ABSTRACT

A recent Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis and the subsequent development of a strategic plan for the College of Engineering and Petroleum at Kuwait University are presented. The SWOT analysis is based on internal self-studies and a number of surveys carried out to determine views of various constituencies. Strategic objectives are developed into strategies and actions to address weaknesses and threats by effectively leveraging the strengths and opportunities. An operational plan is currently being developed, which includes specific actions, a timeline for relevant activities, those responsible to implement them, required resources, as well as success metrics to determine the level of achievement.

KEY WORDS
Engineering Education, Strategic Planning, SWOT, EC2000

INTRODUCTION

The external environment has a profound impact on educational institutions. During the last few decades, significant changes took place in almost every aspect of life including the economy, social structures and even in individual preferences. Existing educational programs, and those planned for the future irrespective of the type of school, should be based on a careful consideration of future trends in society. Strategies must be developed to ensure that institutions will be responsible to the needs of the people at present and beyond. This requires among other things an examination of not only the individual college environment but also the external environment. The Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis (also referred to as the TOWS analysis in some management texts), provides a framework for educational administrators to focus better on serving the needs of their constituencies.

The College of Engineering and Petroleum at Kuwait University has recently carried out a series of surveys (e.g., employers, graduating senior students, alumni and faculty members) to obtain feedback of its constituencies on some key issues related to its engineering programs, facilities, and policies. These survey results, available external evaluations (i.e., ABET concerns and observations) and observations regarding local, regional, and international developments are used to develop a detailed SWOT analysis for the whole college, students, faculty, and facilities. SWOT analysis is a simple, easy to understand technique. It can be used in formulating strategies and policies for the administrators; however, it is by no means an end in itself. Currently, an operational plan for the college is being developed to identify
strategic objectives and strategies to achieve those objectives. The plan includes specific actions, a timeline for relevant activities, those responsible to implement them, required resources, as well as success metrics to determine the level of achievement. The purpose of this paper is to demonstrate how SWOT analysis is used to analyze the current status and develop a practical action plan to improve engineering education by fully utilizing the strengths and opportunities.

THE PROCESS OF SWOT

During the Academic year 2001-2002 the Dean appointed a committee with a mandate of preparing a strategic plan for the college, which will guide the college activities for the next ten years. The committee was also charged to evaluate the achievements of the past five years based on the previous strategic plan. The committee submitted its report in May 2002. Simultaneously, the Office of Academic Assessment has been working on developing a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. The main purpose of this analysis was to complement the strategic planning activities, and to help in establishing strategic objectives. A detailed SWOT analysis has been conducted by taking the following inputs into consideration:

1. Employer Survey [1]
2. Exit Surveys for graduating students [2]
3. Faculty Survey [3]
5. Strategic Planning Committee Report [4]
6. Strategic and Operational Plans of various Universities and Colleges (e.g., University of British Columbia, University of Texas at Austin) [5-9]

In carrying out the SWOT analysis, a balanced approach has been adopted so that the views of all constituencies are included. The assessment of strengths and weaknesses are facilitated through surveys, focus groups, anecdotal evidences provided by individual faculty and administrators. It is recognized that different perceptions may exist depending on the representative group consulted. Therefore, considerable effort has been spent to reconfirm the identified strengths and weaknesses. The external look to identify opportunities and threats is considered complimentary to the internal self-study in the SWOT analysis. National and regional influences and concerns are of paramount importance when deciding about the strategies and actions to address the weaknesses. Furthermore, any strategic planning should also address the local and regional threats. Though no formal survey has been conducted to identify the opportunities and threats, group brainstorming, extensive consultations with knowledgeable people, review of local, regional and international developments, a thorough review of existing literature on engineering education lead to the identification of the most relevant opportunities and threats.

STRENGTHS

1. Young and dynamic faculty
   a. Sufficient number
   b. Excellent academic backgrounds
2. A curriculum designed to meet both local needs and international standards (i.e., ABET)
   a. Strong engineering science component
b. Availability of a good variety of general education courses  
c. A well structured laboratory experience  
d. A strong professional component  

3. Well equipped laboratory, library and IT Facilities  
4. Adequate funding  
   a. Research  
   b. Teaching improvement  
   c. Hiring adequate human resources  
   d. Maintaining and upgrading facilities, new campus project  

**WEAKNESSES**  

1. Deficiencies in certain outcomes in graduating students  
   a. Communication skills  
   b. Design/real world applications  
   c. Laboratory experience  
2. Quality and quantity of current students (Undergraduate and Graduate)  
   a. The lack of motivation to excel  
   b. The culture of being “spoon-fed”  
   c. Inadequate language preparation  
   d. Inadequate training in critical or analytical thinking  
   e. Insufficient number of full-time graduate students  
3. Inappropriate mode of teaching  
   a. Spoon-feeding  
   b. Lack of active learning  
   c. Inadequate classroom assessment  
   d. Increasing proportion of new faculty with limited teaching experience  
4. Large proportion of faculty with limited industrial and research experience  
5. Inadequate tenure and reward systems  
   a. Existence of an automatic tenure for nationals  
   b. Absence of a tenure system for non-nationals  
   c. Inadequate merit based incentives for promoting excellence  
6. Inconsistencies in the quality of support staff  
   a. Engineers (Teaching Assistants)  
   b. Technicians  
   c. Secretarial and administrative staff  
7. Insufficient space for expansion  
8. Complicated decision-making process at the University level  
   a. Complicated and restrictive purchasing procedures  
   b. Complicated and restrictive hiring procedures  

**OPPORTUNITIES**  

1. Assessment and accreditation (EC-2000, regional accreditation)  
   a. The flexibility of EC2000 to incorporate local needs into educational objectives  
   b. Developments leading to a possibility of establishing Gulf Accreditation Board for Engineering and Technology (GABET) and our influence in shaping its structure, criteria etc.  
2. Available faculty development opportunities
a. Sufficient funding
b. Institutional support for sabbaticals, travels etc
c. Availability of international workshops, seminars etc
d. Possibility of utilizing local mentors for teaching and research

3. Location
   a. Kuwait’s location in the Gulf region, easy access
   b. Potential of being a trade and industrial hub

4. Emerging technologies
   a. Technologies that does not require extensive industrial infrastructure
   b. Information based technologies

5. New trends in multi-disciplinary professional education and new teaching methods
   a. Possibility of re-designing curriculum and by-laws to allow multi-disciplinary
      teaching and learning
   b. Possibility of utilizing e-learning and distance education

6. Young and dynamic society
   a. A good pool for potential students
   b. Readiness to accept changes

THREATS

1. Competition (local, regional and global)
   a. Emerging local and regional private colleges
   b. Accessibility of international schools via distance education
   c. Fast pace of developments in technology (e.g. IT, emerging new fields)

2. Declining enrollment (interest) in engineering
   a. Lack of sufficient number of quality students with strong interest in
      engineering
   b. Inadequate public awareness for engineering profession and job opportunities

3. Quality of incoming students (language, analytical thinking, motivation)
   a. Inadequate K-12 curriculum
   b. The quality of teaching staff in K-12 education

DEVELOPMENT OF STRATEGIC OBJECTIVES

After a careful review of SWOT analysis, seven strategic objectives have been established to
address the weaknesses and threats identified. For each strategic objective, a number of
strategies and specific actions are developed which exploits the strengths and opportunities.
Furthermore, an operational plan including the strategies, specific actions, responsibilities,
success metrics, and a suggested timeline has been proposed. It is anticipated that each
responsible party will develop its own operational plan to implement the proposed actions.
During this time, required resources should be identified and some possible adjustments need
to be made for a realistic timetable. Currently, targets are not specified for success metrics.
However, the first year results will be used as baseline and improvements will be sought in
subsequent years.

STRATEGIC OBJECTIVES

A closer examination of the SWOT analysis reveals that College Strategic Plan should focus
on the improvements that are related to students, teaching methods and faculty. Therefore, the
following strategic objectives have been developed to address the weaknesses and threats related to various aspects of those issues.

1. Recruit, nurture and retain outstanding students
2. Recruit, nurture and retain outstanding faculty and staff
3. Promote a strong sense of community and collegiality among the students, faculty, staff and alumni
4. Improve teaching and learning through continuous assessment
5. Promote research and consultation that address the immediate and long-term needs of the society
6. Create a strong relationship with society in particular with industry to cooperate in the advancement of the country’s economy
7. Continue to develop and maintain an adequate infrastructure

In developing objectives into strategies and specific actions, effective leveraging of internal strengths and external opportunities are taken into account. As an example, the development of one strategic objective is given.

**Objective 4: Improve Teaching and Learning**

**Strategy A: Provide clear support for teaching excellence**
- **Action 1:** Implement an endowment to recognize excellence in teaching, to be rotated among deserving faculty
  - Responsibility: Vice-dean for Academic Affairs
  - Timeline: Bylaws by Fall 2003, appointment(s) by Spring 2004
  - Metric: Number of faculty awarded endowment

**Strategy B: Provide support for the faculty who is willing to use technology in teaching**
- **Action 1:** Appoint web masters to design and maintain course web pages
  - Responsibility: Office of Automation
  - Timeline: Fall 2003
  - Milestone: Web masters appointed

- **Action 2:** Improve services of Multi-Media facilities
  - Responsibility: Office of Automation
  - Timeline: Ongoing
  - Metric: Quality of facilities and services as judged by user surveys

- **Action 3:** Provide training for the use of technology in teaching
  - Responsibility: Vice-dean for Academic Affairs, Office of Automation
  - Timeline: Ongoing
  - Metric: Number of training workshops/seminars, attendance
Strategy C: Improve infrastructure for technology use
   Action 1: Upgrade college computer network
       Responsibility: Office of Automation
       Timeline: Ongoing
       Milestone: Upgraded network
   Action 2: Increase the number and quality of “smart classrooms”
       Responsibility: Vice-dean for Student Affairs, Office of Automation
       Timeline: Ongoing
       Metric: Number of such classrooms
   Action 3: Facilitate purchase of laptops for students
       Responsibility: Vice-dean Student Affairs
       Timeline: Fall 2003
       Metric: Number of students using this service/offer
   Action 4: Provide each student a college e-mail account
       Responsibility: Vice-dean for Student Affairs
       Timeline: Ongoing
       Metric: Number of students who utilize such services

Strategy D: Establish and sustain a continuous improvement process for all programs
   Action 1: Revise departmental assessment plans and monitor their implementation
       Responsibility: Office of Academic Assessment
       Timeline: Spring 2004
       Milestone: Revised assessment plans
   Action 2: Continue periodic surveys to assess outcomes, and learning environment
       Responsibility: Office of Academic Assessment
       Timeline: Ongoing
       Metric: Number of launched surveys, participation rates
   Action 3: Survey and benchmark student and faculty outcomes
       Responsibility: Vice-dean for Academic Affairs, Office of Academic Assessment
       Timeline: Ongoing
       Milestone: Reports issued on the achievement of outcomes
   Action 4: Start working on regional accreditation
       Responsibility: Dean, Office of Academic Assessment
       Timeline: Spring 2003
       Milestone: Framework established, draft timeline
   Action 5: Establish an international academic advisory board
       Responsibility: Dean
       Timeline: Fall 2003
       Milestone: Mandate approved, members appointed
CONCLUSIONS

A recent SWOT analysis and the subsequent development of a strategic plan for the College of Engineering and Petroleum at Kuwait University have been presented. The SWOT analysis was based on internal self-studies and a number of surveys carried out to determine views of various constituencies. Strategic objectives have been developed into strategies and actions to address weaknesses and threats by effectively leveraging the strengths and opportunities.

In order to be most effectively used, the SWOT analysis needs to be flexible. Situations change with time and an updated analysis should be made frequently. If significant changes are detected, adjustments should be made in the strategic planning document. Furthermore, an assessment will be carried out annually to determine the progress toward achievement of strategic objectives using specific success metrics and milestones. The assessment will be based on horizontal analysis and benchmarking as appropriate. If required, appropriate adjustments and modifications will be made on the operational plan.

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