

THE DEVELOPMENT OF PROFESSIONAL COMPETENCIES OF AGRICULTURAL ENGINEERS IN PRODUCTION FROM THE DEVELOPMENT OF ACADEMIC STAYS

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Abstract: The Bachelor of Agricultural Engineering in Production is a career that is only offered at the UAEM Zumpango University Center, which is an academic organization of the Autonomous University of Mexico State and since 1987 has been concerned with offering quality education and offering the labor market, professionals in the area of Agricultural Sciences, with the knowledge, skills and abilities required by the profession, to achieve these objectives, the students of this degree in the tenth period, which is the last of their ideal five-year career, enter the labor field through starting from the Academic Stay, which is a learning unit, which evaluates the performance of the students from organizing, executing, directing, controlling and evaluating the technological processes that are carried out in the production units and this way having comprehensive training in the institutions of Federal, State, Municipal and Private Initiative and is an opportunity to stay and work in said agencies.

Keywords: Development, Skills, Engineers, Agronomists, Stays.

INTRODUCTION

The development of the competencies and skills required in the labor field for the Agricultural Engineer in Production is one of the great challenges that Universities that offer careers in the area of Agricultural Sciences have, and it is one of the points to be addressed in the profiles of graduation, which must provide every agronomy professional with comprehensive training, which makes it necessary for every Higher Education Institution to make modifications and restructuring of their study programs in order to comply with the graduation profile, as well as extracurricular activities. that allow them to carry out activities where they can develop their skills and abilities and even more so the generation of knowledge in a comprehensive

manner for the resolution of real problems that farmers experience and that allows them to better integrate into the labor field.

The Universities of Higher Agricultural Education present great dynamics in their substantive functions with the mission of responding to the needs of a society in constant growth and development of demands for technological and environmental innovations, towards a new culture that goes towards caring for the environment and make necessary consumption, so the training of human resources that must respond to these demands makes it necessary that the Agricultural Engineer in Production must be the professional who has the necessary sensitivity to integrate the problems of the field (Limitations and potentialities), since he must have the technical and scientific knowledge necessary to positively transform current production systems, because it must apply the scientific method and the ability to disseminate technological changes and advise producers on the problems they face and must be the promoter of change, for which must identify, access and manage sources of information, thus formulate projects, develop them and present solution proposals based on the development of Academic Stays for a period of 6 months in public or private sector units before entering the labor field.

This work consists of carrying out an analysis of the Stay in the integrative training of knowledge with the practice of the Agricultural Engineer in Production before the Labor Field, which is presented by the Study Program of the Degree of Agricultural Engineer in Production, in its Flexible version 2004 approved by the University Council of the Autonomous University of Mexico State, based at the UAEM Zumpango University Center since 1987, as a learning unit with a load of 21 credits and a total of 21 hours week-month

The study program in the flexible version that was approved in 2004 has the following characteristics: it manages three trajectories, a minimum (8 periods), an ideal (10 periods) and a maximum (11 periods). It is based on the development by competencies, which the same plan contemplates three cores: the basic one that includes the first three periods, where the student receives basic training with the following subjects: Applied Mathematics, Organic and Inorganic Chemistry, Plant Morphology, Photogrammetry and Photointerpretation, General Microbiology, General Biochemistry, Basic Crops, General Zootechnics, Hydraulics, English C1 and C2 Introduction to Agricultural Systems, Research Methodology, Agrometeorology, Rural Sociology and Plant Physiology.

The Substantive core includes the fourth to seventh period: Animal Anatomy and Physiology, Bromatology, General Genetics, Agricultural Administration and Accounting, General Soil Science, Agricultural Ecology, Animal Nutrition, Soil and Plant Nutrition, Probability and Statistics, Plant Pathology, Agrarian Legislation, Experimentation Agriculture, Animal Reproduction, Use and Management of Pesticides, Integrated Use and Management of Soil and Water, Engines, Tractors and Agricultural Implements, Agricultural Communication and Extension, Animal Pathology, Agricultural Industries, Plant Physiotechnics, Animal Improvement, Postharvest Physiology and Technology, Agricultural marketing and organization of agricultural producers.

For the Comprehensive core, it is made up from the eighth to the tenth, where the following learning units are offered: Horticultural Production Systems, Floricultural Production Systems, Poultry Production Systems, Deciduous Fruit Production Systems, Swine Production Systems, Titration Workshop, Evaluation of Production Systems, Evergreen

Fruit Production Systems, Sheep Production Systems (Meat and Milk), Dairy Bovine Production System and as electives for the Area of Accentuation: Intensive Production in greenhouses, Weed Control, Nutritional Diagnosis, Special Crop Production Systems, for the area of Livestock Accentuation: Introduction to Pharmacology, Forage Production, Animal Parasitology, Beef Bovine Production Systems, and the Estancia learning unit that is offered in both areas.

Within the curriculum of the Study Plan, the areas of emphasis are defined: the agricultural area and the livestock area, which has the intention of integrating the knowledge acquired by students with practice. The advantage in this model is that the student chooses which area they wish to study. According to their own training interests, within the training period a Learning unit appears whose name is Estancia that they take in the last period of the degree and its purpose is for them to look for a place in some Federal, State, Municipal, Private Initiative, to carry out a stay for five months that allows them to work as Agricultural Engineers in Production before entering the labor field.

GENERAL GOALS

- Carry out an Analysis of the learning unit Stay in the integrative training of the Agricultural Engineer in Production.
- Promote the comprehensive training of students through academic stays allowing their academic, professional, cultural and personal development, which strengthens the knowledge, skills and value of future professionals, creating a work and social impact, taking into consideration, the characteristics of inclusion, regional equity and social inclusion in its participants.

- Provide work spaces for the development of skills and competencies of the profession for students of the Bachelor of Agricultural Engineering in Production in the labor field.

SPECIFIC OBJECTIVES

TEACHING

- Establish the scope of the Stay learning unit of the Study Program of the Degree in Agricultural Engineering in Production. for the integration and generation of knowledge from a real situation.
- Obtain necessary information to serve the upcoming modifications to the Curriculum of the Study Program of the Bachelor of Agricultural Engineering in Production.

Goals

- Carry out the comprehensive training of students based on the areas of emphasis to generate understanding of knowledge from practice and carry out their academic stay.
- Integration of the thematic contents of the Learning units that make up the accentuation areas of the educational program of the Bachelor of Agricultural Engineering in Production, based on the development of the Stay.

BACKGROUND

The university as a social institution in charge of preserving, developing and disseminating culture in accordance with the demands of contemporary times, has at its center the training of professionals, as custodians and promoters of culture and the development of the country.

To achieve quality education, with coverage and equity between sectors of society, as well as between rural and urban areas, continues to be a desire and a promise of every country. Obviously the agricultural education institutions are not responsible for the crisis nor is it their responsibility to resolve it in all its components, since both education and the fate of the countryside are strongly subject to a social economic model and a country project. It is up to educational institutions to criticize this model and project, criticism that is exercised through proposals and defense of these.

Currently, higher education institutions have a great challenge, which is to strengthen the connection with the labor field, which sets the tone towards the graduation profile, where their graduates must have a multidisciplinary vision and their training whose profile is oriented not only to obtain elements and tools that affect the productive part of agriculture, which is basic and important, but in comprehensive training that includes knowledge and skills in the field of Agribusiness, and skills for planning, implementation and agribusiness administration processes, attitudes to give and maintain competitiveness and linkage to the market in a favorable way, giving an agricultural engineer who is proactive, purposeful, creative and committed to what he does and with whom he does it (Niembro and Navarro, 2013).

Therefore, currently the training of the Agricultural Engineer, regardless of his specialty, must be focused on learning strategies, as a resource that will allow the resolution of a real case, where he will have the possibility of integrating his previously acquired knowledge., to the new and build new knowledge, which will give you the necessary tools to be able to respond to the problem that arises. Therefore, they must take

the Stay learning unit in the last period of their ideal career and be prepared for entry into the labor field. The areas of emphasis must be taught based on case resolution.

In 2004, the approval of the restructuring of the Educational Program of the Bachelor of Agricultural Engineering in Production was carried out, which began its work in 1987 with headquarters in the Zumpango Professional Academic Unit Now UAEM Zumpango University Center in a rigid version and with this modification, the flexible modality was achieved, where the student in the company of his Academic Tutor traces the ideal path according to his particular interests.

This modification to the structure of the Educational program, which, when divided into three cores: Basic, substantive and Comprehensive, seeks for the student to develop their competencies and abilities to resolve cases and that they, with their tutor, shape their training according to the learning units that are present as mandatory and optional in the Accentuation area, whether agricultural or livestock, chosen according to their skills acquired during their basic and substantive training, before choosing the Stay Learning unit, once they have reached the tenth period of the Bachelor's Degree, the students choose the Stay Learning Unit which has the purpose of carrying out a 5-month stay in some agency of the Federal, State or Municipal order, even in the private initiative, which has allowed our students are performing in the work field before graduating, it is an important preamble between school and the work field, likewise they have been assigned a degree teacher who gives them academic follow-up, and evaluates their professional performance in said departments or companies. and collect recommendations that can be considered in the formation of graduation profiles, that is, adjust it according to the demands of the labor field.

It is necessary to remember that academic stays are activities related to your area of study, which allow you to work temporarily in a place and whose purpose is to gain experience and learn practically everything learned at the university.

The *importance* lies in the fact that it is a complementary activity for the academic and professional training of students from different faculties and careers; it provides the opportunity to put into practice the knowledge that has been acquired.

Among the objectives of this practice we have the initiation of a student into professional practice through connection to a national or international organization that can be public or private, in the same way we try to give the student the possibility of adding work experience. to your theoretical preparation so that you can advance your growth and develop your skills and attitudes for a specific job, showing what you know how to do and the added value that you can provide to a company, in addition you can also learn more about the profession from which you intend to graduate.

MATERIALS AND METHODS

At the Autonomous University of Mexico State, based at the UAEM Zumpango University Center, located in the Municipality of Zumpango de Ocampo, Mexico State, since 1987, the Bachelor of Agricultural Engineering in Production has been offered, and it was not until 2004 that plans and programs under the competency approach, with the intention of reducing the failure and dropout rates, as well as the terminal efficiency rate, the work aims to carry out an analysis of the Stays as strategies that integrate knowledge with practice, based on monitoring academic of a teacher assigned by the Academic Coordination of the Educational Program, who is the link between the School and the Agencies of the

Federal, State or Municipal order and private initiative.

RESULTS OBTAINED

In this period 2019A, a total of 28 students completed their stays in the following Institutions, Companies, as shown in the following table:

Company	Place	Number of Students doing Stay
Greenhouse: "Israel Donis"	Santa María Cuevas Zumpango	3
Municipal System for the Comprehensive Development of the Family	Temascalapa, Mexico state	1
Agrochemicals Tequiquiac Seeds and Forages	Tequiquiac, Mexico state	1
Ranch "El Ensueño" CUBU SPR Agriculture of RL of CV	Col. Ranchería Buenavista, Zumpango, Mexico state.	4
H. Temascalapa City Council	Temascalapa, Mexico state.	1
Operator: CHEDRAUI S.A. DE C.V.	Teoloyucan, Mexico state.	1
Secretary of the Environment	Ciudad de México	1
Private initiative	Teoloyucan, Mexico state	2
Sygenta	Mexico city	1
Forages: San José del Potosí	Durango, Mexico	1
U.R El Surco Equipment Inputs and Agricultural Services	Zumpango, Mexico state	1
Agronegocios del valle del Mezquital S. De RL de CV	Mezquital, Hidalgo state	1
National Health Service, Food Safety and Quality (SENASICA)	Tecámac, Mexico state	1
Company: Rijz Zwaan; Mexico	San José Iturbide, Estado de Guanajuato	1
Forage Production Unit "Sergio Retana Padilla"	Tepotzotlán	1

As you can see, there are 15 units, where 21 students are carrying out their academic stay, which are evaluated with criteria of values and professional skills.

For 2022A, a total of 18 students spent their stays in the following facilities, as shown in the following table:

Number	Name	Number of Students doing Stay
1	Operator: CHEDRAUI S.A. DE C.V. Teoloyucan, State of Mexico.	2
2	Poultry Farms: Rocer; S.A. de C.V.	2
3	Mpio Agricultural Development Directorate of Teoloyucan, State of Mexico.	1
4	Cuevas Greenhouses, Zumpango State of Mexico	3
5	Plant and Vegetable Producers, Mpio of Coyotepec, State of Mexico.	2
6	Collection center Teonanactatt S.C. of R-L de C.V.	2
7	Chelita Mpio Ranch. Tequiquiac, State of Mexico.	1
8	Dirección de Fomento Agropecuario of Zumpango, Mexico state.	1
9	Harvests of Tecozautla S. of P.R of R.L. Gentleman	1
10	Constant solutions in development S.A. of CV	1
11	Agricultural Inputs and Pest Control "LOS OAXACAS, Zumpango, State of Mexico.	1
12	Ranch: el Ciruelo, Teoloyucan, State of Mexico	1

For the year 2022A, there were 12 units that received students for their academic stay
 In the 2024A period, a total of 23 students

completed their stays in the following Institutions, as shown in the following table:

Number	Name	Number of Students doing Stay
1	Directorate of Agricultural Development Municipality of Tequixquiac, State of Mexico	2
2	Zitlilac dairy products, Zitlaltepec, State of Mexico	1
3	El Surco, Zumpango State of Mexico	2
4	Cuevas Greenhouses, Zumpango State of Mexico	1
5	Plant Health Board of Oriente Michoacán	2
6	Rancho La Unión Tierra Blanca, Teoloyucan State of Mexico	2
7	Delegación Regional de Desarrollo Agropecuario VIII Zumpango	1
8	Rancho Nuevo Products, Zumpango; Mexico state	1
9	Hydrosel Produce; S. DE R.L.DE C.V. Atlixco, Puebla	1
10	Plant and Vegetable Producers; S.C. by R.L. Coyotepec, State of Mexico	2
11	Entrepreneur of Agricultural Products and Services, S.A. of C.V. Zumpango, State of Mexico	1
12	Regional Delegation of Agricultural Development VII, Cuautitlán Izcalli, Edo de México	1
13	Ramírez Forage and Seed Distributor, Zumpango, State of Mexico	1
14	Division of Basic Sciences and Engineering of the Metropolitan Autonomous University, Azcapotzalco Unit.	1
15	Headquarters of Agricultural Coordination, Municipality of Zumpango, State of Mexico	2
16	Cava 57, Queretaro, Mexico	2

This type of strategies focuses on learning, so the student is the center of the action, and the teacher is just a strategic coordinator of the activities. The strategy is not an end, but a means for students to develop collective abilities to solve problems, being innovative in the search for alternatives based on observation, experimentation, discovery, analysis and group discussion, synthesis. and decision making, always based on their needs and conditions of the environment where they develop (Pezo et.al.2007).

This methodology involves breaking teaching/learning paradigms in student behavior. It is an opportunity to share technical-scientific knowledge and that which constitutes knowledge (Pezo et.al.2007), generated from your stay in previous semesters. Furthermore, this strategy encourages students' interest in experimentation, as input for the decision-making process.

CONCLUSIONS

- The importance of generating productive integration spaces where students can carry out professional practices with the support of teachers within the framework of a comprehensive project is highlighted.
- It allows teamwork and appreciates the appreciation of participation in a productive environment and the performance of skills where the integration of theoretical and practical concepts is necessary for the resolution of cases.
- The academic stays are a space where the student has the opportunity to reinforce theory and put it into practice and this way have a start in the work field of their profession.

- With the results obtained in this work on the importance of completing the Academic Stay by the students, it served as a basis for us to request the restructuring of the 2023 Educational Program Approved

by the UAEMéx University Council to be made mandatory and in the last period, with a value of 30 credits, because in the 2004 version it was optional with a value of 21 credits.

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