



Path to Accreditation for Engineering Programs in Latin America through Coordinated and Tailored Support: The Latin American and Caribbean Consortium of Engineering Institutions (LACCEI) Par Amigo Initiative

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Engineering programs throughout the world have accepted the challenge of educating the global engineer. The required standards in technical, communication and social skills for global engineers must be integrated into the cultural context of engineering programs in different countries. Internationally recognized accreditation is an important way for programs to not only guarantee quality, and contribute to regional capacity building and economic development, but also to develop the continuous improvement and assessment tools that strengthen engineering programs. These tools are essential in the development of engineering programs that can educate the global engineer of the future. The Par Amigo (Peer Mentor) Initiative developed by the Latin American and Caribbean Consortium of Engineering Institutions (LACCEI) is a vehicle to assist engineering programs in understanding the culture of accreditation, the selection of an accreditation agency, the preparation for accreditation, completion of the self-study and preparation for the accreditation site visit. The initiative will link engineering programs and colleagues with accreditation expertise (pares amigos or peer mentors) who can speak their language and understand their culture. LACCEI is not and does not aspire to be an accreditation agency. The purpose of the Par Amigo Initiative is to assist engineering programs in Latin America and the Caribbean to select an accrediting agency and successfully complete the accreditation process. This work details the LACCEI developed training for Par Amigo Initiative participants. The Initiative's collaboration with accrediting agencies is also highlighted. The Par Amigo Initiative is an outcome of the activities related to engineering program accreditation sponsored by Engineering for the Americas (EftA), headquartered at the Organization of American States (OAS).

introduction and background

Numerous studies¹⁻⁸ have documented the need for the development of global engineers. The development of global engineers depends on best practices and continuous improvement of engineering education throughout the world. The engineers of the future must be globally competent, locally relevant, able to cooperate, communicate and compete. Effective future engineers must graduate with global competence. Accreditation of engineering education with global engineering education standards is a key component of professional mobility, capacity building and economic development throughout the world.⁵

Engineering program accreditation is a given in the United States, Canada, Australia and Europe.⁶⁻⁹ The demands of parents, students, employers and graduate programs make accreditation a necessity. Throughout the world, accreditation is recognized as a means of global recognition for engineering education and enhanced mobility for students.⁹ Accreditation is recognized as a critical means of quality assurance, and education quality assurance results in improved educational outcomes, enhanced capacity building and economic development throughout the world.¹⁰⁻¹⁸ The data available indicate that engineering education is an international enterprise and must be an international endeavor throughout the world. Any engineering graduate can work anywhere in the world and most graduates work for multinational

companies.¹⁶ The international nature of engineering education makes integration of local culture and attributes an essential component of any accreditation process.^{18, 19} Internationally recognized accreditation and efforts to strengthen national and regional accreditation are the most effective ways for locally accredited programs to prepare students for the global market. Engineering programs in developing nations face the additional barrier of interpreting accreditation criteria in a foreign language and are more likely to treat accreditation efforts as a test they must pass every accreditation cycle.²⁰ A systematic approach for programs to become accreditation ready is essential for the development of accredited programs in developing nations.

The development of global engineers, capacity building and economic development depend on accreditation as a means of quality assurance and an opportunity for innovation²¹ and continuous improvement.^{22, 23} The emphasis on institutional planning and assessment can serve as a vehicle for continuous improvement. This requires the consideration that self-studies are not an end in themselves but an opportunity for curricular innovation and improvement. In addition, a systematic method to assist faculty and administrators in measuring the progress toward accreditation is important.²⁴ The involvement of faculty and administrators in an accreditation process that is respectful of their culture and is viewed as an opportunity for quality assurance and continuous improvement is essential to successful accreditation outcomes and to the development of global engineers.

LACCEI par amigo initiative

Engineering program accreditation provides essential elements for engineering education enhancement by establishing standards and promoting innovation and continuous improvement. LACCEI's accreditation objectives are to promote accreditation efforts in the Latin America and the Caribbean by

- assisting engineering programs with the selection of accrediting method and agency
- assisting engineering programs through the accreditation process and the preparation of the self-study
- serving as a multilingual and multicultural resource of information, practical assistance and mentors for engineering programs considering or seeking accreditation
- developing faculty leaders in program accreditation and evaluation for accrediting agencies in the Americas
- certifying and maintaining a Par Amigo registry of peer mentors who are familiar with and current in accreditation processes and provide cost effective assistance to engineering programs seeking accreditation.

LACCEI does not aspire to be an accrediting agency and its accreditation initiatives are guided by its mission to enhance engineering education throughout Latin America and the Caribbean. The Par Amigo Initiative is one part of the LACCEI activities. Surveys conducted by LACCEI indicate that engineering programs in many parts of Latin America and the Caribbean have difficulty in adapting the faculty, students, assessment, facilities and institutional information

they collect to the format required by accrediting agencies. Consultants to assist in these efforts are cost prohibitive in many cases and often do not speak the language or understand the culture of the institutions. LACCEI members throughout the world, who have assisted in the accreditation of their programs and are familiar with accreditation criteria, can be an excellent resource for programs considering or seeking accreditation. The Par Amigo (Peer Mentor) Initiative is an effort to enhance accreditation efforts in Latin America and the Caribbean with this powerful resource.

A Par Amigo is an individual familiar with accreditation through his/her own engineering program, an evaluator for a particular accreditation system, and/or an individual who completes the Par Amigo training offered by LACCEI for member institutions. Information on LACCEI accreditation activities is available (<http://www.laccei.org/index.php/initiatives/accreditation>). The LACCEI Par Amigo training is modular and contains a module (Module A) covering general accreditation information and a second module (Module B) specific to particular accreditation agencies. Module A can be completed online or at LACCEI annual conferences and events or other educational conferences. Module B is delivered in collaboration with accreditation agencies at LACCEI annual conferences and events.

Individuals certified and registered in the Par Amigo Registry through LACCEI need to be

- experienced faculty/engineers
- knowledgeable in the relevant accreditation process requirements
- ethical and diplomatic with a clear understanding of and respect for the confidentiality associated with accreditation functions
- good communicators
- sensitive to and familiar with cultural aspects of education and accreditation

Pares Amigos (Spanish plural of Par Amigo) commit themselves to assist engineering programs for at least one week per year without charge. Engineering programs will be responsible for the cost of travel and accommodations but will not be required to compensate Pares Amigos. Pares Amigos are free to conduct consultation functions and enter into contracts with programs. This latter function is independent of LACCEI activities. Pares Amigos are strongly encouraged to donate partial funds to the LACCEI accreditation efforts from any consulting contracts that result from their participation in the Par Amigo Initiative.

To participate in the Par Amigo Initiative, individuals submit their credentials in the form of a resume and letter of intent to the LACCEI Accreditation Activities Committee. The Committee reviews the credentials and determines if individuals meet the criteria for listing in the Par Amigo Registry. This registry is available to all LACCEI member institutions. Engineering programs can select Pares Amigos from this registry. Pares Amigos are listed by countries of residence so that engineering programs can easily find Pares Amigos in close proximity.

LACCEI par amigo initiative training modules

The two modules that comprise the Par Amigo training are modular and self-contained. In addition, they include interactive activities and exercises throughout. These activities are

designed to assist participants with the implementation of techniques such as employer surveys and assessment rubrics to aspects of their programs. There are several group exercises that enhance interactions among participants and allow participants to share experiences and help each other.

module A: the fundamentals

Module A includes the basic elements of accreditation and is divided into five sections:

- Accreditation Fundamentals,
- Accreditation Systems and Cultural Aspects of Accreditation,
- Par Amigo Competencies,
- Self-Study Fundamentals
- Communication with Accrediting Agency and Evaluation Visit.

Module A is available online for member institutions through the LACCEI website. It is also presented as a one-day workshop at LACCEI annual conferences, other engineering education conferences and LACCEI sponsored events. It was recently presented at the 2012 World Engineering Education Forum (WEEF, annual international conference of IFEES, the International Federation of Engineering Education Societies).²⁵ Each section is self-contained and includes updated information from accrediting agencies. Interactive exercises in each section include writing a program mission statement, student evaluations, teaching/learning evaluations and alumni and employer surveys. Module A sections and a description of their content are listed below.

Section 1. Accreditation Fundamentals – This section covers the basic elements of accreditation and reviews the rationale for and importance of accreditation. The relationship between accreditation and continuous improvement for engineering programs is highlighted. Also, the relationship between excellence in engineering education and global competitiveness for graduates, capacity building and regional economic development is discussed. This module explains what engineering accreditation is, and what it is not, so that participants have appropriate expectations of the accreditation process and of the significance of accreditation. Accreditation is discussed in detail as a means of continuous improvement for engineering programs. Accreditation agencies are introduced and discussed in terms of international, regional and national recognition. The general aspects of accreditation are discussed and program aspects that are specifically evaluated are highlighted. Module participants are introduced to the implementation of an accreditation process improvement approach based on the Capability Maturity Model (CMM, a registered service mark of Carnegie Mellon University)²⁶⁻²⁷ to assess an engineering program's readiness for accreditation and to streamline preparation for accreditation. This model is comprised of five levels and its use in accreditation progress assessment has been described.²⁸⁻³⁰ To advance a level toward accreditation, a program must complete all of the requirements of the previous level. However, engineering programs can work on components associated with any level simultaneously. The value of this process is in the assessment of accreditation readiness. As a program completes CMM levels toward accreditation, it is possible to clearly ascertain what requirements need to be completed before an engineering program is accreditation-ready and can contact an accrediting agency and apply for

accreditation. CMM maps to the accrediting process for ABET³¹ and for CEAB (Canadian Engineering Accreditation Board - Engineers Canada)³² have been developed by LACCEI, and in the future other internationally recognized accreditation agencies will be added.

Section 2. Accreditation Systems and Cultural Aspects of Accreditation – This section includes updated listings of accreditation agencies throughout the world and the process of selection of accrediting agencies suitable for specific engineering programs is discussed. The CEAB and ABET accreditation systems are discussed in detail. Best practices of these systems have been used by accrediting agencies worldwide. The importance of monitoring updates from accrediting agencies is stressed. The roles and responsibilities of programs are discussed as well as those of the university administration and the institution. The accrediting process and deadlines for each of the accrediting agencies are explained. Finally, the importance of integrating the culture of the engineering program seeking accreditation in the process is discussed. The responsibility of programs to make certain that students' cultures are considered and respected throughout the accreditation process is highlighted.

Section 3. Par Amigo Competencies – This section includes a discussion of the competencies and experience required for pares amigos. In addition, the responsibilities of pares amigos are detailed. Pares amigos are expected to donate one (1) week per year to engineering programs. During this period, pares amigos do not receive compensation and programs are only responsible for travel and accommodation costs. Pares amigos are free to donate as much time as they wish but are free to enter into contracts with engineering programs outside of the Par Amigo Initiative after they have completed the commitment of one (1) week per year of uncompensated work. The ethical aspects and diplomacy requirements for pares amigos are outlined in this section.

Section 4. Self-Study Fundamentals – This section introduces participants to the basic elements of a self-study and provides a framework for completing the self-study requirements. Since each accrediting agency has its own unique requirements, this section focuses on the requirements that are common among the accrediting agencies. Aspects that are specific to engineering programs in non-English speaking countries are discussed. All program criteria that are part of a self-study are discussed in detail. Materials to be included in a self-study, such as course syllabi, faculty vitae, equipment available and institutional summary, are discussed in detail.

Section 5. Communication with Accrediting Agency and Evaluation Team Visit – This section provides an overview of how to properly communicate with an accrediting agency and the format and expectations of an evaluation team visit. Accreditation agencies have specific formats and deadlines for application, reporting and the evaluation team visit. However, they have many features in common. This section includes all aspects of communication with the accrediting agency and the evaluation team, as well as a detailed overview of the evaluation team visit. This section provides an overview on how to request an evaluation team visit, the appropriate protocol for questions and information sharing, how an evaluation team is formed, communication with the evaluation team, the evaluation team visit and the reporting subsequent to the visit. This section highlights how important preparation is to a successful accreditation visit and how accreditation can serve as a program continuous improvement methodology.

module B: accreditation agency specific requirements

Collaboration with accrediting agencies is critical to the success of any effort to enhance engineering education. The insight, input and guidance provided by agencies are essential and are important tools programs can use for curricular continuous improvement.

Module B is designed and conducted by accrediting agencies. Module B includes details of self-study fundamentals and requirements, assessment, evaluation, reporting requirements, what evaluators look for, common pitfalls, application of judgment, institutional requirements, institutional program materials, format and organization. The Module focuses on the self-study and the evaluation visit and includes activities designed to assist participants in developing a procedure uniquely suited to their programs that can result in a successful self-study, evaluation visit and a positive accreditation decision. Module B is presented as a one-day or two-day workshop at LACCEI annual conferences. It is not available online and is the intellectual property of the accrediting agency. ABET and CEAB have presented Module B at LACCEI annual conferences.

conclusions

The LACCEI Par Amigo Initiative is comprised of peer mentors who can assist Latin American and Caribbean engineering programs to select appropriate accrediting agencies and successfully complete the accreditation process. The Initiative can play a significant role in enhancing engineering education in the region and in promoting economic development and capacity building throughout Latin America and the Caribbean. The LACCEI Par Amigo Initiative is a substantive means by which engineering programs in Latin America can obtain direct assistance in identifying the most appropriate accrediting agency and with the accreditation process. This effort will increase the number of individuals familiar with accreditation, the number of programs considering accreditation and continuous improvement, and the number of internationally accredited engineering programs in Latin America and the Caribbean. The self-contained, modular training program for the Par Amigo Initiative has been presented at LACCEI annual conferences and other education conferences. The fundamentals module (Module A) is available online for LACCEI member institutions. The second accrediting agency specific module had been presented by ABET and CEAB at LACCEI annual conferences with workshop materials provided to participants in both English and Spanish. Both modules have received excellent feedback from participants and have increased the number of individuals involved in the Par Amigo Initiative.

Accreditation of engineering programs throughout the world is an important means by which to develop global engineering education standards, ensure quality and promote continuous improvement in engineering education. The LACCEI Par Amigo Initiative is one way to participate in reaching these important goals in Latin America and the Caribbean. The Initiative should also serve as a template to assist accreditation efforts and increase the number of accredited engineering programs throughout the world.

The Par Amigo initiative and OAS/EftA Engineering program accreditation efforts are being continued under the OAS Ministers of Science and Technology's Plan of Action of Panama, working Group 2: Human Resources. Other organizations interested in joining the efforts should contact the Office of Science, Technology and Innovation of the Organization of American States.

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