

The Art of Innovative Quality Assurance Tools: the case of ABET accreditation



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Introduction

- ABET stands for Accreditation Board for Engineering and Technology
- It is a non governmental organization that accredits post secondary educational organizations in :
 1. Applied science
 2. Computing sciences
 3. Engineering sciences
 4. Technology.
- Around 3,400 programs are accredited, distributed over more than 700 universities and colleges in 28 countries [1].



Introduction

- ABET is a voluntary accreditation that is achieved through a peer review process.
- Accreditation provides assurance that a program meets the quality standards established by the profession for which the program prepares its students [1].
- It was first introduced to the American Engineering Education in the middle of 1990s [2].



Criteria for accrediting Engineering Programs

ABET criteria	Tools developed to fulfill the requirements
Criterion 1 – Students	Student performance must be evaluated. Student progress must be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives.
Criterion 2 – Program Educational Objectives	The program must have published program educational objectives that are consistent with the mission of the institution, the needs of the program's various constituencies.
Criterion 3 – Student Outcomes	The program must have documented student outcomes that prepare graduates to attain the program educational objectives; usually these outcomes are referred to as a to k outcomes.
Criterion 4 – Continuous Improvement	The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which both the program educational objectives and the student outcomes are being attained.
Criterion 5 – Curriculum	The faculty must ensure that the program curriculum devotes adequate attention and time to each component, consistent with the outcomes and objectives of the program and institution.
Criterion 6 – Faculty	The faculty must be of sufficient number and must have the competencies to cover all of the curricular areas of the program. There must be sufficient faculty to accommodate adequate levels of student-faculty interaction.
Criterion 7 – Facilities	Facilities must be adequate to support attainment of the student outcomes and to provide an atmosphere conducive to learning.
Criterion 8 – Institutional Support	Resources including institutional services, financial support, and staff (both administrative and technical) provided to the program must be adequate to meet program needs.

Adapted from ABET [1].



Why ABET is important?

- It is difficult to ensure good educational quality in developing countries; many private and public universities/colleges are offering engineering degrees [3].
- International accreditation can insure that graduates have met the educational requirements necessary to enter the profession [3].
- ABET accreditation provides assurance that a college or university program meets the quality standards established by the profession for which the program prepares its students [1].
- ABET accreditation enables institutions to show the public that they are serious about advancing the quality of their programs [1].



The need for Innovative Quality Assurance Tools

- Many institutions find the preparation process for ABET accreditations a very stressful process due to uncertain review process outcomes.
- This is due to the fact that majority of academic literature and practitioners are focused on the most appropriate procedures for forming Program Educational Objectives (PEOs) and student outcomes (i.e. A-K) [2].
- This has given little attention to developing necessary quality assurance tools and management tools that can enhance accreditation success and minimize review process uncertainty.



Case Study

- A case study was conducted in the premises of the Faculty of Engineering and Information Technology of An-Najah National University in Palestine.
- In 2011, the Faculty of Engineering and Information Technology started an “ABET project” with seven engineering programs at the same time.
- Implementation of this project resulted in a successful ABET visit in October 2013.



Innovative Quality Assurance Tools

1) Centralized ABET project office

- ABET project office is responsible for defining and maintaining standards for ABET criteria implementation.
- The office created economies of repetition in the development and implementation of all processes related to the preparation of ABET accreditation in the seven engineering programs.
- For this purpose, the center has become the source of archival documents, guidance, and metrics related to the practice and execution of ABET criteria.
- the ABET project office conducts internal auditing at the seven engineering programs at the end of each academic semester. These auditing efforts aim for identifying any inaccuracies in the direct and indirect data collection and processing measures, or to detect any course portfolio's lack of materials and samples.



Innovative Quality Assurance Tools

2) ABET Computerized system

- In order to deal with direct and indirect data for seven engineering programs simultaneously, a computerized information system was deemed necessary.
- Teaching staff were able to enter their students' marks in the different course work with proper identification with student outcomes covered in these course works for direct assessment.
- The system also made it possible for other indirect data to be collected by conducting students' survey, alumni survey, and employers' survey.
- To increase efficiency of performing evaluation processes, the computerized system is equipped with student outcomes matrices displaying function for each engineering program based on the direct and indirect data collected.



3) Project steering committee

- The main concern of the committee is making strategic decisions about the management and monitoring of the ABET accreditation project
- This includes processes and procedures to maintain ABET criteria, assessing and validating any changes in these processes as part of the continuous improvement of the quality assurance system used, and controlling the execution deadlines of the project and any needed extensions or changes.
- This role of the steering committee was found to be very helpful to all programs involved in the project



4) PEOs maintenance committee

- The PEOs maintenance committee is responsible for ensuring that the PEOs of the engineering program are always up-to-date and are consistent with the university Mission by the end of each evaluation cycle.
- The committee does this through detection of any changes to
 - I. University mission,
 - II. Detect any changes to global trends in teaching/ curriculum of the engineering program,
 - III. It is also responsible for collecting further suggestions and comments via committee members own personal contacts with industry and local market, apart from the official contacts and meetings with constituencies.





5) Program Quality Assurance committee

- It acts as a forum for discussing inputs from the program constituents that can affect the program curriculum, PEOs, or teaching methods that guarantee improvement of students' outcomes.
- It also acts as a planning engine for the program where all the continuous improvement actions are generated.
- The program quality assurance committee oversees the quality assurance reports as prepared by the teaching staff.
- The committee is able to provide guidance and help on some elements of the measures suggested by the staff member to improve its effectiveness.
- the committee promotes the voice of the students in the program quality framework through effective representation of students in the committee meetings where appropriate.

Innovative Quality Assurance Tools



6) Eco-Accreditation Project

The environmental aspects of the ABET Project at An-Najah University has been a priority by relying on electronically scanned copies of documents instead of hard-copies.

Paper consumption was minimal as it was only used for official correspondences in some certain cases.

The green policy of the project was further fostered by the presence of the ABET computerized system through which all of the direct assessment, indirect assessment, and quality assurance reports of courses were performed.

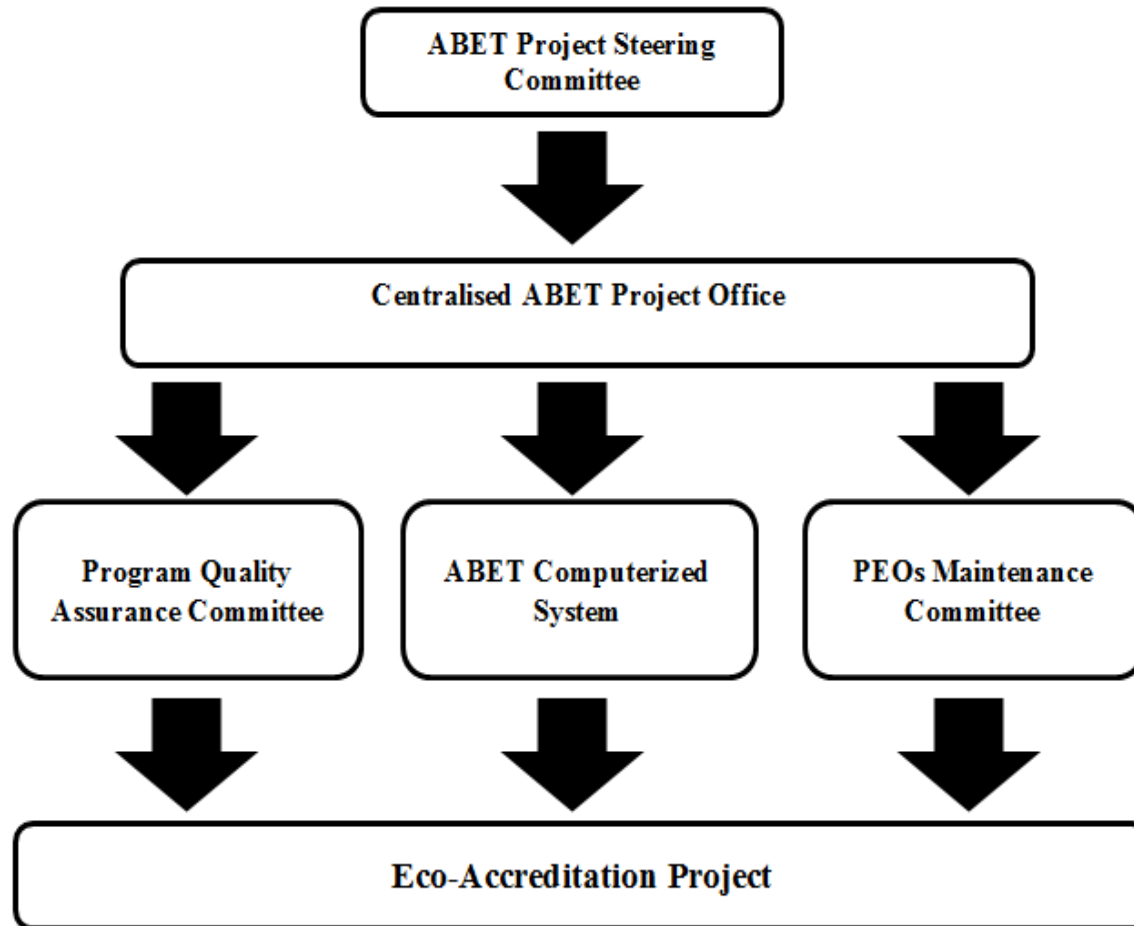
Subsequently, programs review materials and archives were all available electronically for the ABET review visit, which made it a seamless process with easy access to information.





Quality System Framework for ABET

Figure below summarizes the innovative quality assurance tools developed.





Success Factors for Innovative Quality Systems

As indicated by Kalzuny [4], Innovative quality assurance systems are critically dependent on two factors to succeed:

- 1) **Diffusion:** the spread of new tools and pattern of implementation within an institution.
- 2) **Adoption:** the focus on individuals within institutions as the adoption unit and considers factors that instill or jeopardize the successful implementation and impact of innovative quality tools.



Levels of success for Innovative QA systems

Diffusion

- Administration
- Steering Committee
- Deanship
- Program chair

Adoption

- Ownership
- Teaching Staff
- Students



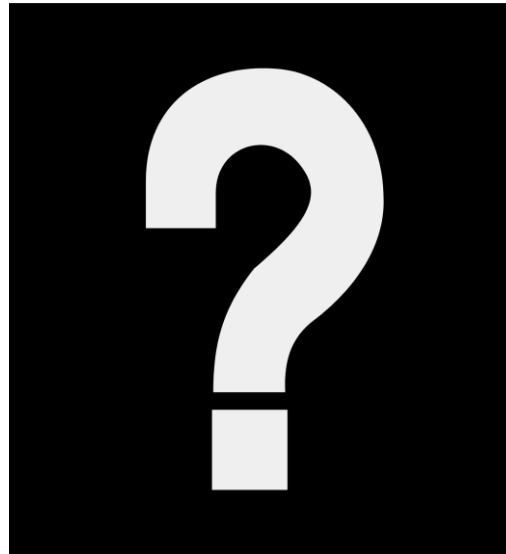
Conclusion

Success can't be achieved without :

- Real staff Involvement
- Sound managerial support
- Existence of motivated staff who are eager to continually improve the overall performance
- Several meetings and workshops were carried out that included all the faculty members to **increase the awareness** towards ABET.
- New TA's were hired and trained to help the faculty members with ABET requirements.



Thank you



References

- [1] ABET website, available at <http://www.abet.org/about-abet/>
- [2] Johnw. Prados, Georged. Peterson and Lisar. Lattuca, (2005) Quality Assurance of Engineering Education through Accreditation: The Impact of Engineering Criteria 2000 and Its Global Influence, Journal of Engineering Education, p. 165-184.
- [3] Bordia, S., (2001) *Problems of accreditation and quality assurance of engineering education in developing countries*. European Journal of Engineering Education, **26**(2): p. 187-193.
- [4] Kaluzny, Arnold D. (1982) *Quality assurance as a managerial innovation: a research perspective*. Health Services Research. 17.P. 253-268.