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Engineering Educators' International Recognition: How and What for

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Abstract:

After more than four years of work by various experts in engineering education worldwide, it was possible to create an independent international registry, the ENTER registry, with worldwide coverage, that allows the evaluation and certifies the level of professional competencies of engineering educators.
This registry, which is already taking place on all continents by thousands of voluntary pioneer engineering educators, will allow the quality of engineering education to increase throughout the globe and finally will establish the recognition of the dignity of the profession of Engineering Educator.
In this paper, the international credentialing functioning is described as well as the roadmap of competencies development to the systematic improvement proposed to the engineering educators to build up as faculty to achieve the profession high-level quality global recognition.
The bridge with the recognized international accreditation of engineering education programs is also shown to have a symbiotic effect with advantages for the universities and their faculty.

1 - Introduction

Engineering education is a crucial aspect of the engineering profession and plays a vital role in shaping the future of the industry [1]. Engineering educators are the backbone of this process and are responsible for imparting knowledge, developing critical thinking skills, and promoting hands-on experience to the students. However, despite their significance, the profession of engineering education has until now gone unrecognized and undervalued [2].

The recognition of engineering educators for their contributions to the field is crucial in promoting the advancement of engineering education and providing incentives for future innovations.
Historically, there have been several ways in which engineering educators can receive international recognition, including awards, conferences, and publications.
These recognitions received by educators have over the years changed engineering education and its impact on the students, their institutions, and the engineering community.

1.1 - Awards

One of the most common forms of recognition for engineering educators is awards. There are various engineering education awards programs, such as the Association for the Advancement of Computing in Education (AACE) EdMedia Awards [3] and the Institute of Electrical and Electronics Engineers (IEEE) Awards for Education [4]. These awards recognize individuals and institutions for their outstanding contributions to engineering education and for developing innovative teaching and learning methods.

1.2 – Conferences

Another form of recognition for engineering educators is recognition at conferences. Several international conferences focus on engineering education, including the European Society for Engineering Education (SEFI) Annual Conference [5], Frontiers in Education Conference [6], International Conference on Engineering Pedagogy (IGIP) Annual conference [7], and the American Society for Engineering Education (ASEE) Annual Conference [8]. These conferences provide a platform for engineering educators to present their work and receive

recognition for their contributions to the field. Moreover, attending these conferences can also provide opportunities for networking and exchanging ideas with other engineering educators from around the world.

1.3 Publications

In addition to awards and conferences, engineering educators can also receive recognition through publications. Publishing in high-quality engineering education journals, such as the Journal of Engineering Education [9] and the European Journal of Engineering Education, can help educators showcase their work and demonstrate their expertise in the field. Moreover, publishing can also help increase visibility and recognition for the institutions and programs in which the educators work.

However, thanks to this type of recognition, we got a certain opposite effect. Educators began to place a much greater emphasis on publication activity, and scientific developments, devoting less effort and time to improving their pedagogical performance.

Another side effect of the existing national and international systems of professional development is usually a rather shallow formal approach to improving professional competence as an educator following formal (sometimes bureaucratic) requests, rather than a thoughtful choice of professional development competencies according to the real individual needs.

There is a mandatory system of periodic advanced training for the teaching staff in some universities (for example, once every three years). And this system turns out to have some shortcomings sometimes just superficial massified courses that do not lead to qualitative changes at the individual level. Most of the time educators enroll in specific courses based on what is easily available, or that are mandatory, most of them selecting those courses that take less time and would take less effort to complete sometimes even because they are already familiar with the topic offered.

Such motivation ultimately leads to the fact that there is no actual improvement in pedagogical competencies, and the introduction of new knowledge, skills, and competencies into practical pedagogical activity does not occur.

The disadvantage of the existing massified systems becomes obvious: the lack of an independent preliminary assessment of the educators' performance and their motivation that allows them to identify the missing professional competencies or those requiring improvement.

There are few opportunities to build up an individual trajectory for professional development taking into account previous background, experience, and professional and personal interests, and the existing are seldom tailored to include all the diversity requirements.

Also, handling these issues of career development at the institutional level creates sometimes conflicts due to the human factors of the proximity between the evaluators and the evaluated.

All the shortcomings described above made it clear that there was a need to create an open system that could bring professional recognition to a completely new level, ensuring global transparency and understanding by all the interested parties, aimed at enhancing the pedagogical, scientific and management competencies assessment and recognition mechanisms for the engineering educators of HEIs [10]. The system was designed to promote and reward excellence in competencies development, namely those related to the digital environment, sustainable development goals, ensuring equity and inclusion, and achieving international professional recognition.

After more than four years of work by various experts in engineering education worldwide, it was possible to create an independent international registry [11], with worldwide coverage, that allows the evaluation and certifies the level of professional competencies of engineering educators.

This registry, which is already in use by thousands of voluntary engineering educators across the globe, aims to increase the quality of engineering education and to finally provide recognition of the dignity of the engineering education profession.

Considering that educators require instruments to support their career development and achieve international professional recognition, the ENTER Registry provides educators the criteria and opportunity to follow the registration procedure to achieve their international professional recognition. This will allow them to be a part of the international database of registered professional educators.

Considering the students' need for highly qualified professional educators as their teachers to improve their university experience, the ENTER Registry provides open access to information about the quality and competence of the professional educators they encounter during their study program.

Considering that management needs to assess the teaching staff's performance, the ENTER Registry provides a reliable transparent evidence-based system of professional recognition to positively reinforce the career development of educators.

Considering the needs of socio-economically disadvantaged educators the ENTER Registry provides support to progress in their professional life ensuring equal opportunities in the registration procedure.

Moreover, the Covid-19 pandemic limitations have demonstrated that all the activities that facilitate the recognition and validation of knowledge, skills, and competencies acquired through formal, non-formal, and informal learning are of paramount importance [12]. Therefore the system of professional educators' certification proposed by ENTER Registry is designed to promote and reward excellence in competencies development in a digital and sustainable mode.

2 - How the ENTER Registry works for educators

The ENTER Network is a worldwide initiative that has received funding from the European Commission. It allowed bringing together experts and stakeholders to establish global standards for the creation of Engineering Educator Professionals and develop the ENTER Registry to validate individuals' qualifications. Currently, it is the only professional regulatory body to oversee the International Standard Classification of Occupations ISCO - 2311 - Higher Education Teaching Professional - Engineering Educator [13]. The ENTER Network formally created the long-overdue engineering educator as an international profession.
The ENTER Registry objective is to validate the pedagogical, research, and management competencies accepted worldwide and to record the individuals as professional engineering educators awarding them the iPEER title (International Professional Engineering Educator Registered).

Applying to become a registered International Professional Engineering Educator is a comprehensive and quite rigorous process. Potential educators are required to digitally submit the necessary evidence of the competencies they possess in all the domains as an educator, fill out an application form, submit their portfolio, and evidence of their professional development achievements.

Each application is reviewed by three international experts (members of the Evaluation and Monitoring Committee) necessarily from other countries and preferentially from other continents, to verify that it meets the criteria of the ENTER Registry.

Once the peer review is complete, the educators will be notified whether they are eligible for professional registration. If the educator has managed to evidence the competencies that allow him/her to be a professional the formal notification indicates, not only the level as iPEER but also indicates the competencies that were evidenced as well as the ones that require further evidence and some development. If the educator failed to provide the minimum evidence will also receive a formal notification with the missing evidence and can resubmit the portfolio with the lacking elements.

The professionals will have a unique iPEER for life but to evidence the continuous evolution of the competencies it is required to submit a portfolio every 4 year of the engineering educator competences, in case it is not done before the registration period expires, the status changes to "not active", nevertheless the educator remains in the database. Naturally educators can submit further evidence at any time that may allow the iPEER to increase the professional level as it occurs in any professional career development.

To have an idea of the breadth of the evaluation carried out, the competencies of engineering education professionals are evaluated in the following areas: Research; Management; Innovations in engineering pedagogy; Time management; Effective interaction; Improvement of learning interactivity; Systems analysis in education; Psychology and pedagogical communication; Interaction with interested parties; Sustainable development [14]; digital education; Problem-based, project-based, and practice-oriented learning; Assessment of learning outcomes; Course design; Engineering innovation process; and Lifelong learning;

Each one of the iPEER has unique verifiable digital evidence of the current status (a QRcode that can freely be used to identify as a professional) and can generate from their page at any time certificate that can also be verified online.

One of the great advantages of the ENTER registry is that submitting portfolio translations of the documents and evidence is not required since the monitoring committee is growingly composed of different members with several languages skills. At the moment, the registry is already reviewing applications in English, Spanish, French, Portuguese, Russian, Kazakh, and Chinese (Mandarin and Cantonese). Other languages will continue to be added with the extension of applications in other languages.

For all professionals seeking international recognition, it is recommended that they consult the ENTER network page, enterprof.org, and therefore apply to the only international registry of engineering education professionals existing.

3 - What is the ENTER Registry for

The introduction of a transparent evidence-based system of evaluating practices and pedagogical and scientific competencies of engineering educators promotes and rewards excellence, provides recognition of educators at the international level, and, therefore, helps to increase the reputation of the engineering educator profession, the institutions globally, the quality professional development programs, and the engineering education internationally as a whole.

Higher education institutions could count on reliable verification of the quality of educators and future candidates (above the generic minimum standards established by the national laws), as well as their relevance to the engineering educator profession. Further increasing the number of faculty with international professional certification (iPEERs) provides universities with an opportunity to attract more talented students who strive to receive the required engineering competencies from international educators committed to continuous improvement. At the same time, the increase in engineering educators' recognition is expected

to induce an increase in the industries' interest to establish partnerships with the universities to have access to engineering graduates exposed to the required competencies at the international level.

The international credentialing process begins with the development of a roadmap of competencies that are essential for an engineering educator. These competencies include subject matter expertise, teaching and assessment skills, instructional design and technology, and leadership and professional development. By working towards the systematic improvement of these competencies, engineering educators can establish themselves as highly qualified professionals who can make a significant impact on the education system.

The international recognition of engineering educators also has a symbiotic effect on the recognition of engineering education programs. By establishing a link between the two, the international registry provides a framework for engineering education programs to align their curriculum and teaching methods with the competencies outlined in the roadmap.
This, in turn, ensures that the engineering education programs are of the highest quality and meet international standards, thus leading to the recognition of the programs by international accreditation organizations.
Moreover, the ENTER Registry imposes rigorous quality control of Professional Development Programs with expert review through international quality management standards.
In addition to the competency roadmap, the international registry also provides opportunities for engineering educators to participate in continuous professional development activities, attend workshops and conferences, and engage in peer-to-peer learning. These opportunities help to keep engineering educators up-to-date with the latest trends and developments in the field and to further enhance their competencies.

The world experience of professional registration systems shows that for those who receive the iPEER title, new opportunities for professional activity become available (faster career development and academic mobility). Thanks to the recognition of such Registry system by different countries certified professional educators get the opportunity for international mobility within the framework of the agreement on this system of registration and certification. International Professional Educator Registry provides transparency and allows HEIs to consider certified educators from different countries for their high-profile faculty vacancies; certification allows educators to participate more easily in international projects and academic mobility, which, in its turn, will result in the internationalization of education and improvement of its quality.

4 – Conclusion

In conclusion, the recognition of engineering educators is a critical aspect of the advancement of engineering education. Traditionally this recognition was obtained through awards, conferences, and publications, where engineering educators can receive recognition for their contributions to the field and for developing innovative methods. However, these recognitions serving as an incentive for educators, enhancing the reputation and visibility of institutions and programs, and increasing the credibility of engineering education is not always impacting positively the profession since most of the time it asks the individuals to excel in research only as the pathway for the career development with the consequent reduction of the professional commitment in other areas as teaching or educational management.

The establishment of the iPEER managed to create a worldwide recognized profession for engineer educators. The impact of recognition can be significant, providing personal satisfaction, professional benefits, and institutional benefits for educators and their institutions. It is important to note that the iPEER recognition of engineering educators goes beyond awards, conferences, and publications by recognizing the daily efforts and contributions of

engineering educators in their classrooms, interacting with students, and preparing for lectures and seminars.

The purpose of recognition for engineering educators is multi-faceted. Firstly, recognition serves as an incentive for engineering educators to continue their work in developing innovative and effective teaching and learning methods. Secondly, recognition can also enhance the reputation and visibility of the institutions and programs in which the educators work, attracting more students and resources to these institutions. Thirdly, recognition can increase the credibility of engineering education, demonstrating that the field is valued and respected by the international community.

The most important aspect of the ENTER Professional Registry goes beyond registration and issuance of the individual iPEER, it is an important tool to peer recognize engineering educators' continuous improvement efforts as complete educators and to help identify the areas in which individually they need to grow as educators.

Acknowledgments

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