

AC 2009-1011: DESIGNING QUESTIONNAIRES TO OBTAIN OPINIONS IN ASSESSING PROGRAM PERFORMANCES

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Design of Questionnaires to Obtain Opinions in Assessing Program Performances

Abstract

In accrediting a program, the Accreditation Board for Engineering and Technology (ABET) assesses the program using a list of nine Criteria. Opinions of external constituents of a program are important assessments required by ABET. The major constituents are alumni of a program and their employers. The Educational Benchmarking Inc. (EBI) is one business organization which has a set of questionnaires to collect opinions of external constituents. These questionnaires are enormous in size often repelling the respondents to volunteer their time. Besides, many questions in that survey are irrelevant to program objectives and are devoid of the very essence of the assessment requirements. As a result, it is better to design opinion survey questionnaires based on own assessment requirements. The psychology of the respondents is also one important factor to consider. In the process of development of questionnaires, sacrificing some less important questions turns out to be a good idea too. Any questionnaire more than one page in length is likely to be abandoned by the respondents. The first attempt to obtain responses from external constituencies using the EBI questionnaires ended up with not a single response from employers in 2004. To address this problem, emphasis was made to develop precise instruments (questionnaire) to obtain opinions from the external constituents. Various elements were considered in designing the instruments. One major focus was to make sure which minimum information is needed to fulfill the objectives of the program objectives. This strategy resulted in adequate responses which strengthened the self-study report for ABET visit of Fall 2004. This paper discusses the development of the survey instruments for gathering opinions of external constituents for program objective assessment required in closing the loop in the process of continuous improvement.

Introduction

An academic program excels by the continuous effort of faculty, staff, academic environment and facilities provided by the institution. ABET accredits program based on measured evidence that is in the loop of continuous improvement process. Performance of a program is measured by internal and external constituents of a program. Continuing students are the internal constituents to measure the performance trend of a program while the primary external constituents are the alumni (graduates) and their supervisors/employers.

The ultimate success of a program is measured by the success of the graduates in their professional fields. The professional performance/success of graduates is not noticeable or

measurable unless they are in the profession for at least two years. With maturity in the jobs they are able to make valuable suggestions/feedback to adopt the emerging technology in the industry to uphold a program for continuous improvement.

Program Educational Objectives

The second Criterion of nine Criteria of TAC-ABET (2008-09) is Program Educational Objectives. ABET defines Program Educational Objectives as¹:

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

In the process of assessing the achievement of program objectives, ABET assesses the level of achievement of each program objective including involvement of various constituents supporting the program. Based on the above broad statement, a number of specific educational program objectives were developed as shown in Figure 1.

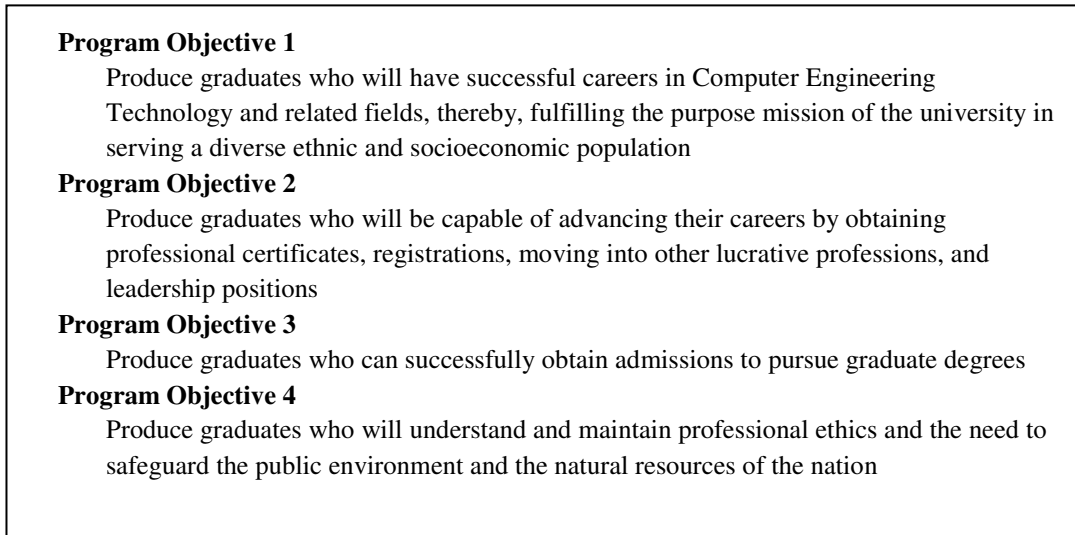


Figure1. Educational program objectives in specific terms

A questionnaire should address all the specific elements of the objectives. This helps to obtain very specific information which can be analyzed to assess the level of achievement of the objectives of a program. Here we describe questionnaires which are brief in size but are capable of capturing relevant information to measure the achievement of program objectives.

Design Criteria

Design of a questionnaire should be based on the specifics of the intended use. It should be short in size. If, for example, the degree of achievement of program objectives is to be

measured, major elements (wordings) in the objectives should be used to prepare a questionnaire. Any questionnaire larger than two pages in length is repelling to respond.

The Educational Benchmarking Inc. (EBI) does business to conduct opinion surveys. It has as many as 83 questions with lot of redundant and boring questions. It is difficult to relate these questions to the objectives and assessment plan. During designing a questionnaire (instrument), the psychology of the respondent should be carefully thought about. It is likely that a respondent may not respond to a long list of questions. Even if he does, he may not put his valuable thoughts. To obtain meaningful response from a targeted person, a survey instrument (questionnaire) needs to be prepared with adequate judgment and thought. In designing a questionnaire some basic and simple factors should be kept in mind such as:

- i. Psychology of the respondents - their interest or desire to respond, time they would require to set aside in responding
- ii. Basis of the questionnaire - what specific purpose or objective the analysis will it serve
- iii. Length of questionnaire - emphasis or focus on major questions; avoiding simple, obvious, and pleasant questions. A single page questionnaire is desirable in obtaining meaningful information from the respondents.

Constituents Supporting a Program

Faculty, students, staff, institutional facilities and learning environment together are the major constituents in the process of continuous improvement of a program. These are the internal players who are directly involved in the process. The evaluators and patrons of the program are the Alumni, Employers, Industrial Advisory Board Members, Graduate Degree Supervisors, and Intern/Co - op Supervisors. These players play a vital role as external members who extend their supports as obligation to the society, nation by extending their support to the program.

Figure 2² is a model which depicts how its constituents can improve a program. The internal constituents are actively involved to keep the program sustain and improve continuously. The external ones support with their soft services to the program. Of the internal players, faculty members are the engineers to build students equipped with knowledge and skills needed to be successful in their professional careers. Staff is the helping hand in the program. The external players do not carry direct responsibility. They contribute with their moral, ethical and patriotic obligation and responsibility to the society and nation as a whole. Internal players have additional responsibility to keep the external players involved in the process of improvement.

Of all the external contributors (players), the members of Industrial Advisory Board (IAB) get a first hand view of the academic program, its curricula & laboratory facilities and have chance to talk to the continuing students. They can also make on-the-spot assessment and provide advice and suggestions for improvements. Others contribute by participating as experts in Opinion Survey.

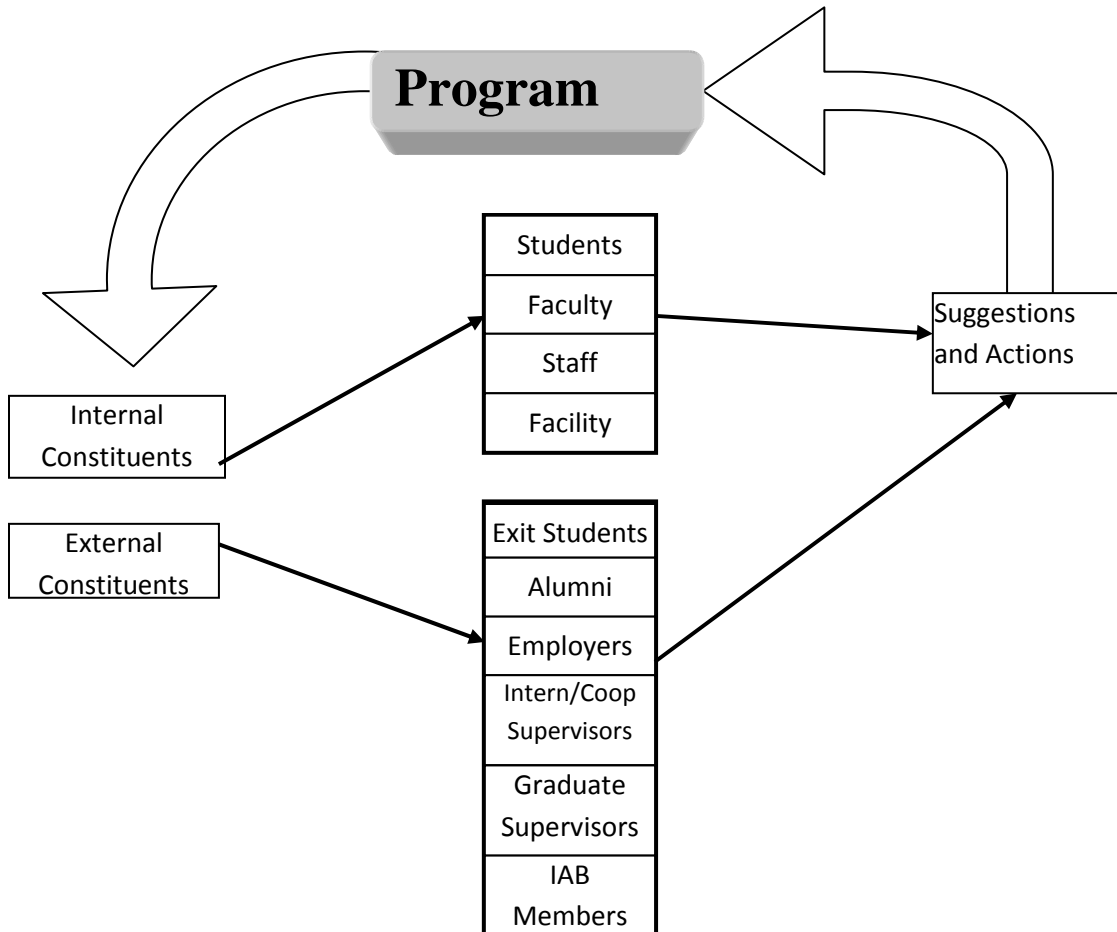


Figure2. Constituents' involvement in the process of continuous improvement²

Survey Instruments

The Survey Instruments are shown in appendix Figures A.1 to A.6 at the end of the paper. Each one is only one page long. Basis of each instrument is indicated with a single line theme of emphasis. A response scale of 1 through 10 widens the flexibility to answer individual questions. However, depending on situations, “Yes” or “No” responses are specified too.

Exit Survey

This survey is conducted at the end of each semester on the graduating students. The ABET a-k outcome tool is used to measure the level of their confidence. At course level their outcomes are measured using the a-k outcome tool. Students judge themselves as to what level of confidence and expertise they have earned as they get ready to enter the Corporate America (Figure A.1)

Graduate Advisor Opinion Survey

Readiness for graduate study is one of the objectives of any program. This survey is sent to the graduate advisors of those alumni who have been pursuing graduate studies (Figure A.2) in any disciplines.

IAB Member Survey

Industrial Advisory Board members meet at least once a year to assess programs from various aspects and suggest any improvements. This survey captures their opinions on the quality of the programs reflecting the students, faculty and laboratory facilities (Figure A.3.)

Intern/Co-op Supervisor Survey

Opinions of the Intern/Co-op supervisors on the skills and performance of the continuing students form another important feedback to a program. The ABET a-k outcome tool can be used in this survey (Figure A.4)

Alumni Survey

Alumni with at least two years of professional experience are the valuable source of information to judge the strength and recommend ways to enhance the programs. Their performance in the industry is the major indicator of achievement of the program objectives. As shown in Figure A.5, a one page questionnaire is prepared on the basis of program educational objectives. The wordings used in each program objective are analyzed to create questions for the alumni. As for example, to capture the major elements for Objective 1, six sub-questions (1.1 through 1.6) have been shown in the Figure. Thus the information obtained from the alumni can be used to determine the level of achievement of program objectives.

Employer Survey

Employers are the persons who can rightfully assess the performance of the product of a program. An educational program achieves its objectives when the employers are satisfied by

the performance of the graduates of the program. This questionnaire is prepared in the light of the program objective elements similar to the alumni survey (Figure A.6.)

Results and Discussion

With three pages long elaborate questionnaires no response was received for the self-study report prepared for the 2004 TAC-ABET visit. The assessment reflected this as a weakness. The redesigned questionnaire described above was utilized and generated expected results. Total of 26 alumni and 16 employers responded immediately. The department was able to receive adequate responses from other external constituents as well. The alumni and employer questionnaires were designed to assess the four program objectives with opinions from the alumni working in the Corporate America and their employers as well. Responses from the alumni are in Yes or No format while that from the employers are on a scale of 1 to 10. Figures 3 and 4 show the analyses of responses from the alumni and employers, respectively.

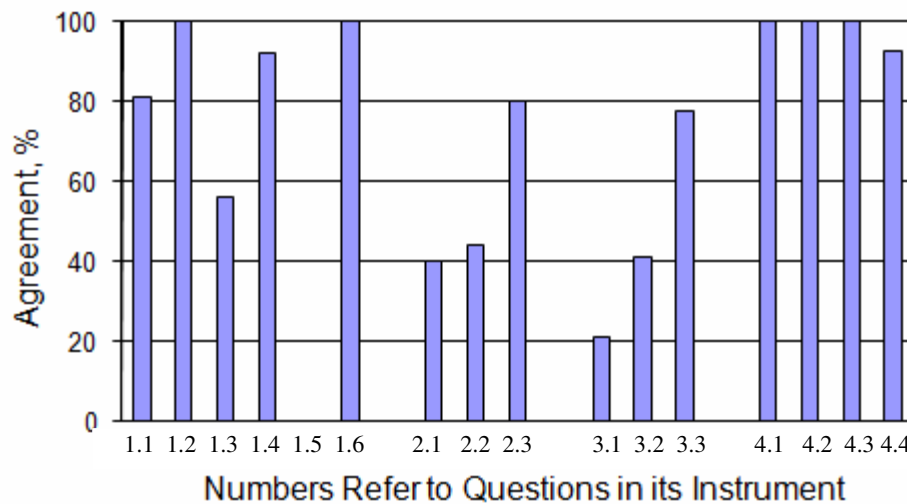


Figure3. Responses from alumni to reflect the degree of achievement of the four Program Objectives

To achieve optimum response for each objective, multiple sub-questions were created for each objective. For example, Objective 1 contains sub-questions as 1.1 to 1.6 and Objective 2 has sub-questions as 2.1 to 2.2.

Alumni responses are plotted in percentages while the responses from the employers are shown on a scale of 1 to 10. A closer look at Figures 3 and 4 indicate a better match between the responses. Objective 1 measures the degree of success of the alumni in their profession in terms of technical skills, comfort of work, recognition in the profession, attitude toward challenging

skills, and skills developed to work in teams. Figure 3 shows the alumni point of view in their success. The “Yes” or “No” responses have been translated to the scale of 0 through 100 as shown in the Figure. Their claims of success do not seem to be exaggerated as the employers are seen to have the same level of appreciation about the alumni (Figure 4). For example, question 1.2 indicates that the employers are 90% inclined to hire graduates from the same institution. This is a very positive finding to support the achievement of Objective 1 of the program.

Objective based questionnaire with few but specific sub-questions provides useful tool to assess achievement in a particular objective of a program.

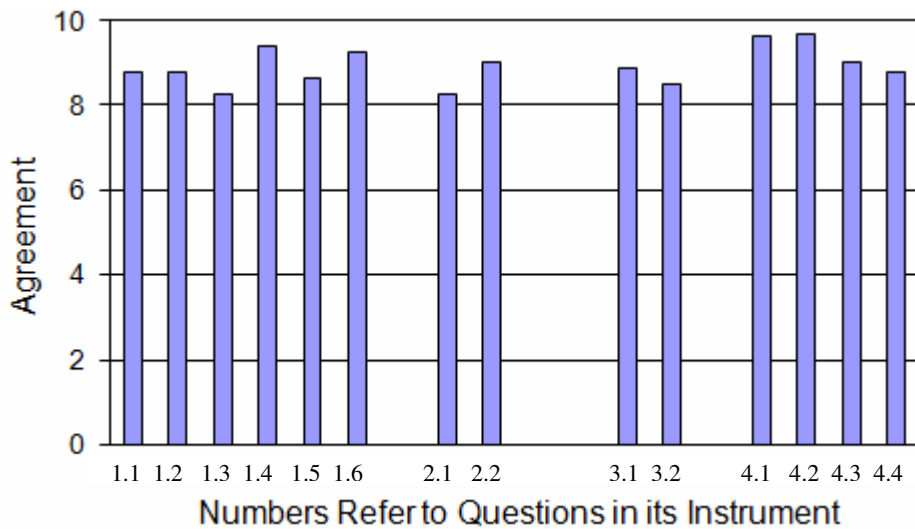


Figure 4 Responses from employers in reflecting the degree of achievement of four Program Objectives.

Conclusions

In designing a survey instrument to collect opinions, certain important factors, such as, key objective elements, psychology of the respondents, and method of analysis of the responses, need to be considered. The respondent is always not obliged to respond in any way. A questionnaire more than a single page long is usually discarded. Focus should be made to obtain information to reflect only the key elements of an objective. In setting a question, its relevance to meet the objectives should be emphasized. A less effective question should always be avoided in order to obtain realistic opinion from a respondent.

The instruments presented in the Appendix proved very effective in getting adequate responses from target population. However, there is always room for improvement.

References

1. T003 Self-Study Questionnaire 6-28-07 (<http://www.abet.org>). p.6
2. Sarker, N. N. and C. M. Akujuobi, 2008. On instruments for closing the loop for ABET accreditation. Fifteenth National HBCU Faculty Development Symposium held at Kellogg Conference Hotel at Gallaudet University, Washington DC, October 23-25, 2008

APPENDICES

Exit Survey

**Theme: Gaining Academic Confidence by achieving knowledge and skills
(a-k Outcomes used as a method to measure)**

Student Name _____

Student Graduated with Major: CPET/ELET Date Responded _____

Response scale: 1 – Not agreed at all. 10 – Agreed the most.

Instruction: Focus on the entire length of study period here

Criteria	Criteria Description	Response: 1 - 10
a	Appropriate mastery of knowledge, techniques, skills, and modern tools of their disciplines	
b	An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology (MSET)	
c	An ability to conduct, analyze, and interpret experiments and apply experimental results to improve process	
d	An ability to apply creativity in the design of systems, components or processes appropriate to program objectives	
e	An ability to function effectively on teams	
f	An ability to identify, analyze, and solve technical problems	
g	Ability to communicate effectively	
h	A recognition to the need for and an ability to engage in life-long learning	
i	An ability to understand professional, ethical, and social responsibilities	
j	A respect for diversity and knowledge of contemporary professional, societal, and global issues	
k	A commitment to quality, timeliness, and continuous improvement	

Your email address which you will keep the longest: _____
(Hotmail, yahoo, or Gmail account)

Figure A.1 Instrument to survey of the strength and skills of the exiting students

GRADUATE ADVISOR Opinion Survey

Theme: Preparedness for Graduate Studies

Graduate Student (Alumnus) Name _____ Major at PVAMU CPET/ELET

Graduate Advisor Name _____

Department _____ University _____

Date Responded _____

Response scale: 1 – Not agreed at all. 10 – Agreed the most.

Nos.	Description	Response: 1 - 10
1	Adequately prepared for graduate studies	
2	An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology (MSET)	
3	An ability to conduct, analyze, and interpret experiments and apply experimental results to improve process	
4	An ability to apply creativity in the design of systems, components or processes appropriate to program objectives	
5	An ability to function effectively on teams	
6	An ability to identify, analyze, and solve technical problems	
7	Ability to communicate effectively	
8	A recognition to the need for and an ability to engage in life-long learning	
9	An ability to understand professional, ethical, and social responsibilities	
10	A respect for diversity and knowledge of contemporary professional, societal, and global issues	
11	A commitment to quality, timeliness, and continuous improvement	

Figure A.2. Instrument to obtain the opinions of Graduate Study Supervisors on the preparedness of the Alumni from the Engineering Technology department

IAB MEMBER Feedback on the Programs

Theme: Educational Program Quality and Facility

Note:

This questionnaire is designed for the IAB members to assess the performance of the department as a whole in terms of quality teaching, motivation and dedication of the faculty and staff to achieve the goals of the department and the environment for the students to learn.

Member Name _____

Affiliation _____

Date Responded _____

Response scale: 1 – Not agreed at all. 10 – Agreed the most.

Nos.	Description	Response: 1 - 10
1	IAB meeting outcomes are implemented in the programs	
2	Faculty members strive to continuously update the course and curricula	
3	Laboratories are being updated with modern equipment and software	
4	Faculty members are actively involved in their professional developments	
5	Student scholarships are properly managed by the department	
6	Department engaged in exploring Coop/Internships for students	
7	Students are involved in professional societies and clubs	

Figure A.3. Instrument to obtain the opinions of the IAB members on the programs of the Department of Engineering Technology

INTERN/COOP SUPERVISOR Survey

Theme: Quality of the Continuing Students

Intern Supervisor Name _____ Organization Name _____

PVAMU Student Name _____ Major CPET/ELET Date Answered _____

Response scale: 1 – Poor. 10 – Excellent.

Program Objective 1

Produce graduates who will have successful careers in Computer/Electrical Engineering Technology and related fields, thereby, fulfilling the purpose mission of the university in serving a diverse ethnic and socioeconomic population

Questions	Answer: 1 to 10
1.1 How do you rate the technical skill of the intern	
1.2 How comfortable you are in hiring our students as intern in the future?	
1.3 The intern deserves special recognition/appreciation	
1.4 The intern is enthusiastic about taking challenging tasks	
1.5 The intern's communication skills	
1.6 The intern's skill to work on teams	

Program Objective 2

Produce graduates who will be capable of advancing their careers by obtaining professional certificates, registrations, moving into other lucrative professions, and leadership positions

Questions	Answer: 1 to 10
2.1 Do you see any leadership potential in the intern?	
2.2 The intern's motivation to advance career by obtaining certifications, involvement in leadership, etc.	

Program Objective 3

Produce graduates who can successfully obtain admissions to pursue graduate degrees

Questions	Answer: 1 to 10
3.1 The intern has intuition/potential to do research and analytical skills to solve problems	
3.2 The intern demonstrates potential for graduate studies in the future	

Program Objective 4

Produce graduates who will understand and maintain professional ethics and the need to safeguard the public environment and the natural resources of the nation

Questions	Answer: 1 to 10
4.1 How do you rate the intern in maintaining the professional code of conduct	
4.2 The intern maintains high ethical standard in his/her career	
4.3 The intern is aware of the importance of public safety in his/her career	
4.4 The intern is aware of protecting the environment and the natural resources of the nation	

Figure A.4. Instrument to obtain the assessment of Coop/Intern Supervisors of performance of the Continuing students of the Department of Engineering Technology

ALUMNI SURVEY

Program Objective Based Questionnaire

Theme: Professional and Career Satisfaction to meet the Educational Program Objectives

1. Name _____ 2. Semester Graduated _____ 3. Major _____
 4. Name and Address of Organization working _____ 5. Date _____

Program Objective 1:

Produce graduates who will have successful careers in Computer/Electrical Engineering Technology and related fields, thereby, fulfilling the mission of the university in serving a diverse ethnic and socioeconomic population

Questions	Yes	No
1.1 Are you working in the area of your expertise (CPET/ELET major)?		
1.2 Do you feel comfortable and secured with your job performance?		
1.3 Did you receive any special recognition from your employer?		
1.4 Do you think your company is comfortable in hiring CPET/ELET graduates of PVAMU in the future?		
1.5 Do you have or applied for any patent?		
1.6 Do you think you received adequate academic foundation from PVAMU for this job?		

Program Objective 2:

Produce graduates who will be capable of advancing their careers by obtaining professional certificates, registrations, moving into other lucrative professions, and leadership positions

Questions	Yes	No
2.1 Are you in a leadership position?		
2.2 Have you received any professional certification or registration?		
2.3 Did you receive any professional training to advance your career?		

Program Objective 3:

Produce graduates who can successfully obtain admissions to obtain admissions to pursue graduate degrees

Questions	Yes	No
3.1 Do you have graduate degrees (MS or PhD)?		
3.2 Else do you have graduate admission but did not complete yet?		
3.3 Else do you have plan for graduate studies in near future?		

Program Objective 4:

Produce graduates who will understand and maintain professional ethics and the need to safeguard the public environment and the natural resources of the nation

Questions	Yes	No
4.1 Do you maintain the professional code of conduct?		
4.2 Do you maintain your high ethical standard in your career?		
4.3 Are you aware of the importance of public safety in your career?		
4.4 Are you aware of protecting the environment and the natural resources of the nation?		

Figure A.5 Survey Instrument to opinions from Alumni

Employer Survey

Theme: Achieving Educational Program Objectives through the Performance of Alumni

Supervisor Name _____ Organization Name _____

Employee Majored in CPET/ELET Date Answered _____

Response scale: 1 – Poor. 10 – Excellent.

Instruction: Respond for those who graduated from PVAMU

Program Objective 1

Produce graduates who will have successful careers in Computer/Electrical Engineering Technology Engineering and related fields, thereby, fulfilling the mission of the university in serving a diverse ethnic and socioeconomic population

Questions	Answer: 1 to 10
1.1 How do you rate the technical skill of the employee	
1.2 How comfortable you are in hiring our graduates in the future?	
1.3 The employee deserves special recognition	
1.4 The employee is enthusiastic about taking challenging tasks	
1.5 The employee's communication skills	
1.6 The employee's skill to work on teams	

Program Objective 2

Produce graduates who will be capable of advancing their careers by obtaining professional certificates, registrations, moving into other lucrative professions, and leadership positions

Questions	Answer: 1 to 10
2.1 The leadership skill of the employee	
2.2 The employee has the potential to advance career by obtaining certifications, etc.	

Program Objective 3

Produce graduates who can successfully obtain admissions to pursue graduate degrees

Questions	Answer: 1 to 10
3.1 The employee has higher degrees (MS or PhD) or potential for. (1 - Poor, 10 - Excellent)	
3.2 The employee has intuition to do research and analytical skills to solve problems	

Program Objective 4

Produce graduates who will understand and maintain professional ethics and the need to safeguard the public environment and the natural resources of the nation

Questions	Answer: 1 to 10
4.1 How do you rate the employee in maintaining the professional code of conduct	
4.2 The employee maintains high ethical standard in his/her career	
4.3 The employee is aware of the importance of public safety in his/her career	
4.4 The employee is aware of protecting the environment and the natural resources of the nation	

Figure A.6. Survey Instrument to obtain opinion from the Supervisors of Alumni