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The training of researchers in higher education

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Abstract: This work is ascribed to the research project, "Strategies of didactic innovation for the improvement of the training offer at SEK International University." Its objective is to design a Management Training Program for researchers in function of a managerial and organisational conception in institutions of Higher Education, where any research can be carried out to produce scientific and technological knowledge, in response to different work agendas linked to the needs of national and international communities. Everything based on a descriptive study that determined the social, environmental and economic needs in research management of Occupational Health and Safety, Architecture, Environmental Engineering and Mechanical Engineering careers of the institution. However, the results were not conclusive; it perceived that the research management of analysed careers does not produce scientific results or cutting-edge technologies. The proposed training program of researchers considers the organisational and managerial aspect of the university institution, what is more, the human capital that must be re-empowered, innovated or modified if necessary, in spaces of observation, articulation and criticality, serving the vital socio-political elements of the entity and the country.

Keywords: Management and organizational conception, research, research culture, training of researchers

I. Introduction

This work ascribes the research project "Strategies of didactic innovation for the improvement of the training offer of the UISEK (International University SEK)". It arises as a response to the limitations of the teaching-learning process and research training in the university, corroborated through a procedure created in the institution for review, systematisation, methodological advice in the classes, research projects and in the review of the primary documents of the Gallar micro curriculum [1]. It is presented as an alternative to solve the difficulties mentioned above, to design a Management Training Program for researchers, based on management and organisational concept in Higher Education Institutions. Therefore, any research can be carried out to produce scientific and technological knowledge, in response to various work agendas linked to the needs of national and international communities.

As a first activity, a survey was carried out exploring the social, environmental and economic needs in research management in Occupational Health and Safety, Architecture, Environmental Engineering and Mechanical Engineering career at the SEK International University. The variables of each item were taken according to the professional profile presented in the curricular grid of the careers mentioned above.

Ultimately, as a conclusion, the policies were redefined to design the Management Training Program for Researchers in function of a managerial and organisational conception in Higher Education Institutions, beyond what is established in the curricular meshes presented by the programs of research in the analysed careers

II. Survey of Information

2.1 Pilot test: The instrument consisted of 10 items, a Likert scale, which explored the social, environmental and economic needs in research management in the Occupational Health and Safety career and applied as a pilot test. The variables of each item were taken based on the professional and research profile present in the curriculum of the career. The internal validity statistic used was the Cronbach's Alpha, because of this, it was found that the weighted average of the correlations between the variables or items was 0.85 (see annexe 1); evidencing thus, a high index of reliability or internal validity of the instrument designed and applied.

2.2 Diagnosis of management needs in careers of Occupational Safety and Health, Architecture, Environmental Engineering and Mechanical Engineering: The diagnosis was made through a descriptive study Hernández [2] determining the social, environmental and economic needs in research management in Occupational Health and Safety, Architecture, Environmental Engineering and Mechanical Engineering at the International SEK University. The variables of each item were taken based on the professional and research profile present in the curriculum of the careers mentioned above.

The survey consists of a total of 10 items, to which the respondents answered through a Likert scale of 5 points: 1 - Strongly disagree, 2 - Disagree, 3 - Partially Disagree, 4 - Agree and 5 - Strongly agree. (see annexe 2). The sample consisted of 80 people; professionals and technicians in the areas of Occupational Health and Safety, Architecture, Mechanical Engineering and Environmental Engineering.

Once the information was collected, we proceeded to analyse these by examining the frequencies and averages in the tables that continue:

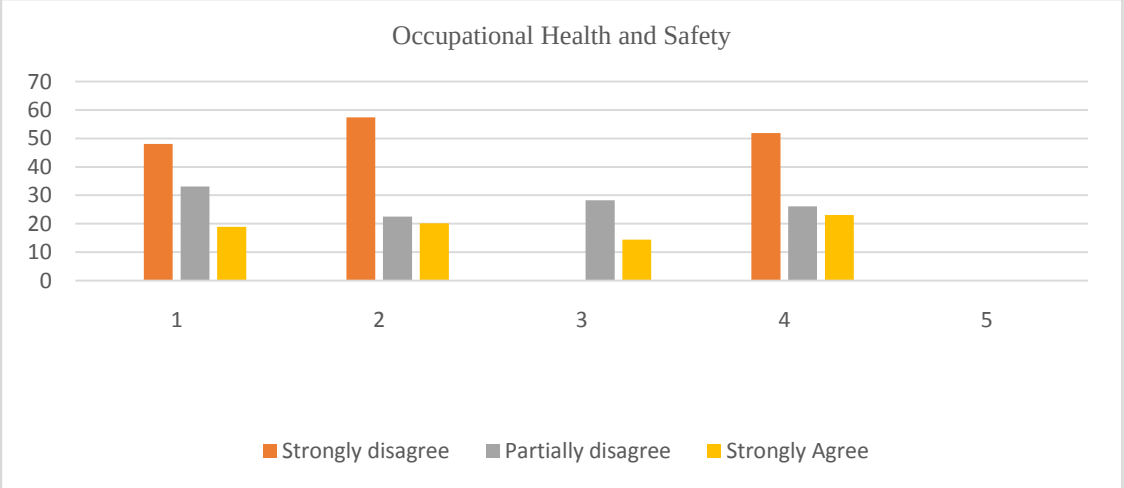
III. Analysis of the results.

3.1 Analysis of the Engineering career in Occupational Safety and Health.

The results in Occupational Health and Safety career are presented in table number 1, adding the frequencies of "strongly disagree", options 1 and 2, and "strongly agree" options 4 and 5.

Table 1.
Occupational Health and Safety

Item	Strongly disagree	Partially disagree	Strongly Agree
P1	50,4	16,4	33,2
P2	40,3	39,4	20,3
P3	49,4	16,7	33,9
P4	56,6	22,3	21,1
P5	50,9	33,8	15,3
P6	66,4	12,2	21,4
P7	62	22,9	15.10
P8	48	33,1	18,9
P9	57,4	22,5	20,1
P10	57.4	28,2	14,4
Average	51,87	26,14	23,12



Graph 1: Occupational Health and Safety

In table number 1 and graph number 1 are the results of the Occupational Health and Safety career; The majority of the respondents, 51.87%, were "very much in disagreement" with investigative management implementation in the career. Item number 6 was the variable of greatest disagreement; that is, "occupational health and safety management systems are not implemented in organizations", followed by item number 7, "neither innovative research projects in occupational safety and health are implemented" and, in item number 9, "they manage projects in occupational health and safety according to the economic situation of the country." 26.14% of the respondents were "partially in disagreement" with the research management carried out in the

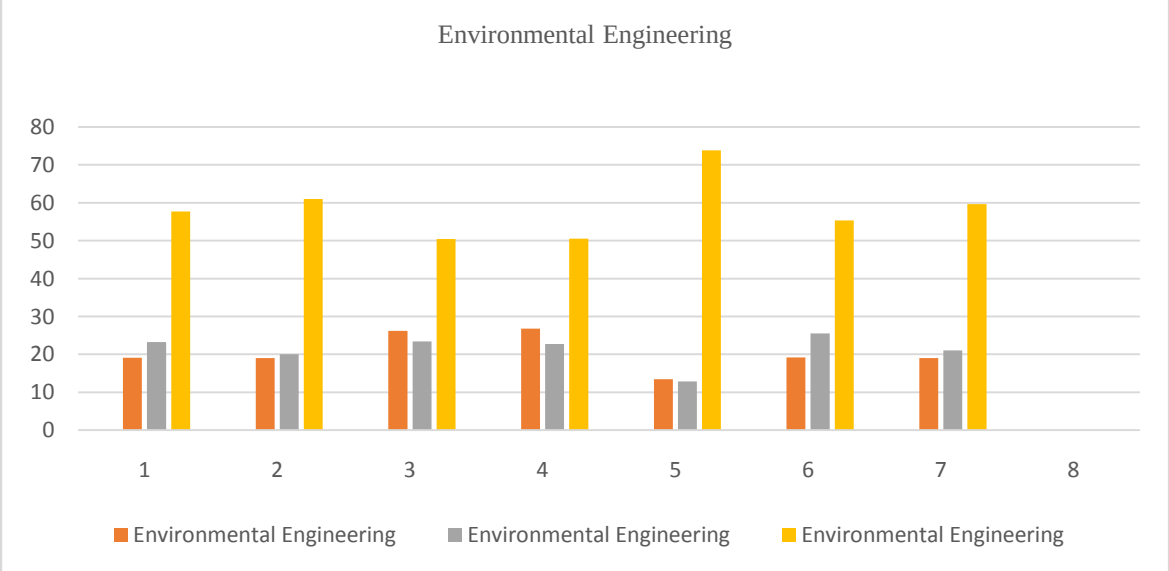
Occupational Health and Safety area, and only 23.12% of the people were "very much in agreement" that research management processes are carried out accordingly to the profile of the curriculum of the career.

3.2 Analysis of the Environmental Engineering career.

The results in Environmental Engineering career are presented in table number 2, adding the frequencies of "strongly disagree", options 1 and 2, and "strongly agree" options 4 and 5.

Table 2
Environmental Engineering

Item	Strongly disagree	Partially disagree	Strongly Agree
P1	22,2	22.2	55,6
P2	14,5	18,2	67,3
P3	12,5	22,3	65,2
P4	16,9	24.8	58.3
P5	19,1	23,2	57,7
P6	19	20	61
P7	26,2	23,4	50,4
P8	26,8	22,7	50,5
P9	13,4	12,8	73,8
P10	19,2	25,5	55,3
Average	18,98	21,01	59,64



Graph 2 Environmental Engineering

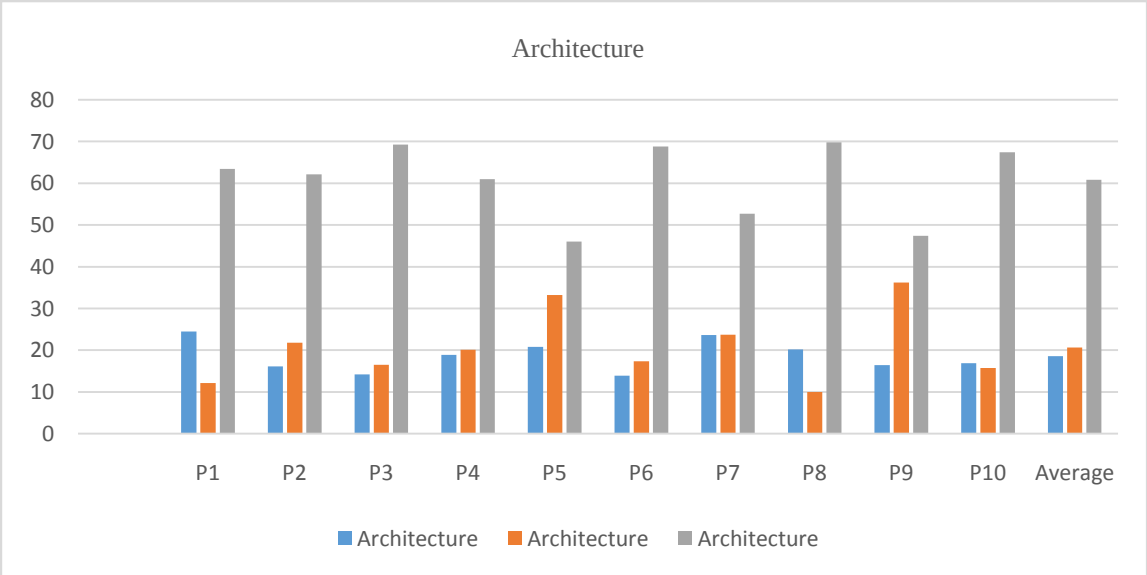
In table number 2 and graph number 2 are the results of the Environmental Engineering career; 59.64% of the respondents were "very much in agreement" on how the investigative management is carried out. Item number 9 was the variable of "greatest agreement", where 73.8% of people think that "competent research with a high environmental impact is promoted" and 67.3% of people also "strongly agree" in the fact that "environmental engineering area manages sustainable processes in the production environment". On the other hand, 21.01% of people were "partially in disagreement" with the conduction of research in the area of environmental engineering, and only 18.98% of the people surveyed were "strongly disagree" with the research management in the area of Environmental Engineering.

3.3 Analysis of the Architecture career.

The results in the Architecture career are presented in table number 3, adding the frequencies of "strongly disagree", options 1 and 2, and "strongly agree" options 4 and 5.

Table 3
Architecture

Item	Strongly disagree	Partially disagree	Strongly Agree
P1	24,5	12,1	63,4
P2	16,1	21,8	62,1
P3	14,2	16,5	69,3
P4	18,9	20,1	61
P5	20,8	33,2	46
P6	13,9	17,3	68,8
P7	23,6	23,7	52,7
P8	20,2	10	69,8
P9	16,4	36,2	47,4
P10	16,9	15,7	67,4
Average	18,55	20,66	60,79



Graph 3 Architecture

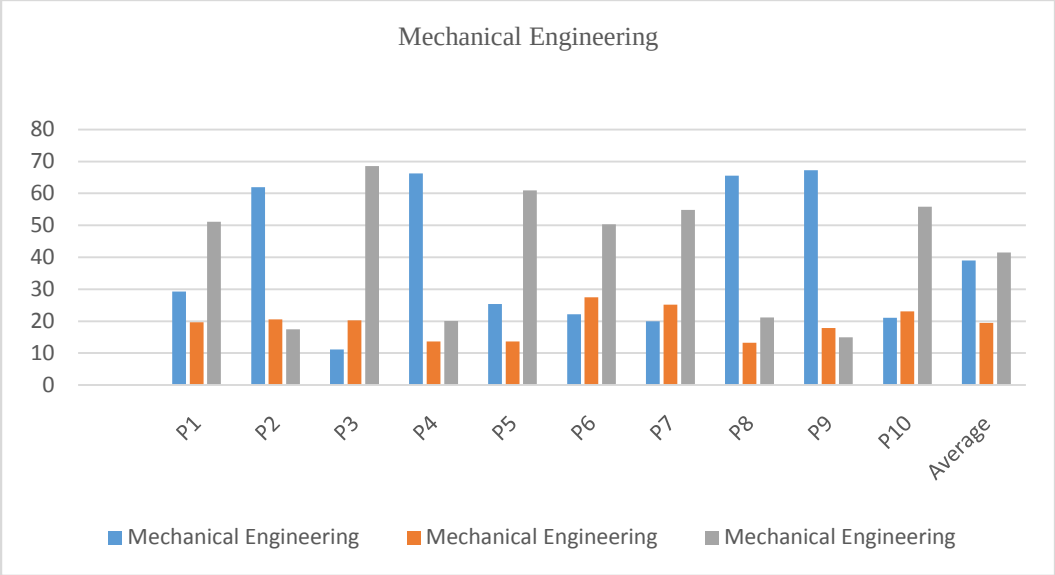
In table number 3 and graph number 3 are the results of the Architecture career; the majority of the respondents, 60.79%, were "very much in agreement" with whether the investigative management in the area is carried out properly or not. 69.8% of people believe that "the architectural area generates comfortable spaces", 69.3% of the people were "very much in agreement" that "the architectural area conceives, modifies, projects and constructs architectural spaces with adequate theoretical, communicative and technical knowledge, in order to generate architecture solutions according to the social needs of the context in which they operate. Also, 68.8% believe that "research responds coherently through spaces with places and the society". 20.66% of the people were "partially in disagreement" with the fact that the area of Architecture performs research management in response to the curriculum of the career, and only 18.55% of respondents were "strongly disagree" on how investigative management is carried out in the area of Architecture.

3.4 Analysis of the Mechanical Engineering career.

The results in the Mechanical Engineering career are presented in table number 3, adding the frequencies of "strongly disagree", options 1 and 2, and "strongly agree" options 4 and 5.

Table 4
Mechanical Engineering

Item	Strongly disagree	Partially disagree	Strongly Agree
P1	29,3	19,6	51,1
P2	62	20,6	17,4
P3	11,1	20,3	68,6
P4	66,3	13,6	20,1
P5	25,4	13,6	61
P6	22,2	27,5	50,3
P7	20	25,2	54,8
P8	65,6	13,2	21,2
P9	67,3	17,8	14,9
P10	21,1	23,1	55,8
Average	39,03	19,45	41,52



Graph 4 Mechanical Engineering

In table number 4 and graph number 4, the results of the Mechanical Engineering career are shown as follows; 41.52% of the respondents were "very much in agreement" with the research management, 68.6% believe that "production processes in the automotive sector are evaluated", however, 67.3% of the people "disagrees" with the fact that the area of research management "designs systems and components of automotive mechanisms," while 66.3% of the people also "disagreed" on how "scientific management and research projects are promoted in response to the processes of energy transformation for sustainable development in Ecuador". Lastly, 39.03% of the respondents were "in disagreement" on how the research is managed according to what is established in the curricular mesh of the career.

The results obtained are not in any way conclusive or generalizable. However, through them, we can see that in response to different curricular meshes, research management does not generate the expected results.

Consequently, we can infer that the investigative work in the careers of Occupational Safety and Health, Environmental Engineering, Architecture and Mechanical Engineering, do not produce scientific results or state-of-the-art technologies under the managerial conception of the research as it was previously proposed.

IV. Conclusions

Although the descriptive study assigned to the research project "Strategies of didactic innovation for the improvement of the training offer at SEK International University." did not yield conclusive results, it determined that the research management attending to the different curricular meshes, does not generate the results expected. Therefore, it does not produce scientific results or cutting edge technologies under the directional conception of research management.

In response to this situation, a Management Training Program for Researchers is proposed, based on a managerial and organisational conception in Higher Education institutions, together with a human capital that must be re-empowered, innovated or modified, in spaces of observation, articulation and criticality. Not without taking into account the socio-political elements of the entity and the country, and considering, in addition, the following elements indicated by Padrón [3]:

1. To define investigative management as a collective, cohesive fact, therefore, an organisational and managerial event.
2. To define investigative management as a strategically diverse process; On the one hand, it obeys a system of personal convictions, enduring what Fleck [4] proposes when he expresses that there are different styles of thinking and that each person has different privileged characteristics to process and handle problems in response to different cognitive personalities. Therefore, it is logical to think that none of these styles of procedure on solving different real life phenomena is better than any other and that all are important. On the other hand, attends to the different collective instances of research programs.
3. Manage research as a social fact, which is due to the development needs of the communities and which has real success only if its results are aligned with the progress of society and its growth goals. The research begins and ends in the demands of knowledge and technologies located in their environment.
4.Define investigative management as a socialised fact; that is to say, of high social impact, with highly systematised and organised results, in view so that they can be evaluated and criticised and, finally, the research must have a theoretical foundation, previous ideas from which to start and from where to formulate the research problems.
5. University institutions must develop attitudes and investigative competencies in students and teachers:
5.1. Provide the researcher with an updated knowledge system; pertinent information to the thematic discipline itself and its problems, information related to the world of international, national and local research (history of science, epistemology, and socio-cultural research and the role of researcher).
5.2. Provide an axiological component (or values): the researcher should be trained in a particular system of stable preferences or assessments (permanent inclination to analysis, intellectual creativity and criticism), ability to work both autonomously and in teams, with honesty and commitment and, in general, all implicit aspects in the so-called 'researcher vocation'.
5.3. Provide a procedural component ('know-how'): the researcher must be trained in response to a specific system of technologies and techniques, both of general scope (common to all types of research) and specialised scope, typical of their own epistemological approach and their own problem areas.
5.4. The researcher must train in the typical interpersonal dynamics of the institutional and organisational research processes, such as leadership relations, prestige, promotion, career development, reward systems and awards, modalities of publication and dissemination, and exchanges — all framed within the typical tasks of the job of the researcher, Davalillo [5].
5.5 The training of researchers should provide training in the management of empirical and theoretical structures typical of research, always depending on the different epistemological approaches and the different diachronic phases in the development of cooperative programs (both at regional and national level and global levels); this includes aspects linked to empirical or observational treatments, the formulation and logical analysis of problems and objectives, the design and evaluation of models and theories, and the modalities of technological derivation from theories. Padrón [6], Camacho [7], Di Gravia [8].
5.6. To train the discursive competencies of research: communicational structures in general, linguistic construction of descriptive systems and theories, and semiotic processes. Hernández [9], Padrón [10].
5.7. Students and teachers must train in direct experiences within the lines, groups and research centres, alongside veteran and active researchers, Padrón [11]. The notions of 'learning by seeing' and 'learning by doing' should be incorporated into the curriculum through innovative didactic strategies that are much more dynamic than the simple elaboration of a project in a classroom and under the guidance of professors actively engaged in research.

8. The university institutions must form the scientific committees by career; train staff to manage the relationships between research processes and the significant spheres of society, economy, politics and development, Padrón [12]. This aspect refers to the fact that the area of knowledge and technology demands must be known (clients and consumers of research, marketing of research, rates of obsolescence of research), investment structures and profitability (research economy, rationalisation of spending), decision-making and access for communal, national and international development programs.

References

[1]. Gallar, Y., Rodríguez, V. Di Gravia, A. (2018). *Estrategias de Innovación Didáctica para la Mejora de la Oferta Formativa de laUISEK* https://www.pedagogia.edu.ec/Documento/Vista/844

[2]. Hernández, R., Fernández, C., Baptista, P. (2014).*Metodología de la Investigación*, 6ta. Edición,McGraw Hill. México

[3]. Padrón, J. (2016).*Un Modelo de Variabilidad de la Investigación Científica*. Disponible en http://padron.entretemas.com.ve/TeoriaInvest-2016/

[4]. Fleck, L. (1986.).*La Génesis y el Desarrollo de un Hecho Científico*. Madrid: Alianza editorial.

[5]. Davalillo, L. (2006). *Los Procesos de Investigación como Procesos Grupales. Tesis doctoral no publicada*. Universidad Nacional Experimental Simón Rodríguez. LINEAhttp://padron.entretemas.com.ve/Tesistas/TesisLyzziDeCap1aConclusiones.pdf

[6]. Padrón, J. (1992).*Aspectos diferenciales de la Investigación Educativa. Modelos y Patrones de Variabilidad. Tesis doctoral, mención Publicación*. Caracas. Universidad Experimental Simón Rodríguez. Disponible en http://grupoetti.net/repositorio/Tesis_Jose_Padron.pdf

[7]. Camacho, H., (2000). *Enfoques Epistemológicos y Secuencias Operativas de Investigación. Tesis Doctoral no publicada*. LÍNEA-I. Universidad del Zulia; Maracaibo. Venezuela. http://padron.entretemas.com.ve/Tesistas/TesisHermelinda.pdf

[8]. Di Gravia, A. (2006) *El Problema Científico; aspectos lógicos, lingüísticos y epistemológicos. Tesis Doctoral. MenciónPublicación*. Universidad Nacional Experimental Simón Rodríguez. Caracas, Vzla. Disponible en http://padron.entretemas.com.ve/Tesistas/TesisAnaRosa.pdf

[9]. Hernández, A. (2000) *Tesis Doctoral no publicada. Universidad Simón Rodríguez*. LÍNEA-I.https://www.scribd.com/document/87836875/Enfoques-epistemologicos-y- estilos-del-pensamiento

[10]. Padrón, J. (1992).*Aspectos diferenciales de la Investigación Educativa. Modelos y Patrones de Variabilidad. Tesis doctoral, mención Publicación*. Caracas. Universidad Experimental Simón Rodríguez. Disponible en http://grupoetti.net/repositorio/Tesis_Jose_Padron.pdf.

[11]. Padrón, J. (1992).*Aspectos diferenciales de la Investigación Educativa. Modelos y Patrones de Variabilidad. Tesis doctoral, mención Publicación*. Caracas. Universidad Experimental Simón Rodríguez. Disponible en http://grupoetti.net/repositorio/Tesis_Jose_Padron.pdf

[12]. Padrón, J. (2002).*Aspectos Básicos en la Formación Investigadores. Línea-I. Documento solicitado por los organizadores del Fondo Virtual para las Jornadas de Investigación en la UPEL* en San Cristóbal.http://padron.entretemas.com.ve/FrmacInvest/AspBasicosFormInv.htm