

International Internship Based on Research Collaboration to Improve the Educational Management on Engineering

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Abstract– Generating critical reflection in the members of the educational community, regarding the daily practice of the internship, for the purpose of improvement, requires experiential experiences of observation and interaction in new settings. Based on the objective, the investigation entitled “The internship to improve educational management” was carried out, with the directive, teaching and administrative staff of the Institution. The research corresponds to the qualitative approach, in its participatory action research modality, with a population of 48 people and the census sample. The techniques used are: observation and survey; the field diary and the questionnaire were used as instruments. The results of the research show that the internship constitutes an adequate strategy of continuous training, to promote changes of improvement in the conception and practice of educational management and teaching performance; based on observation, critical reflection and self-established improvement proposal; In addition, it contributes to better communication, organization, collaboration, teamwork, appreciation of humane treatment, mutual respect and attention.

Keywords–Internship, educational management, international meeting, collaboration, student exchange.

I. INTRODUCTION

The recent circumstances of engineering education have drastically changed by general attribution of internationalization of the whole society in addition to the research areas of science and technology. During the last decade, the necessity of the educational reforms has been strongly stated even in almost of universities, as pointed by R. Miller [1]. The roles of universities were actually redefined again. The engineering education should take the important roles to attract the students toward their profession. The numerous problems have been pointed such as the elevation of applicants, the decline of the scholastic ability due to the university-applicant elevation in number [2] and the globalization of whole society [3].

The Group of Studies and Development of Energy Alternatives (GEDAE) and linked to the Institute of Technology (ITEC) and à Faculdade de Engenharias Elétrica e Biomédica (FEEB), from Universidade Federal do Pará

(UFPA). O GEDAE was founded in the first year of November 1994 by Prof. Dr. – Ing. João Tavares Pinho and the coordinator at May 2018, when he officially settled down and passed to coordinate for his Vice-Coordinator, Prof. Dr. Edinakdo José da Silva Pereira. The group executes its scientific and technological activities considering mainly or regional aspect; preserving its university profile and acting in an integrated way with society.

II. INTERNATIONAL INVESTIGATIONS ON ENGINEERING

The first opportunity for us to start the international activity on the engineering educational researches overseas was Group GEDAE of the Pará University, the main purposes of the group are: development of low-cost technologies for serving electricity to small and medium loads, with the use of renewable energies; the survey of energy demands and potentials; the development of research on energy efficiency and rational use, conservation and energy quality; the assessment and labeling of the energy efficiency level in buildings; the dissemination of knowledge through undergraduate and graduate courses, lectures and seminars on renewable energy sources and their applications, and the provision of services in the form of consultancy and courses to the community in general.

GEDAE was the headquarters group of the National Institute of Science and Technology of Renewable Energies and Energy Efficiency of the Amazon - INCT-EREEA, from 2009 to 2017, and also integrated the National Network of Energy Efficiency in Buildings - R3E and the Eletrobras ProcelSolar Network.

The Group is linked to the Undergraduate Course in Electrical Engineering and to the Graduate Program in Electrical Engineering (PPGEE) at UFPA, through the professors of its staff, who regularly teach disciplines, and also through the guidance of scholarship students, interns and at the end of the course, on topics related to their areas of expertise.

The GEDAE laboratories have equipment for the development of research and work at the internship,

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undergraduate, master's and doctoral levels, being visited frequently by students of all levels and members of the community in general. In particular, GEDAE has received visits from researchers from national and international academic institutions and there is a frequent request for visits by professors and students at various levels, in order to learn about the operation of alternative systems for the production of electricity and the projects developed.

A. Internship for International

The internship according to the Ministry of Education of Peru is an act that consists of directly observing various aspects of the pedagogical action visited to reflect, learn about new experiences and improve the praxis of the participating teachers (MINEDU) [15].

R. Miller [1] in his research on pedagogical accompaniment and teaching performance, establishes that accompaniment aims to improve teaching performance and the quality of the teaching-learning process [15] corroborates this perception, arguing that it allows direct contact with the educational situation in the classroom and influences the commitment to improve teacher practice.

MINEDU [15], when addressing the Framework of good managerial performance, establishes that a practice of the director's pedagogical leadership is to accompany and evaluate teaching performance, promoting critical reflection for the continuous improvement of pedagogical processes.

Proposal that agrees with the contributions of [15] regarding the pedagogical leadership of the director, who through good practice contributes to the success and transformation of the educational process and the quality of learning. MINEDU [14] argues that it is not enough for teachers to participate in continuous training events, but rather that they need to be accompanied and share their practice to reflect, mutually strengthening their conceptions and practices.

However, the perception of the benefits of the internship has limitations, as refers, in the resistance of some teachers to the practice of the internship [8]. It is stated that each teacher has their way of teaching and their respective reasons; therefore, it is not possible to talk about their practice with another colleague. However, it is clarified that regardless of external factors, educational practices have a strong correlation with the results of the learning obtained. In [12] recommends that the internship be promoted as an incentive to motivate them to perfect their pedagogical practice. For his part [13] refers to five categories or models of lifelong learning that serve as a theoretical basis for internships:

1. Individually oriented training,
2. Observation evaluation,
3. Development and improvement of teaching,
4. Training and
5. Inquiry or investigation.

When analyzing the experience of the internship, starting from the fundamental in the analyzed models, it is noted how

it takes advantage of the benefits they contain. The value of observation and dialogue for critical reflection is expressed by [8] proposing to carry out reflective critical dialogue, with analytical and evaluative questions that allow reflection and conclusions to be drawn for continuous improvement.

B. Dispatch of Students to Foreign Institute/university and Academic Research Collaborations

The main objective of FONDECYT, the National Fund for Scientific, Technological Development and Technological Innovation is to promote the exchange of scientific, technological and innovative experiences and knowledge and its dissemination among the Peruvian community that contributes to strengthening R + D + i capacities. Likewise, CONCYTEC is the governing body of the National System of Science, Technology and Technological Innovation (SINACYT), in charge of directing, promoting, coordinating, supervising and evaluating the actions of the State in the field of science, technology and technological innovation.

The results of these training activities that contribute to the development and strengthening of scientific research capacities. The expected results are the described procedures, techniques and methodologies. As well as identifying potential contacts for collaborative networks of investigation.



Fig. 1. GEDAE UFPA facilities



Fig. 2. Mutual student's exchanges with GEDAE-UFPA



Fig. 3. Acceptance of students from UFPA on collaborative scientific researches

III. METHODOLOGY AND RESULT

The research is based on a qualitative approach, of the participatory action research type, whose population was made up of 48 people, of which 14 were teachers and 34 students of pre grade and postgraduate. The sample was census, not probabilistic for convenience. See Table I.

The techniques implemented in the present investigation on the observation and the survey; the instruments: the field diary and the questionnaire.

The categories established in function of the moments of the process was: the internship with its sub categories: observation, critical reflection and proposal of improvement; and educational management with its subcategories: planning, organization, execution and evaluation. For the application of the instruments, authorization from the host educational institution is requested, maintaining the identity of the informing teachers in reserve.

The process of the internship took place provided for the coordination of the directors of both institutions, the agreement is closed, the timetable and the sequence of activities of both parties, if the fulfillment is established.

TABLE I
NUMBER OF EXCHANGE STUDENTS AND TEACHERS IN UFPA-BRASIL

Institute	Number of people	Stay period	Year
Students to GEDAE UFPA Brasil	12	More of 12 Months	2018-2020
	22	3 to 12 Months	2018-2020
Teacher from Peru university	14	3-6 Months	2019-2020

In the expressions of the interns, according to the category of teacher or student, improvement proposals are established based on their personal reality, which they will replicate in their work; causing the improvement of: educational management, communication, organization, teamwork, collaboration, spirit of service, respectful and friendly

treatment, and greater commitment to their work, the student, the institution and the educational community.

Regarding their assessment in relation to the internship, they state:

- "It is a way of observing and learning from the management of other institutions and applying them to improve the educational training of our students",
- "We should do this type of events once a month, because it strengthens the spirit and improves the desire to teach, breaks mental patterns",
- "It is an excellent practice because it allows exchanging experiences and is inclusive",
- "It was interesting, novel, exchanged opinions with teachers in the area. A friendship with the institution visited was also started",
- "It was important and interesting, because you learn to share pedagogical experiences in order to improve and apply in our pedagogical practice",
- "It is positive because it enriches our work. In addition, it strengthens the unity between teachers. I suggest that at least two internships be scheduled per year".

A. Impact of the Internship Program

From the results of the internal and external evaluations carried out to the Internship Program, which rescue the opinion of the organizations involved in its execution as well as that of the interns, it is observed that:

- The program achieved its purpose of disseminating innovative educational practices aimed at improving the quality of education in Peru and provided a design and execution strategy that offers valuable lessons to those who want to carry out similar actions. Although it was not without its problems and difficulties, these did not affect the smooth running of the internships or the satisfaction with which the interns returned to their countries. Fig. 4 shows the opinion of the interns regarding the main contributions that this experience meant to them.
- The program was articulated around agendas that included a wide range of experiences at different educational levels and provided time to interact with the stakeholders involved in the selected experiences, often presenting a critical view of the achievements of the innovations examined.
- The presentations were given by prominent professionals, who in addition to presenting the contents, strategies and results of the experiences, motivated a rich dialogue with the participants.
- The socio-cultural activities, aimed at getting to know the culture of the host country, were highly valued by the participants, as they allowed a better understanding of the context in which the reforms

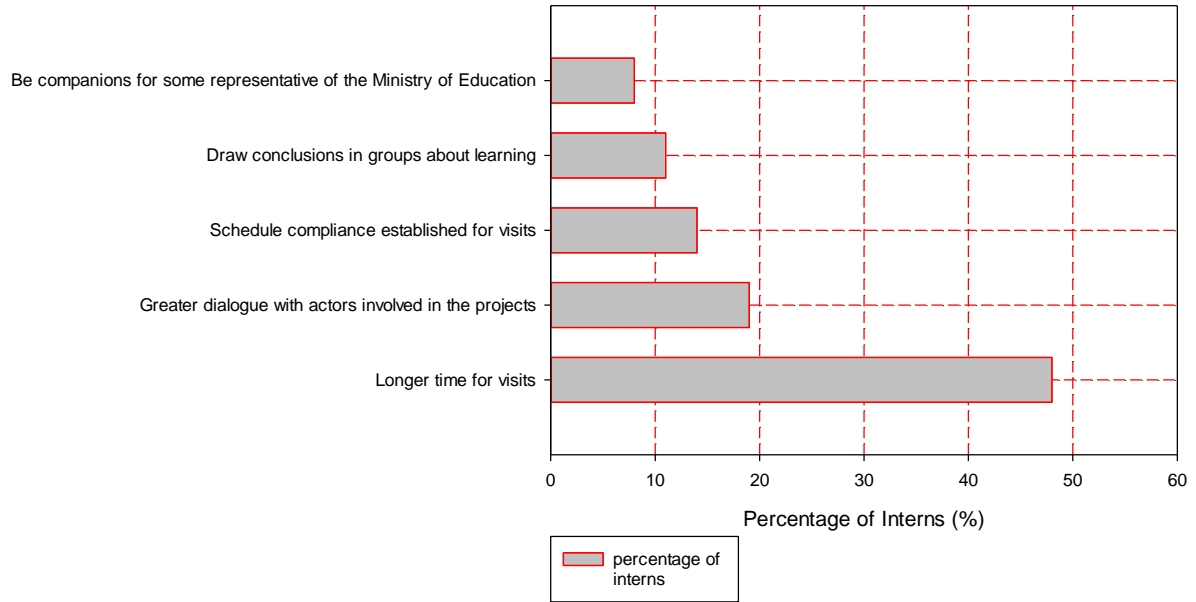


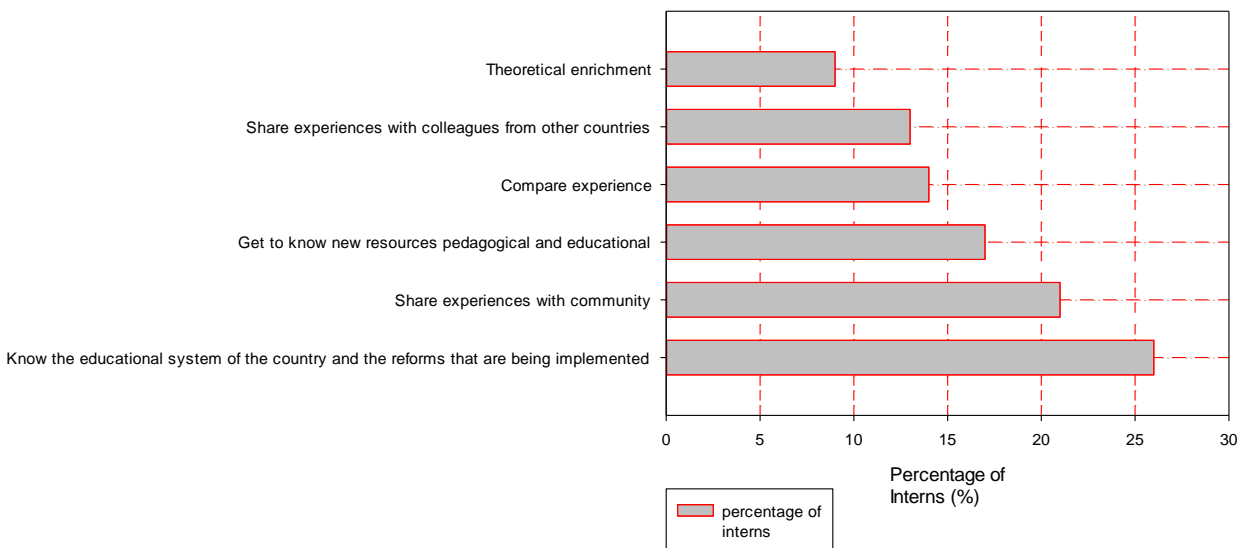
Fig. 4. Main Benefits of Participation in the Internship

were carried out, while offering various exchanges between interns and managers of internships.

- Coordination of the program, supported by the national counterparts, was a key element in its development. The technical capacity of the teams and the wide network of institutional and academic contacts made it possible to adequately identify inspiring experiences for the interns, as well as to effectively execute the project in both academic and logistical aspects.
- The program had a positive impact on the participants and, consequently, on their work environments.

- The materials distributed during the internships were used as instruments for the discussion and analysis of educational reforms in the academic and university spaces of the interns' countries of origin, since they were often shared with teams of peers and made available to libraries or documentation centers of the respective institutions.

Fig. 5. Aspects to Correct in Visits



IV. CONCLUSIONS

The international internship at GEDAE of the Federal University of Pará - Brazil was planned, executed and evaluated, generating a critical reflection on the interns that made it possible to establish their proposal for improvement in their job performance. The internship constitutes a continuous training strategy that favors the change of conceptions and practices for the improvement of educational management and teaching performance, based on observation, critical reflection and a proposal for self-established improvement; In addition, it contributes to better communication, organization, collaboration, teamwork, appreciation of humane treatment, mutual respect and attention.

According to the appreciation of the interns, the internship favors the integration of staff, continuous improvement, exchange of experiences, expansion of labor and human relations, breaks monotony and mental schemes, improves the desire to teach and learn.

Although the educational circumstances are different with each university or country, the current issues on the engineering education were found to be mostly common in every country. Therefore, it is profitable for us to discuss about the present status and further developments on education programs.

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