

THE EFFECTIVENESS OF AN ADVISORY BOARD AS A CRITICAL FRIEND

Benjamin C. Flores¹, Andrew Swift², Thomas Brady³, and Jana Renner Martinez⁴

Abstract — External advisory committees have played a crucial role in both the implementation of the Model Institutions for Excellence (MIE) program and preparation for ABET accreditation for the College of Engineering at the University of Texas at El Paso (UTEP). The advisory committee model utilized by the MIE program consists of members from both academia and industry that are selected based on their credentials and national stature in their fields. The committee serves as a group of critical friends and provides constructive advice on how to improve implementation of the program, keeping in mind the purposes of the original award: to increase the quality and quantity of under-represented minorities who earn degrees in science and engineering. Recommendations from the committee have positively impacted the program and the university. Based on the recommendations of the committee, the program expanded its pilot entering student program to include all entering science and engineering students in 1998. The success of the entering student program influenced the formation of a new administrative unit at UTEP, the University College, which serves the needs of all entering students. Based on the positive influence of this advisory committee, the College of Engineering adopted its own advisory board. The college then went to the next level and developed a strategic partnership with one company in preparation for ABET accreditation in the fall of 2001.

Index Terms — Accreditation, Advisory Board

INTRODUCTION

In 1995, UTEP was designated as a Model Institution for Excellence to develop strategies to increase the quality and quantity of under-represented minorities in the fields of science, engineering, and mathematics (SEM). The six institutions chosen by the National Science Foundation (NSF) or the National Aeronautics and Space Administration (NASA) represent the spectrum of historically minority-

serving colleges and universities: Bowie State University, Spelman College, the Oyate Consortium, Universidad Metropolitana of Puerto Rico, Xavier University of Louisiana, and UTEP. At UTEP, the overall goal of the program is to double the number of SEM degrees conferred by 2006. In order to accomplish this goal, the Colleges of Engineering and Science have implemented NSF MIE funded activities aimed at increasing the retention and success of their majors. These activities include an entering student program for pre-engineering and pre-science students, an academic center for student support, a center for effective teaching and learning for faculty support, and an undergraduate research program.

NSF and NASA required each of the institutions to seek the advice of an external advisory committee as one part of the evaluation process. While each institution selected its own committee, NSF or NASA approval was required. UTEP's advisory board consists of individuals from both industry and academia with national recognition in their fields. Members from academia either have experience with minority programs in higher education or have an interest in assessment and retention issues. Members from industry include directors of educational foundations, chief engineers, and managers of corporation university-relations offices. These industry members have a vested interest in higher education, in part because their companies actively recruit UTEP's students. UTEP's advisory committee serves as a group of friends that critique the program. This was best epitomized by one of the members of the board: "the advisory board is comprised of individuals who were selected because they have a real and continuing interest in the success of UTEP [1]."

In preparation for the ABET EC 2000 site visit, the College of Engineering utilized many of the MIE evaluation and assessment processes, including an external advisory board. This board, the Industrial Affiliates Group (IAG), was formed in 1998 and is comprised of representatives from twelve companies. The IAG has been a guiding force in the college's adoption of the principles and processes

¹ Benjamin C. Flores, University of Texas at El Paso, bflores@utep.edu

² Andrew Swift, University of Texas at El Paso, aswift@utep.edu

³ Thomas Brady, University of Texas at El Paso, tbrady@utep.edu

⁴ Jana Renner Martinez, University of Texas at El Paso, janarm@utep.edu

The UTEP MIE initiative is funded by the National Science Foundation's Model Institutions for Excellence Program under cooperative agreement No. EEC-9550502.

required for Continuous Quality Improvement (CQI). CQI, a principle used widely in the business sector that involves concepts such as using teamwork to identify and solve problems and making decisions based on fact in order to improve quality of services, has many applications in higher education as well [2].

In 1999, the College of Engineering and its IAG made a joint decision that the college should form a strategic partnership with one company in order to prepare the administrators, faculty, staff, and students for ABET 2000. The company, Raytheon, introduced "Quality" principles to the entire college and demonstrated how the implementation of such principles can affect positive change [3].

BACKGROUND

Located in the largest binational metropolitan region in the world, UTEP serves a diverse and non-traditional student population. Currently, more than 90 percent of UTEP's 16,220 students are from the El Paso area, a community whose majority population has been historically underserved in higher education and under-represented in the fields of engineering and science. Over 70 percent of UTEP's students are Hispanic and an additional 10 percent are Mexican nationals, making UTEP the largest Mexican American majority university in the nation. UTEP is also first in the nation in the number of bachelor's degrees awarded to Hispanic students. In addition, the majority of UTEP's students commute daily and work in order to finance their education or assist in supporting their families. More than 50 percent of UTEP's students are the first in their families to attend college. On average, it takes a successful UTEP student six or more years to graduate.

The College of Engineering is comprised of five departments: Civil Engineering, Computer Science, Electrical and Computer Engineering, Mechanical and Industrial Engineering, and Metallurgical and Materials Engineering. The current undergraduate enrollment in the College of Engineering is 2010 students. The demographics of the College closely mirror those of the university. Historically, the six-year graduation rate in the Colleges of Engineering and Science has been slightly lower than the university wide graduation rate. For this reason, the Colleges of Engineering and Science have joined forces, under the MIE initiative, to create a new model for undergraduate SEM education that focuses on retention and student success.

The MIE program is now in its second phase and in its seventh year of funding. During the first phase, programs and activities that target student retention and success in engineering and science were developed. The MIE initiative at UTEP was required to provide the following:

- A mandatory freshman summer transition program for all SEM students and concurrent enrollment for all

entering students in courses such as University Seminar, Mathematics, and English Composition.

- The services of the Academic Center for Engineers and Scientists (ACES), which is a home for student support, including peer tutoring, study groups and professional societies.
- Expansion of undergraduate research experiences, mentoring, and professional internships
- Enhancement of lower division SEM courses to take advantage of collaborative learning and other study skills developed in the entering student program.
- A center for effective teaching and learning opportunities dedicated to serve faculty and teaching assistants campus wide.
- Enhancement of the institution's capacity for evaluation and assessment for improvement, accountability, and understanding of undergraduate education in SEM.
- An advisory committee for the MIE effort with the approval of the NSF program official to critique major program activities.

The focus of the second phase has been to expand and institutionalize the programs and activities that are successful. The external advisory board has played a critical role in the implementation and ultimate success of these major programs. The board is also a driving force behind the push to institutionalize the programs.

MIE ADVISORY BOARD

Following NSF guidelines for the National MIE Program, the UTEP MIE stakeholders and the Provost selected the advisory board members from a list of distinguished individuals. The board was then approved by both the President of the university and by NSF. The board consists of people from both academia and industry. Many of the members were willing to serve on the board because they already had a connection to UTEP, and the opportunity to serve on this board formalized their relationship with the university. Some board members from industry are recruiters, while others are in the position to be asked for funding. Other members have long-standing friendships with members of the university community. Finally, some of the members are UTEP alumni who are originally from the El Paso area. "Advisors with some connection to UTEP are valuable as it provides a sense of a common starting point, i.e. original roots [4]."

The diversity and overall experience of the group is a huge advantage to MIE and UTEP. The mixture of industry and academic members works very well. "We bring a varied set of viewpoints to the table, coming from many different companies and differing parts of those companies [1]."

Most of the members of the board also have national connections and are familiar with the latest issues and

strategies in higher education. The combination broadens the overall knowledge base of the group. "The Advisory Board has been one of the most involved and thoughtful boards on which I have served. Our board meetings have been energizing and productive conversations about UTEP's important role in delivering the highest-quality educational programs in science and engineering to UTEP students [5]."

Another unique quality of this board lies in its strong relationship with UTEP administrators and MIE personnel. The board meets formally twice a year; however, the principle investigator and director of evaluation of the program communicate with the board, especially the chair of the board, throughout the year.

The board meets to offer advice and assess the impact of the program. "We are supposed to keep in mind the purposes of the original NSF award and to give constructive advice to UTEP faculty and administration about how to improve implementation of the program at UTEP [6]."

Board meetings are scheduled to accommodate the busy schedules of the members. The meetings usually begin in the early afternoon on a Thursday and adjourn by 3:00 p.m. on the next day. Board members are given the agenda and any pertinent information and materials prior to the meeting. Coordinators, directors, and major stakeholders make brief presentations updating the board on recent activities of their programs. The most recent assessment and evaluation results are also presented. The process of preparing for the board meeting has proven to be extremely valuable. Reviewing the data and the material in preparation for the meeting is a "catalyst for introspection [4]": it allows the MIE team to take a step back and review their progress.

The board, in turn, is then able to offer its perspectives from industry and higher education, critique the program, and validate the successes of the program. Three times, the advisory board has met in advance of an NSF site visit in order to raise and address issues that might come up during the visit.

Board members are free to make comments and ask questions for clarification during the presentations. They are also given approximately one hour at the end of the presentations to adjourn to a private meeting room and prepare a brief report to present back to MIE personnel. At a more recent meeting, board members joined MIE personnel in a round table discussion regarding required Phase 3 activities, including dissemination efforts.

MIE is careful to share both the strengths and the weaknesses of the program with the board. The administrative arm of the program has made a real effort to make its advisory board feel like an essential part of the MIE team and its decision making process. MIE personnel and the UTEP administration take the advice of the board seriously. Likewise, the board members expect to be taken seriously and take it upon themselves to seek justification for reasons their ideas were rejected. In addition, the chair of the board has access to key UTEP administrators, including

the President of the University. He knows he can take the board's concerns to a higher level.

One board member sums up her experience this way: "I believe that the personnel in the MIE program fully included the advisory board in understanding what the plans were, how well the plans were progressing, and what appeared to be the major burdens. This openness and focus allowed the advisory board to tune its focus on areas that it could offer the most advice or influence. Thus, the board members felt useful to the project and had a great desire to stay engaged and help wherever they could. I believe the help offered by the board allowed several barriers to success to be lowered, earlier than they might have otherwise been addressed [7]."

The advisory board has had a significant impact on the implementation of the key components of the MIE program. For example, the entering student program, CircLES, was expanded beyond the pilot program to include all entering SEM students at the strong urging of the board. CircLES began as a pilot program aimed at increasing the retention of pre-engineering and pre-science students in 1997. From 1992 to 1997, the first-year retention rate was approximately 70 percent in the Colleges of Engineering and Science [8]. Here, the retention rate is defined as the percent of first-time, full-time students in each cohort that re-enrolled at UTEP the following year [9].

Figure 1 compares the first-year retention rate of the sixty students who were self-selected to participate in the pilot project (1997 pilot group) to the larger comparison group who chose not to participate (1997 comparison group). The first year-retention rate for the pilot group (77%) is higher than that for the comparison group (68%).

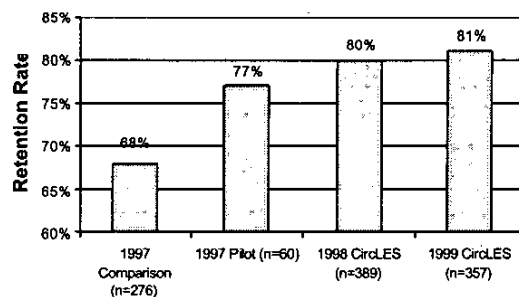


FIGURE 1
ONE-YEAR RETENTION RATES BY STUDENT COHORT

Acknowledging the success of the pilot, the board urged UTEP to expand the program to include all entering SEM students, and therefore maximize the success of the program. In the fall of 1998, the Colleges of Engineering and Science did expand the program as suggested.

Figure 1 also includes the first-year retention rates for the scale-up in 1998 and the following year. The 1998 and 1999 CircLES cohorts include first-time, full-time (i.e. enrolled for at least 12 hours) pre-engineering and pre-science students enrolled at UTEP in the fall semester and who participated in the summer orientation. As the figure demonstrates, the program has continued to be successful and has achieved a first-year retention rate of 80 percent. Achieving a first-year retention rate of 80 percent should have a positive impact on the total number of degrees conferred five years later. In fact, Figure 2 demonstrates that the second-year retention rate of the 1998 CircLES cadre continues to be higher than the 1997 comparison group. The second-year retention rate for the 1998 CircLES cohort is 69 percent while the second-year retention rate for the 1997 comparison group is 54 percent. (Because of its small size, the 1997 pilot group is not included in this data). The success of this program is one of the factors leading to the creation in the year 2000 of the University College, an administrative unit focused on the recruitment, retention, and success of all entering students.

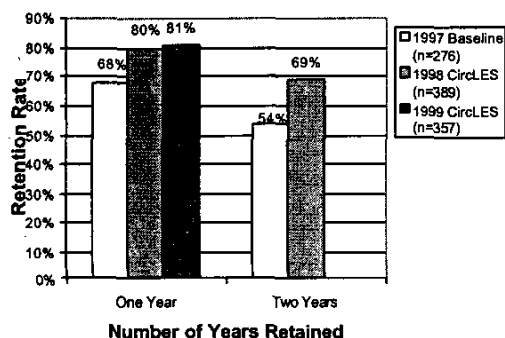


FIGURE 2
ONE AND TWO-YEAR RETENTION RATES BY COHORT

The MIE advisory committee has also played a major role in redirecting other activities the first phase of the program. For example, the board recommended that the program rethink the budget of the undergraduate research program. They suggested that the program spend less on infrastructure and more on student support. The implementation of this change has allowed the program to support approximately 70 students per semester.

The board also supported the selection of new activities for the renewal proposal. New activities included the development of the Bachelor of Science Environmental Science Program and the development of supplemental instruction in gateway courses in Chemistry and Biology.

The board has been plainspoken about problems it sees with the program or the university culture. It voiced its

concerns regarding the lack of process for rewarding faculty, especially non-tenured faculty, for time and effort spent on scholarly teaching. The members urged the university to commit to a culture that does reward scholarly teaching and educational research with tenure, promotion, and merit pay. Because of this recommendation, all tenure-track professors are now required to submit a teaching portfolio, which includes a teaching philosophy statement, with their tenure and promotion packets.

In addition, the board has continually emphasized the importance of the university covering the salaries of the new faculty hired under the grant. The Provost did pick up the salaries of those faculty who remained on campus at the end of Phase 1.

Finally, because the MIE initiative involves long-term institutional change, the board encouraged MIE key players to develop a long-term strategic plan. The board also makes sure that MIE stays focused on the end game.

COLLEGE OF ENGINEERING'S STRATEGIC PARTNERSHIP

Many of the elements included in the assessment and evaluation of the MIE program were utilized by the College of Engineering in implementing CQI and preparing for ABET 2000. In 1998, the College of Engineering formed its own external advisory board, the IAG, which consists of representatives from 12 companies. Three members of the MIE advisory board also serve on the IAG. Each of the five engineering departments also has its own external advisory board, and two members of the MIE advisory board transitioned to departmental advisory boards.

Two years prior to the ABET 2000 visit, IAG and the College of Engineering determined that a college-wide initiative was needed in order to prepare for ABET 2000. The departments were unclear about the new criteria, and each department had its own ideas about how to address the issues. Therefore, the College of Engineering took the advisory board model to a higher level and developed a strategic partnership with one of the companies, Raytheon, that was represented on their board. This partnership required long-term planning and a deep commitment from both UTEP and Raytheon. This partnership was beneficial to both parties: the college benefited from the expertise of industry with "Quality" issues; and by helping the college implement CQI, Raytheon was assured that the students they recruit come from a quality, accredited program.

A two-year plan was developed including two annual college retreats. Two of the MIE advisory board members played a key role in organizing, planning, and providing the financial backing for the retreats. At the first retreat, facilitators from Raytheon shared their CQI expertise with UTEP administrators and faculty. They also assisted the faculty and administrators from the college and each individual department in developing ABET-specific vision

and mission statements and educational objectives. At the end of the retreat, participants left with specific action plans to work on during the year.

The second retreat one year later involved a mock ABET visit. During this three-day retreat, a mock team consisting of representatives from both industry and academia evaluated the college and departments in the same manner an actual visiting team would conduct a visit. The mock team carefully prepared for the visit by attending workshops and reviewing the documentation. The college also prepared for the mock visit as if it were real.

The mock visit was a valuable experience for the faculty and administrators. In fact, the departments felt that the tour of the laboratories portion of the visit was valuable enough to do every year. In preparing for the visit, they documented plans for dealing with the laboratories, laboratory classes and equipment for their undergraduate curriculum. The mock team then delivered an evaluation of those plans. These evaluations were shared with the departmental advisory boards so that new action plans could be made.

The mock visit prepared the college and departments for the ABET visit by increasing their understanding about ABET criteria and allowing them to develop new action plans focusing on the strengths and weaknesses identified by the mock team [3]. At the end of the process, all departments were able to focus on similar goals, and the self-study reports written by each department reflected this unity.

LESSONS LEARNED

The educational model created under the MIE program is a catalyst for long-term systemic change. This type of change challenges traditional undergraduate education and involves institutional and cultural changes. The College of Engineering's preparation for ABET 2000 also involved long-term cultural change within the college. In both cases, the excellent working relationship with an external advisory board, as well as its recommendations and assistance, has played a crucial role in the implementation of these critical changes. The following is a list of lessons learned from our experience.

- The board must have access to higher-level administration. In order for the members to feel as if they are part of the decision-making process, they must have the attention of higher-level administration and decision-makers.
- A selection process for board membership with external expert input is required.
- A broad perspective of board members is highly desirable to validate institutional effort. The diverse

and vast experience of the board enhances the knowledge base of the program. The members validate the successes or confirm the failure of the program based on their experiences elsewhere.

- The institution and program must make it a point to follow through on recommendations. Board members take valuable time from their own schedules to serve on the board. The thoughtful and informed recommendations made by the members deserve careful consideration from the program. In addition, the program needs to justify actions taken.
- The program must engage in considerable self-analysis prior to a board meeting to evaluate quantitative and qualitative data, determine strengths, and identify areas that need improvement. If the preparation for the visit is thoughtful, the program personnel can gauge the progress of the program and target the problem areas for the board to focus on.
- The board must remember that the goal is long-term institutional change.

Good working relationships with board members is essential for long-term institutional change as it adds validity and credibility to the process. Such a relationship is valuable for both parties: the academic partner gains valuable experience and knowledge from outside university setting, and the board members feel like valuable members of the team and gain status in the university community.

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