessments. Ultimately, the participant who taught the class provides a self-assessment. Each participant receives written assessments and video recordings of his or her classes.

Social Events: While much of the evening time is spent preparing for the teaching laboratories, ETW includes social events to promote interaction, collaboration and the sharing of ideas. An introductory banquet or picnic, a closing dinner, student skits, morning/afternoon snack breaks and lunches are important for team building, reflection, and discussion.

COURSE SCHEDULE						
	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:00		Admin & Gift Demo Class I	Admin & Gift Lab III	Admin & Gift Lab IV	Admin & Gift Classroom Assessment	Admin & Gift Making it work
10:00		Principles of Teaching & Learning	Practice Class 1	Practice Class 2	Design of Instruction	ASCE Initiatives
		Learning Objectives			Non-Verbal	ETW Assessment
12:00		Lunch	Lunch	Lunch	Rapport	Graduation
2:00		Planning A Class	Teaching Assessment	Lab IV (continued)	Lab V Practice Class 3	
		Chalkboard	Demo Class II			
4:00	Intro To ETW	Lab II Objectives	Communication Skills	Demo Class III		
6:00	Learning To Teach	Working Dinner & Class Prep				
	Lab I Team-Building				Hudson River Cruise	

Figure 1. Typical ExCEED Teaching Workshop Course Schedule

V. Immediate Assessment

Every ETW participant receives a complete assessment survey on the first day of the workshop and is encouraged to review and comment on the individual activities as they occur rather than waiting until the final day of the workshop. Participants rate 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 USMA ETW 2005 participants. The demonstration classes and practice classes are consistently rated as the most valuable activities which validates the “learn by doing” philosophy. No activity received a composite rating less than 4.

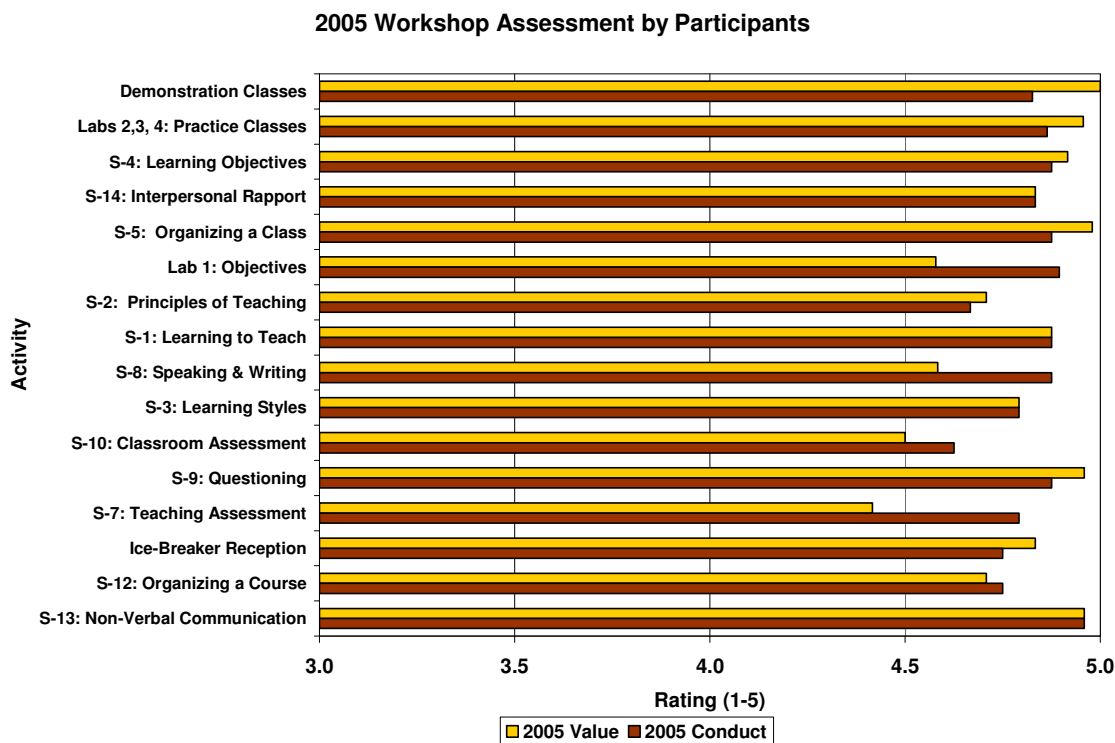


Figure 2. Composite Ratings from Participants at ETW 2005 at USMA

To compare the results of this workshop to the previous workshops, Figure 3 shows both the 2005 data and the average responses on the same questions over the previous five years. Again, the demonstration and practice classes receive the highest scores. From the seminars, the subjects of board notes, questioning techniques and lesson objectives have received the highest ratings over the years. Written comments were highly encouraging and most were overwhelmingly positive:

“I’m not a man of superlatives but this was a life-changing experience. I feel I have a calling for teaching and this workshop helped me put my calling into a more focused/human/efficient perspective.”

“It was totally worth time, even if I felt exhausted at the end. THANK YOU, THANK YOU, THANK YOU!”

“Excellent workshop - I was very depressed about teaching before taking the ExCEED workshop. I felt that I worked very hard but was not effective or appreciated by my students. I was ready to leave teaching for consulting - something that I felt I could excel at. The ExCEED workshop has made it fun to come to work.”

“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.”

“The ExCEED workshop was amazing. If I had known what I was in for ahead of time, I would not have ever gone. However, after surviving the week (sort of), I would not have missed it for the world. It is absolutely one of the most important and useful, although painful, teaching growth experiences I have had.”

“Overall I felt this was an EXCELLENT workshop. I wish I had this 3 years ago when I just started my teaching career.”

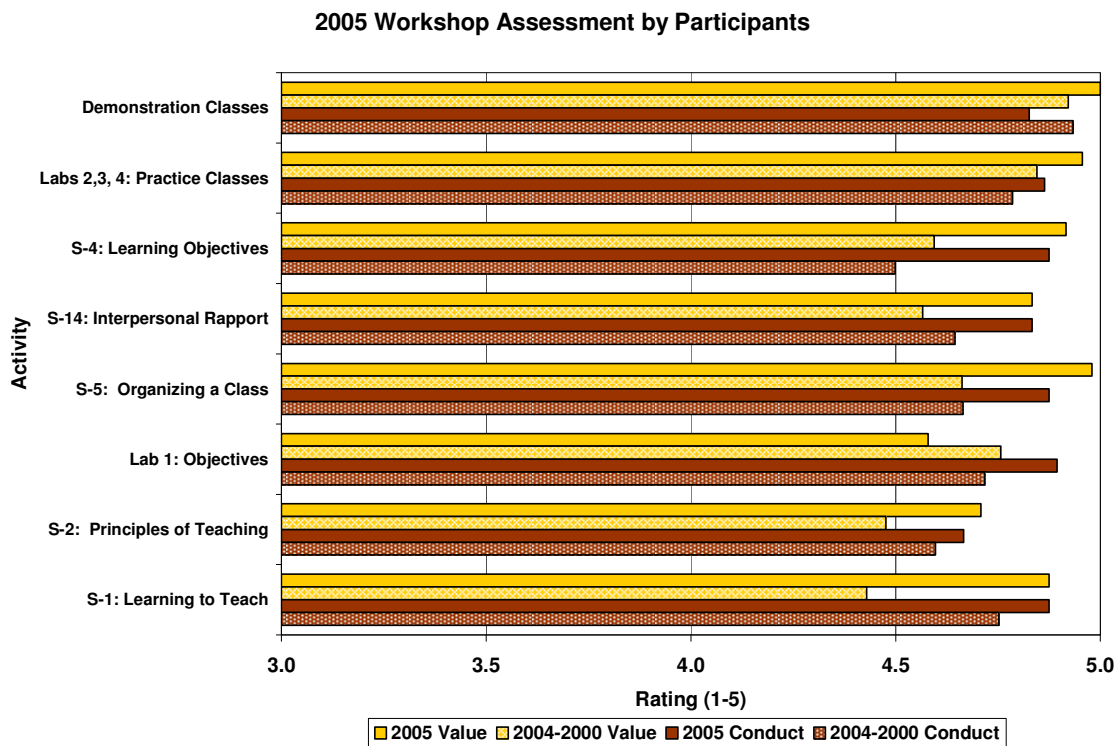


Figure 3. A comparison of the USMA 2005 ETW ratings to the previous five years.

VI. Longer Term Assessment

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) both before the ETW and after the ETW. 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 the USMA 2005 ETW is shown in Figure 4. The participants professed 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 has been between 50 - 75% which itself is an indicator of the long-term

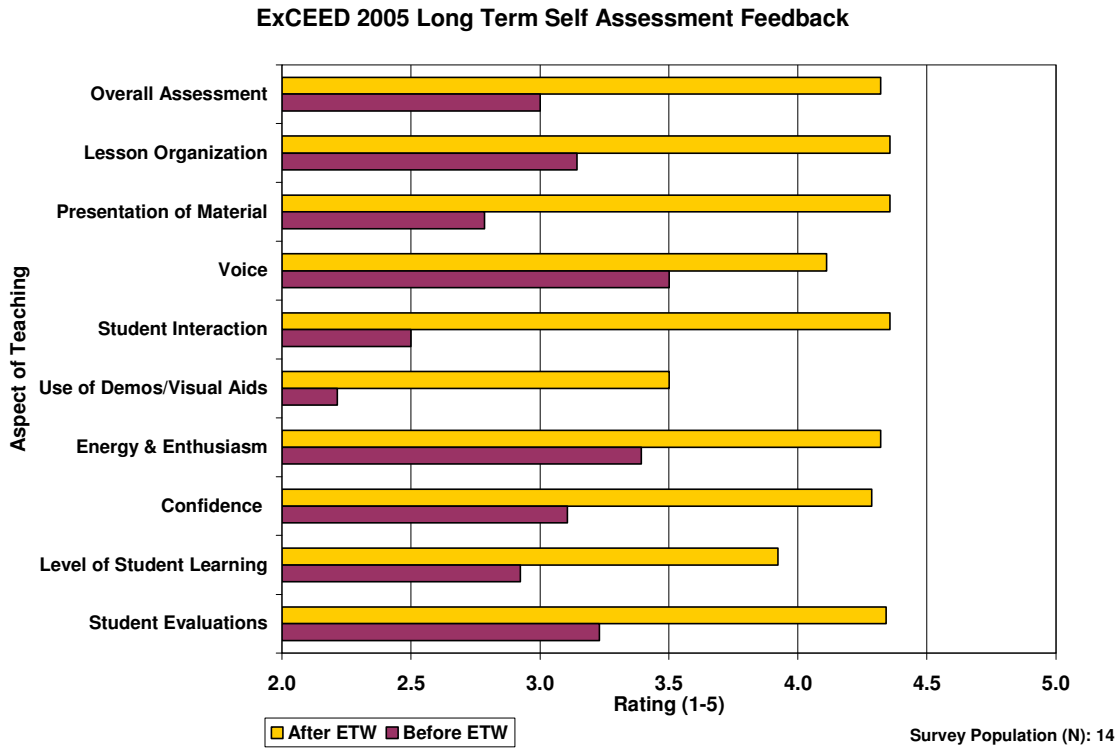


Figure 4. Long Term Self Assessment Feedback From USMA ExCEED 2005 Participants

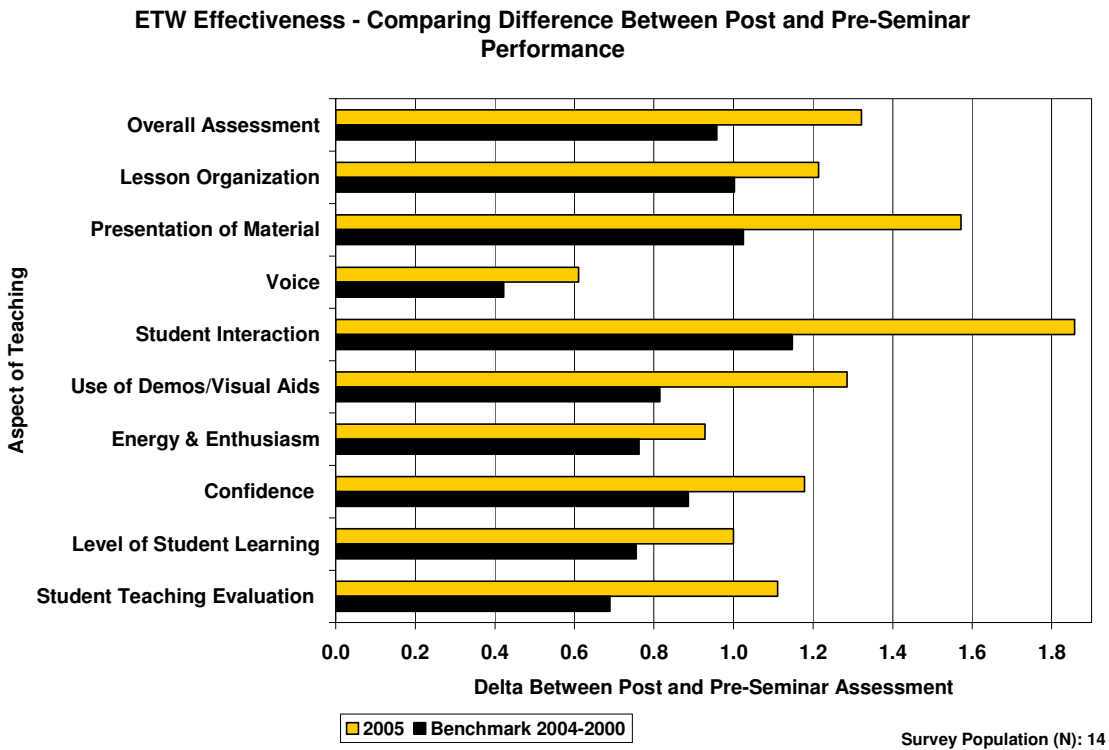


Figure 5. The magnitude of improvement self-assessed by respondents as a result of ETW

effect of the program. Participants are finding it most difficult to bring demonstrations and physical models into the classroom.

The most relevant measure is degree of improvement which is represented by the difference in the pre and post-workshop ratings. For example, the degree of improvement in student interaction for the USMA 2005 ETW was +1.86 ($4.36 - 2.50 = 1.86$) obtained from the values shown in Figure 4. On average, the improvement per category was +1.21 on a scale of 1 to 5 – essentially a 30% improvement in every area. Figure 5 shows the improvement delta for each question and compares the response to the average over the past five years. Participants cited that ETW contributed most to their improvement in student interaction and presentation of the material, which is consistent with past data. The use of voice showed the least improvement.

Participants were also asked to rate the contribution of the ETW to their improved performance on a scale of 1 to 5 (1 = none; 2 = small; 3 = moderate; 4 = high; 5 = very high). Figure 6 shows the results for 2005 and for the previous five years. The ETW contribution was considered between high (4.0) and very high (5.0) in every area except voice and energy/ enthusiasm.

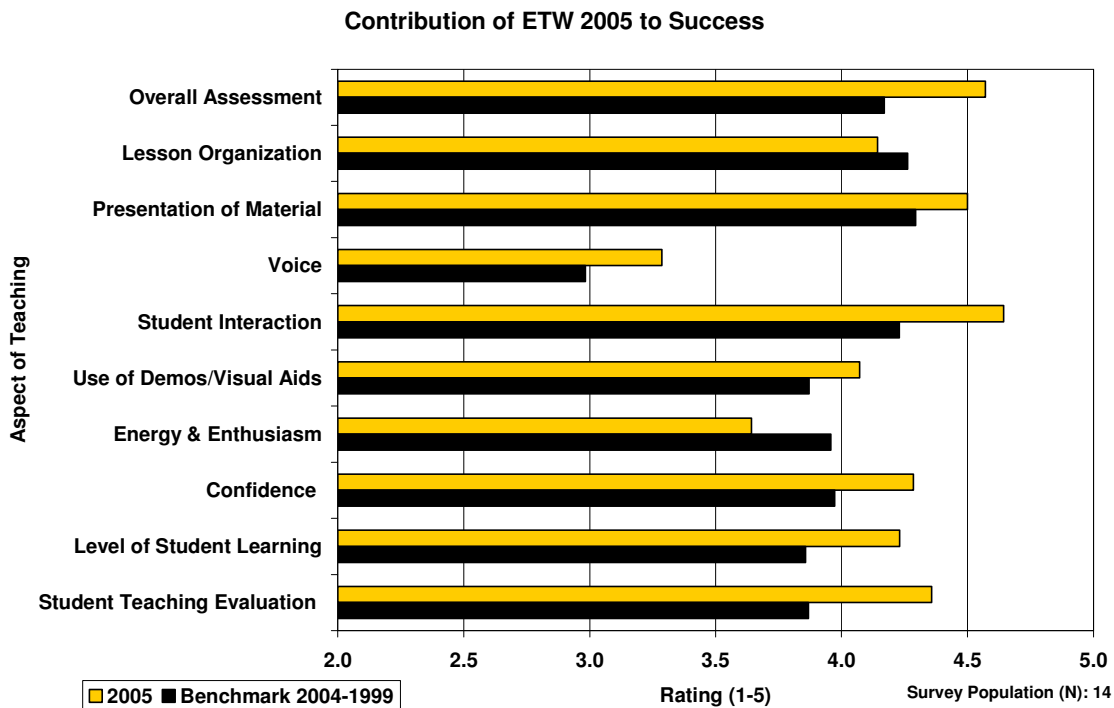


Figure 6. Participant’s assessment of the degree to which the ETW causes improvement in various aspects of teaching

VII. Longitudinal Survey

The ASCE CFD conducted a longitudinal survey in 2007 of all past ETW participants to further gauge the long term effects of this workshop. There were 112 responses; a response rate of 28%. The average length of time since attending the ETW was 3.55 years with a standard deviation of 1.77 years. The respondents were asked how often they use the various skills that are taught in

the teaching workshop. Figure 7 shows the responses which further support that questioning techniques, lesson objectives, and interpersonal rapport seem to have the most long term benefit for participants. The classroom assessment techniques seem to be used least often.

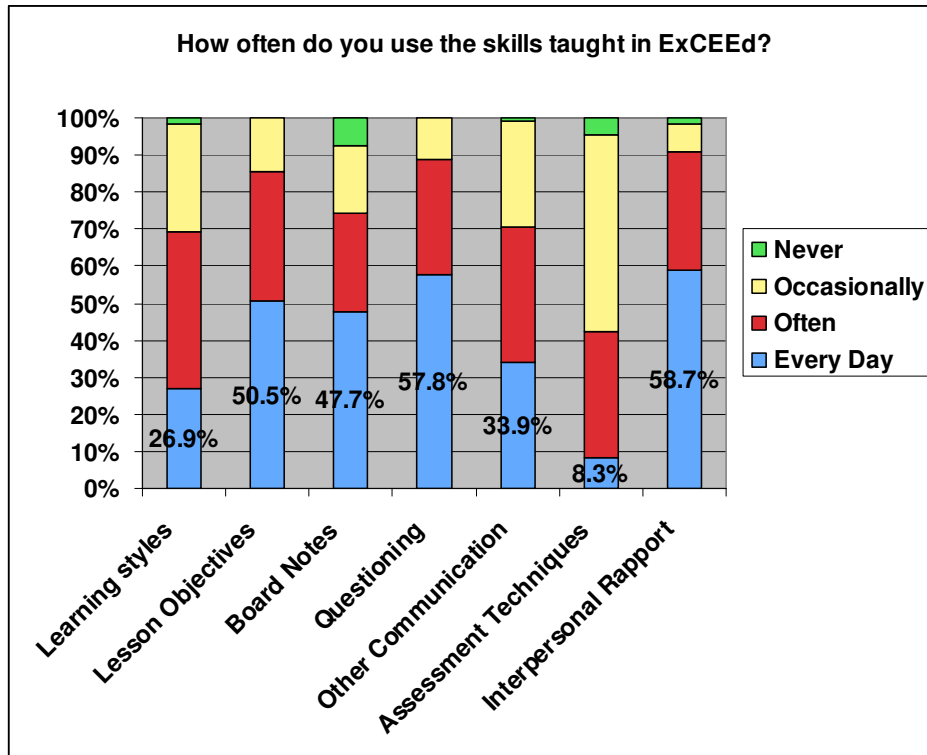


Figure 7. Longitudinal survey results (ETW 1999-2006) regarding how often the skills taught in ExCEED are used.

The survey also asked a number of questions about the value of the ETW with respect to personal growth as a teacher and teaching ratings from students. Figure 8 shows the results for these questions. 89% of the respondents indicated that the ETW was either essential or important for their personal growth as a teacher. For 86% of the responding participants, their teaching ratings improved after their attendance at the ETW. When asked whether they would recommend the workshop to new faculty members in their department, the response was unanimously favorable with 93% offering the highest possible response of “absolutely”. Of the 112 respondents, 45 had been considered for tenure since attending this workshop. Of those, 82% indicated that the ETW helped their attainment of tenure, which is substantial considering the preponderant weight of research over teaching in many university tenure processes.

VIII. Responses to the Assessments and Changes to the ETW

The participant assessments have been tremendously valuable for revising and improving the ETW. As stated earlier, a number of new seminars have been tried as a result of participant feedback. The inclusion of the seminar on Systematic Design of Instruction was largely in

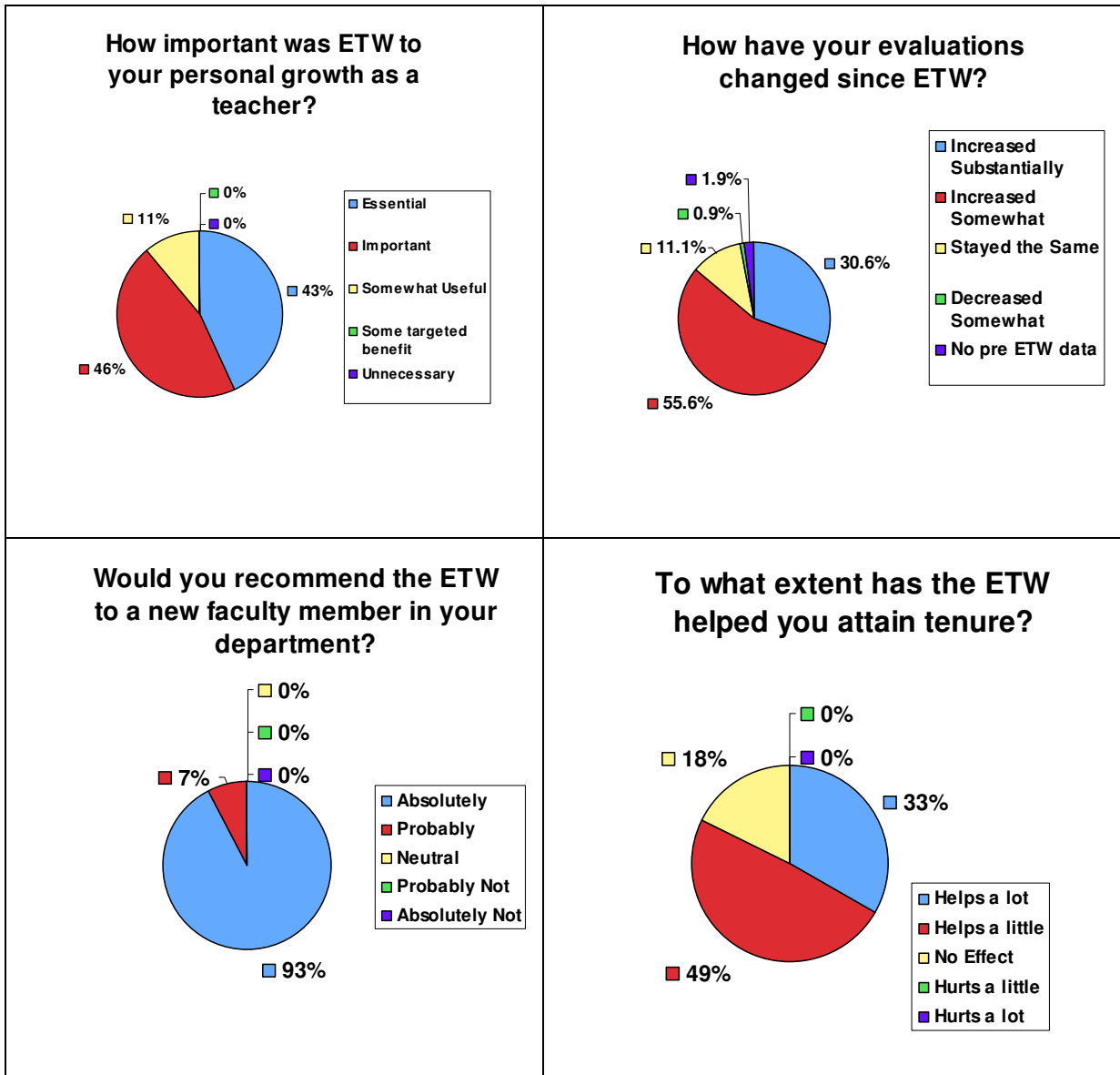


Figure 8. Longitudinal survey results (ETW 1999-2006) on the long term effectiveness of the ExCEED Workshop.

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. The challenge is that there is a fixed amount of time and content available and for every new seminar to be added, some content needs to be deleted.

Because time is such a critical element of the workshop and the participants are exhausted at the end of the week, the minute details of the workshop schedule have provided the most assessment discussion. A major issue has been whether it is better to have participants teach their classes in the morning and attend seminars in the afternoon or visa-versa. There have been advantages to either and the results are inconclusive. Classes are taught in the morning at the USMA

workshops when participants are fresh and focused and in the afternoon in Arkansas and Northern Arizona where mentor-led small groups sessions can proceed at their own individual schedules after the structured morning seminars. The workshop has traditionally started on a Sunday afternoon and finished at noon the following Friday. In response to participant request for more time to prepare classes, USMA attempted a schedule in 2007 that started at noon on Wednesday and finished at noon on Monday. Sunday morning was provided as time off for class preparation and reflection.

In the initial ETW, the demonstration classes were on three totally separate topics, which appealed to the various sub disciplines of civil engineering. All three of the demonstration classes in ETW 2000 were on truss analysis and design. The classes built on each other and 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. The sequenced demonstration classes were better able to incorporate group work into the instruction as well as illustrate how higher cognitive levels can be reached, even in basic engineering topics.

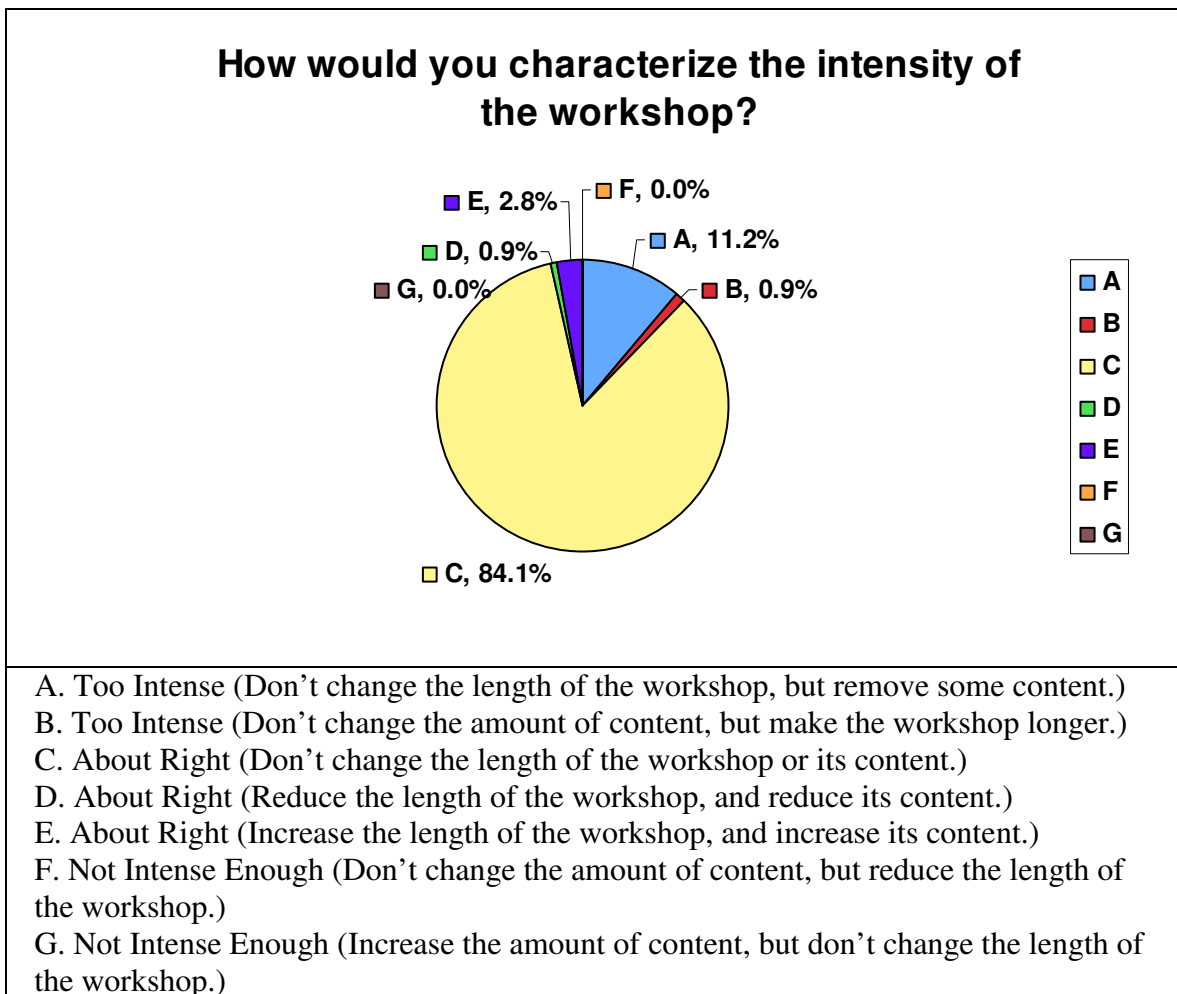


Figure 9. Longitudinal survey results (ETW 1999-2006) on the intensity of the workshop

While there have been changes and improvements made to individual seminars, the core of the workshop has remained surprisingly unchanged since its inception. Allowing sufficient time for discussion is always a balancing act between the productive sharing of ideas and the desire to meet the stated objectives of the workshop. The longitudinal survey asked the respondents about the length and content of the workshop. Figure 9 show the results where 84% of the respondents, when offered several alternatives for revising the workshop, opted not to change anything.

IX. The Future of ETW

The ExCEED teaching workshops will most likely continue as long as funding is available and participants continue to apply. An ever-increasing corps of mentors and assistant mentors are being recruited from the ranks of the workshop graduates and more schools continue to recognize the value of the workshop and are sending participants. In addition to the regular summer workshops, the Committee on Faculty Development has experimented with mini-versions of the workshop at ASCE technical conferences. While the program is a few hours as opposed to a few days, the attendees tend to be practitioner adjunct professors who would probably never be able to attend a full scale ETW. A mini-ExCEED workshop was offered as the 2005 CE Department Head Conference to provide department heads a better understanding of the program they are supporting. Two day workshops have been attempted at individual campuses (University of Missouri at Rolla and University of Delaware), usually with the support of ETW graduates at the host university. Two, 2-1/2 day workshops were also conducted at the Helsinki University of Technology in the summer of 2004.

CFD is considering a follow-up version of the ETW that provides refresher training and addresses more advanced topics. In the longitudinal survey, when asked if they would be willing to attend a follow-up version of the ETW, 79% of the respondents replied yes; 17% said no; and 4% replied maybe. Other plans include expanding the program internationally and perhaps developing an equivalent workshop for new faculty to develop and manage a career plan towards tenure that includes aspects of teaching, research, and service. ASCE has currently established a chat room where ETW graduates can discuss issues involving teaching and maintain a learning community of engineering educators. Similarly CFD is working on high quality DVDs of seminars and demonstration classes from the summer workshops that schools can show at their home institution and allow more effective training for part time faculty.

How many of these initiatives will come to fruition is still being determined. What is certain is the impact that these 21 workshops over the course of a decade have had on the quality of teaching in the civil engineering classroom. The short and long term assessment data provide overwhelming and consistently positive feedback for this program. Engineering students are the real winners. Hopefully more of them will stay in engineering and will ultimately become productive practicing engineers because of ASCE's commitment to this landmark faculty development initiative.

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