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**INTERNATIONALIZATION ROAD MAP FOR
BIOMEDICAL ENGINEERING DEPARTMENT**

THE GLOBAL CONTEXT

Institutional responses and positioning strategies have become a growing imperative to an increasingly competitive and interconnected higher education landscape. The purpose of this document is to map a framework to improve understanding of key concepts, which will guide process of internationalization of the Biomedical Engineering Program as a pilot for the School of Engineering.

Universities train a workforce with necessary skills, foster innovation for competitive advantage and economic growth, as well as act as knowledge producers and repositories for the complex challenges facing contemporary society. The global challenges require greater expertise, along with more nimble institutional responses

Defining Internationalization

The international dimension of higher education is arguably one of the most significant phenomena facing higher education (Rumbley 2015, 16); however, it frequently suffers from conceptual unclarity but authors agree that there are seven broad themes which characterize the thematic map of this field of study:

1. Mobility of students and academic staff;
2. Mutual influences of higher education systems on each other;
3. Internationalization of the substance of teaching, learning, and research;
4. Institutional strategies of internationalization;
5. Knowledge transfer;
6. Cooperation and competition;
7. National and supra-national policies as regarding the international dimension of higher education.

First step is to distinguish between Globalization and internationalization, there are different but related processes. Internationalization has been defined as “the variety of policies and programs that universities and governments implement to respond to globalization” (Altbach, Reisberg & Rumbley 2010, 7).

For this map road “internationalization’ is the “process that integrates the international, intercultural and global dimensions into the key functions of a program including: curricular reform, international courses, joint degrees, academic mobility programs, collaborative initiatives such as branch campuses, research networks, international research projects, international development and capacity-building initiatives among others. But is a long journey not a quick stop.

Internationalization represents a means of transforming knowledge boundaries, expanding academic horizons and generating linkages for academic and research strengthening.

THE REGIONAL CONTEXT

Internationalization has become a core element of Central American universities' activities. It is now generally agreed, "creating globally aware graduates with skills suited to the jobs of today and tomorrow". Current internationalization practices at Central American universities are diverse in terms of their purpose, content and delivery. However, a number of key priority areas and trends can be observed.

Education and learning abroad

Central American student's participation rates for education and learning abroad programs currently very low. The estimated percentage can be determined due the lack of statistics. As a result, very little is currently known beyond the number and destinations of students going abroad.

At the institutional level, there are additional barriers to data collection and program evaluation. University administrators face numerous challenges, including: collection of data by multiple offices on campus, lack of available software to record information efficiently, difficulty classifying an ever -growing number of diverse program options, lack of clarity and different perspectives on what to evaluate, lack of proven effective tools to evaluate programs, among others.

International research collaboration

International research collaborations have grown immensely in recent years in response to several factors, including the development of communications technologies facilitating international teamwork, and growing recognition of the need for diverse perspectives on common global challenges.

Research partnerships also increasingly span the public sector, private sector and civil society. Some universities have chosen to narrow the scope of their international efforts and target a small number of country partners that are of strategic importance for research collaboration.

Internationalization at home

Internationally mobile students continue to make up a relatively small proportion of the university student population. Recognizing this, Central American universities have begun purposefully integrating international dimensions into their academic curriculum and co-curriculum, in order to ensure that all students can benefit from a global education.

This can include efforts to:

- Mainstream integration of international topics, perspectives and content within the curriculum, across university faculties, programs and departments.

- Develop a cross-cultural competency certificate, global citizenship designation, or the like, for students to complement their degree programs.
- Enhance opportunities for internationalization of the campus through intercultural events and activities.
- Increase and encourage opportunities for students, staff and faculty to develop language skills.
- Enhance opportunities for students to participate in international educational experiences for course credit.

Comprehensive internationalization

A strategic, coordinated process that seeks to align and integrate international policies, programs, and initiatives, and positions colleges and universities as more globally oriented and internationally connected.

This process requires institution-wide support and uptake, with leadership from the highest levels of university administration, “and results in deep and ongoing incorporation of international perspectives and activities throughout the institution”

Strategic planning is key to this process. It is necessary that administrators take the time to develop clear commitments, strategies, indicators and targets for each priority area related to internationalization. This will lay a strong foundation for doing internationalization well, and can help guide the actions of university faculty and staff members, and bring them in line with broader institutional mandates.

INTERNATIONALIZATION AT BIOMEDICAL ENGINEERING DEPARTMENT DIAGNOSIS

This section provides a synthesis from a series of semi-structured interviews and focus groups conducted with faculty members, senior administrators, mid-level leaders and students on international policies, practices and perceptions at BIOMEDICAL .

Rational

The interview and observational data suggest that the department is motivated to pursue an internationalization agenda for two primary rationales, the need of strategic partners and the second, to enhance the academic/research experience. Both rationale springs from a general understanding that internationalization is a pathway to prepare graduates to gain cultural competencies, acquire linguistic skills and become ‘global citizens’.

Strategies

The data gathered from the respondents indicate that the Biomedical Engineering Program approaches internationalization with a heavy emphasis on Practicum and Projects this base on national and international strategic partners and topics.

Outcomes

The Biomedical Engineering Program has dedicated a significant time, energy and resources to its internationalization this first year. It has accomplished a number of its objectives; particularly in area of collaborative partners and stablishing the base line diagnosis and the Road map for the next five years.

- Key Findings
- International services must be strategically aligned with institutional needs and goals.
- Internationalization practices require a fundamental shift from reactive to reflexive approaches.
- The Biomedical Engineering Program should be more proactive in international curriculum development, have a practicum and project catalogue to foster and promote knowledge mobilization. Existing program partners and stakeholders can play a key role in mobilizing technical advice and funding for these initiatives.
- At present, the Biomedical Engineering Program has eight agreements tit is recommended no to expand but strengthen the relationship.

ROAD MAP

The importance of internationalization as a vehicle to enriching the program and the student experience. This section discusses principles that should guide decision making with a goal of enhancing the University's international presence.

Internationalization: Goals, Guiding Principles and Strategic Choices

Internationalization is a recognized component of Biomedical Engineering Program identity and must be reflected in its teaching, research and outreach missions. The Department had stablish a clear vision about the priorities and goals of internationalization and have a set of strategic principles for the next five years.

The proposed strategic are:

1. Quality of student experience
2. Research excellence, and
3. Bilinguism

The objectives of the proposed Internationalization Strategy are to:

1. Recruit and develop a diverse global community and provide the appropriate and necessary support services for national and international students to foster their success and integration on the program.

2. Provide students with exceptional experience through international and intercultural learning and research opportunities. That builds and sustains global consciousness to better preparing students to live and work in an increasingly complex international and intercultural environment;
3. Undertake international cutting-edge, interdisciplinary, socially engaged and collaborative international research in areas of program's strengths. This implies to enhance recognition and support for international research as an institutional priority and identify prioritized strategic international partnerships.

Success of any strategy ultimately depends on the senior administration's commitment and leadership to the strategy, as well as the skill and quality of management responsible for execution. With this in mind, here are six guiding principles that come into play for selecting partnerships and identifying new initiatives:

1. **Integrated:** This implies that internationalization is no longer an add-on and marginal activity, a separate pillar of the program policies and strategies but integrated into all other pillars: research, educational activities and service to community.
2. **Geographically Focused:** The Biomedical Engineering Program should focus its internationalization efforts in specific geographic regions. Because international activities and partnerships maintained by the program represent a significant investment in time and resources.
3. **Faculty-driven:** The faculty role in internationalization is widely recognized as being both central and critical.
4. **Impact on student learning outcomes: Internationalization** should benefit students in the long run through enhanced global competency, personal, cross-cultural capabilities and employability skills.
5. **Enhancing the international profile and excellence of research and teaching:** Internationalization should promote the Programs ambition, enhance it's overall reputation and increase the international visibility of its research by making its voice heard in discussions on future world priorities.
6. **Collaborative:** Internationalization should engage global partners to advance the core missions of teaching, research and service.

Creating a Transforming Vision and Mission

The Biomedical Department establish as a mission a vision the follow statements:

- Vision of the UVG Biomedical Engineering be the first regional program to enable technologies to improve human health and health care solo or in partnership of national and international partners.
- Mission through its faculty and graduates, Universidad del Valle de Guatemala, Biomedical Engineering, is a driving force to improve human condition creating knowledge and biomedical technology in a national and international context.

In order to achieve this mission and vision there were two key steps to follow:

Revising Structures for the Growth of Internationalization

Internationalization at the Biomedical Engineering Program requires a commitment to promote and reward international endeavors in teaching, research, and service. The selected model is a combination of centralize and decentralize model where there are specific activities (practicum, extension, research) are centralized leaving the study abroad, the internationalization of curriculum to academic units.

Internationalization at the Biomedical Engineering Programs a shared responsibility among various administrative and academic units. Among administrative units, some are of a more specialized nature with respect to international activities while others are of a more general service nature.

Fostering a Culture of Internationalization

Internationalization is about changing culture because the best internationalization strategy is doomed to fail if it does not include a comprehensive plan for changing the culture of the community. This requires institutional adaptations involving significant transformation in the organization of research, training and administration in higher education. It is a co-creation and participative process.

AREAS OF FOCUS FOR INTERNATIONALIZATION AT THE BIOMEDICAL DEPARMENT

International Student Recruitment, Retention and Integration

Biomedical Engineering Program will start to actively recruit international students and faculty. Consultation with international students will ensure the needs and priorities of international students are identified and appropriate strategies are in place (or are developed) to meet them. Given the bilingual character of program, recruitment of international students will take place in a large Spanish and English- speaking priority countries.

- Increasing the geographical reach of our recruitment efforts to include a broader range of continents/countries. Current recruitment efforts are limited to Central America, México and US.
- Fully leveraging our language preparation to better prepare incoming international students (language training, integration, etc.). This is critical if we wish to retain the international students we attract and to expand recruitment efforts to countries with non-native Spanish speakers.

Professors, Academic Units and Staff:

Building synergies to facilitate student-learning opportunities Professors and university staff play an integral role in the internationalization. Collaborations with international partners offer opportunities for innovations in knowledge production.

Faculty research and partnerships around the world provide immense opportunities for innovations in internationalization and student learning opportunities. The Biomedical Engineering Program must remain committed to supporting faculty research initiatives that foster improved partnerships and collaborations around the world, and which facilitate improved understanding of – and responses to – global challenges and

Biomedical Engineering Program faculty, staff and students are encouraged to work with national and international departments in the development of international research and program priorities.

Internationalizing the Curriculum

Globally-engaged learning for students often begins with the exposure they receive in their classes. This exposure can include course curriculum, readings and activities that ensure international education. Expanding opportunities for internationalizing the curriculum is central to laying the foundation for preparing the next generation of leaders in a globalized world. Faculty members can be encouraged for the internationalization of their curriculum, and opportunities for sharing experiences and strategies are important starting points.

The Biomedical Engineering Program will provide support for curriculum development to ensure internationalization of the curriculum is facilitated where appropriate and as widely as possible. In addition, resources, strategies and training opportunities will be offered to ensure that existing knowledge of internationalization of the curriculum is shared more widely on campus.

The Biomedical Engineering Program will encourage faculty members and staff to highlight and document their efforts o increase internationalization and global engagement strategies.

Global Engagement and Education at Home and Abroad

Building on the foundations provided through an internationalized curriculum, students often benefit from opportunities to develop global competency through international experiential learning opportunities.

International experiential learning and globally-engaged community service learning are two strategies for enhancing the student learning experience through practical work placements, service activities, and applied learning options. There are many ways to enhance student applied learning through co-operative education (co-op), community service learning, study abroad, research opportunities, and international internships or volunteering.

The international Affairs Office will provide a mobility Factsheet for the department, a beta version of a bilingual Web page and some promotional videos in Spanish with English captions.

Forging Strategic Partnerships and Facilitating International Research Collaborations

Strategic partnerships are important to facilitate international research collaborations. The Biomedical Engineering Program has experience with international partnerships and collaborations and it is focus on few relevant partners.

Leveraging the Biomedical Program Image and Presence Abroad

On the long term the Biomedical image and presence abroad needs to be enhanced by the role that students and faculty can have as ambassadors of the program but is too early in this stage. Some of the activities suggested for the first years are:

- Using opportunities such as hosting or attending international conferences, participating in international consortia and networks, among other international activities.
- The Biomedical Engineering Program should facilitate closer collaborations with strategic renowned researchers from partner universities geographically focused who might have an interest in spending research leaves and sabbaticals as visiting professors to the Biomedical

Alumni as Agents of Internationalization

The Biomedical Engineering Program can capitalize on this large and growing network of alumni and their presence in countries around the world to facilitate partnership building and network creations. Strategies to work collaboratively with alumni abroad can also enrich programs for student practicum placements abroad or within their 'home

communities' and can also be central to the internationalization efforts.

Recommendations and next steps

1. Deploy a targeted regional strategy for international research and partnerships, with cross-referenced projects, collaborations, faculty and student mobility, and recruitment within identified geographic concentrations

Action points:

- Undertake a comprehensive institutional assessment of existing international priorities and activities with the aim of developing a targeted and coordinated international strategy, focusing on specific projects and activities.
- Form a committee to conduct the preliminary institutional assessment and ensure high-level oversight of the new international strategy. The committee can provide support for integration at the faculty and program level, and develop and oversee the implementation of regional- and country-specific activities.

Curricula

2. Adopt a more comprehensive approach to internationalization at the administrative, curricular and co-curricular levels

Action points:

- Move away from the traditional language of "international education" and "internationalization" in the strategic and international plans, and instead opt to use more encompassing terms like "global engagement" or "globally engaged learning" that are more reflective of the transformational educational experience the university seeks to provide.
- Provide the foundation for educational experiences that enhances the academic program towards to a more globally awareness.

3. Establish the necessary foundations to achieve and evaluate international commitments

Action points

- Undertake a strategic planning process to align and integrate internationalization policies, programs, and initiatives across the university.
- Develop clear commitments, strategies, indicators and targets for each internationalization priority area. This will lay a strong foundation and a road map for doing internationalization well.

4. Recognize and reward faculty for their role in internationalization

Action points:

- Creating a structure within the international portfolio to identify, support, evaluate and reward faculty participation and leadership, recognition and support in international activities.
- Launch a curriculum development fund to support faculty in their efforts to facilitate international activities (field courses, collaborative online courses, exchanges, experiential learning, etc.).
- Enhancing support for support for faculty to apply for external funding to develop international educational experiences and activities; and providing cultural competency
- Developing further instruments, such as mentoring programmes for internationalization, for young researchers, etc.

5. Enhance and support opportunities for increased faculty-led global research projects and training opportunities

Action points:

- Identify key National and International agencies in the development of international research and program priorities to ensure impact-oriented research.
- To development of research grant applications and provide recommendations for the best utilization of student participation in those grants .

6. Encourage increased internationalization of the curriculum

Action points:

- Encourage reporting of internationalization and global engagement efforts in annual reports by creating specific line items to reflect these strategies.
- Invest in a careful analysis of the current strengths and gap areas based on research of current internationalization efforts (by reviewing annual report data, etc.)

7. Increase the number of Biomedical Engineering students going abroad

Action points:

- Actively pursue additional scholarship funding options for students who wish to engage more globally.

- Foster new opportunities for faculty-led, research-based or practicum experiences in field studies courses around the world.
- Ensure full-cycle reflection and analysis in preparing and debriefing students who engage in cross - cultural opportunities through improved support before, during and after the placement.
- Consider diverse ways of recognizing the contributions of international activities to education through co-curricular and certificate options.
- Analyze challenges that students might face to participate on a mobility program.
- Improve options for international co-op placements.

8. Forge Strategic Partnerships for improved international research collaborations

Action points:

- Analyze and check Biomedical Engineering program international priorities.
- Document and share information about the current innovations in international research and collaborations to provide case studies and improve visibility of such initiatives.

10. Promote Biomedical Engineering Program's Image and Presence Abroad

Action points:

- Encourage students and faculty members giving presentations at conferences to use UVG logos in their multimedia presentations (such as PowerPoint slides) and circulate templates widely.
- Foster opportunities for international scholars to spend research leaves and sabbaticals as visiting professors.
- Capitalize on the large and growing network of alumni and their presence in countries around the world to facilitate partnership building and network creations.
- Develop social media and communication strategies to link with alumni who are globally engaged students and faculty.

References

Altbach, P. G., Reisberg, L., & Rumbley, L. E. (2010). Trends in global higher education: Tracking an academic revolution. Rotterdam: Sense Publishers.

Rumbley, L. E. (2015). "Intelligent Internationalization": A 21st Century Imperative. *International Higher Education*, (80), 16-17. <https://doi.org/10.6017/ihe.2015.80.6146>

ANNEX 1 SWOT SUMMARY

Strengths

- The program has identified and contact local and international partners.
- Full time teachers committed and seek postgraduate training opportunities.
Student mobility possible in different formats: academic trips, semester abroad, etc.
- Curricular review for 2020 will open a window for international courses
- Bilingual webpage an information in process.
- Student and faculty English proficient.
- Services for international students.
- Mega projects/spin offs.
- Use of open Source technology

Weakness

- Lack of exchange programs for full-time teachers and excessive workload that prevents them from continuing studies.
- Lack of experience in carrying out large-scale research or intervention projects.
- Few scientific publications.
- A very tight academic program few possibilities for mobility.
- No faculty assigned to internationalization.

Opportunities

- Erasmus + or similar mobility programs available.
- There are internationalization processes that can be consolidated and become a strategy.
- Tailor made study abroad/practicum programs.
- Promote agreements or collaborations with identified institutions.
- Define internationalization actions in the short and medium term and define responsible by Faculty.
- Include in the curriculum a course that develops multicultural skills.
- Develop own technology.

Threats

- Not having foreign students who are attracted to short programs or to exchange.
- Few financial resources to support professors and researchers to participate in international activities.
- Immigration policies
- Travel warnings
- Language certificate
- No public funds