

Competencias del eje de conservación y protección del ambiente del médico veterinario zootecnista

***Competencies of the axis of Conservation and Protection of the Environment of
the Zootechnical Veterinary Doctor***

***Competências do eixo de Conservação e Proteção do Meio Ambiente do Médico
Veterinário Zootécnico***

Daniel Rodríguez Tenorio

Universidad Autónoma de Zacatecas, Unidad Académica de Medicina Veterinaria y Zootecnia,
México

rtenorio00@hotmail.com

<https://orcid.org/0000-0002-2113-5911>

Francisco Javier Gutiérrez Piña

Universidad Autónoma de Zacatecas, Unidad Académica de Medicina Veterinaria y Zootecnia,
México

fpina@uaz.edu.mx

<http://orcid.org/0000-0001-5743-254X>

Alejandro Espinoza Canales

Universidad Autónoma de Zacatecas, Unidad Académica de Medicina Veterinaria y Zootecnia,
México

alejandroespinoza@uaz.edu.mx

<http://orcid.org/0000-0002-5031-4791>

Marlen Hernández Ortíz

Universidad Autónoma de Zacatecas, Unidad Académica de Matemáticas, México

marlen.hernandez@uaz.edu.mx

<https://orcid.org/0000-0003-2428-9016>

Regina Compeán González

Universidad Autónoma de Zacatecas, Unidad Académica de Derecho, México

compean_77@hotmail.com

<https://orcid.org/0000-0002-9398-6192>

Resumen

El propósito del presente estudio fue definir las competencias profesionales y las materias del eje de conservación y protección al medio ambiente del nuevo modelo educativo de la carrera de Medicina Veterinaria y Zootecnia de la Universidad Autónoma de Zacatecas, la cual establece que el docente y el educando conozcan las competencias por ejes con la finalidad de hacer más eficientes sus procesos educativos desde una óptica global. Para ello, se trabajó con un núcleo académico base de docentes de la unidad académica, los cuales se apoyaron en una metodología bibliográfica, síntesis y análisis, así como en la comprensión de documentos analizados del ámbito de la medicina veterinaria. Como resultado del trabajo en equipo de 50 docentes y 2 especialistas en educación veterinaria, durante talleres de trabajo y con base en la revisión documental de artículos de investigación en educación veterinaria, a través de la búsqueda en bases de datos como Scopus, Web of Sciences, Google Scholar y Dialnet, se definieron las siguientes competencias en el eje de conservación y protección al ambiente, donde el estudiante debe de ser competente en la realización de un manejo y disposición adecuada de los residuos peligrosos biológico infecciosos (RPBI), así como de material corrosivo, reactivo, explosivo, tóxico, inflamable y biológico infeccioso (CRETIB) generados por la actividad médica y agropecuaria para evitar la contaminación del ambiente y propiciar una buena salud pública. Además, debe tener la capacidad de realizar un manejo integrado de los residuos producidos como resultado por la actividad agropecuaria para aprovecharlos y evitar la contaminación del ambiente, así como diseñar y aplicar la metodología para la conservación y aprovechamiento de los recursos naturales. De estas competencias se definieron las asignaturas contenidas en el plan curricular.

Palabras clave: competencias, medicina veterinaria y zootecnia, conservación y protección del ambiente.

Abstract

The purpose of the present study was to define the professional competencies and subjects of the conservation and environmental protection axis of the new educational model of the Veterinary Medicine and Zootechnics career of the Autonomous University of Zacatecas, which establishes that the teacher and the student know the competencies by axes in order to make their educational processes more efficient from



a global perspective. To do this, we worked with a core academic core of teachers from the academic unit, who were supported by a bibliographic methodology, synthesis and analysis, as well as the understanding of analyzed documents from the field of veterinary medicine. As a result of the teamwork of 50 teachers and 2 specialists in veterinary education, during workshops and based on the documentary review of research articles in veterinary education, through searching in databases such as Scopus, Web of Sciences, Google Scholar and Dialnet, the following competencies were defined in the axis of conservation and protection of the environment, where the student must be competent in carrying out adequate management and disposal of hazardous infectious biological waste (RPBI), as well as corrosive, reactive, explosive, toxic, flammable and biological material infectious (CRETIB) generated by medical and agricultural activity to avoid environmental contamination and promote good public health. In addition, it must have the capacity to carry out integrated management of the waste produced as a result of agricultural activity to take advantage of it and avoid environmental contamination, as well as design and apply the methodology for the conservation and use of natural resources. The subjects contained in the curricular plan were defined from these competencies.

Keywords: skills, veterinary medicine and zootechnics, conservation and protection of the environment.

Resumo

O objetivo do presente estudo foi definir as competências e disciplinas profissionais do eixo conservação e proteção ambiental do novo modelo educacional da carreira de Medicina Veterinária e Zootecnia da Universidade Autónoma de Zacatecas, que estabelece que o educador e o aluno conheçam o competências por eixos, com o objetivo de tornar os seus processos educativos mais eficientes numa perspectiva global. Para o que trabalhamos com um núcleo académico constituído por docentes da Unidade Académica, que se apoiaram numa metodologia bibliográfica, de síntese e análise, bem como na compreensão de documentos analisados da medicina veterinária. Como resultado do trabalho em equipe de 50 professores e 2 especialistas em educação veterinária durante oficinas e com base na revisão documental de artigos de pesquisa em educação veterinária por meio da busca nas bases de dados Scopus, Web of Sciences, Google Scholar e Dialnet, foram definidas as seguintes competências no eixo de conservação e proteção do meio ambiente onde o aluno deve ter competência na realização de gestão e destinação adequada de resíduos biológicos infecciosos perigosos (RPBI), bem como de resíduos biológicos corrosivos, reativos, explosivos, tóxicos, inflamáveis e infecciosos (CRETIB) gerados pela atividade médica e agrícola para evitar a contaminação ambiental e promover a boa saúde pública. Da mesma forma, deve ter capacidade para realizar a gestão integrada dos resíduos produzidos pela actividade agrícola para aproveitá-los e evitar a contaminação ambiental, bem como conceber e aplicar a metodologia de conservação e aproveitamento dos recursos naturais. recursos. As disciplinas constantes do plano curricular são definidas a partir destas competências.



Palavras-chave: Competências, Medicina Veterinária e Zootecnia, Eixo da conservação e proteção do ambiente.

Fecha Recepción: Julio 2023

Fecha Aceptación: Diciembre 2023

Introduction

Currently, the increasing degradation of natural resources is evident, which is consequence of failures in environmental management systems, the inconsistency of policies environmental to level global, the weakening of the awareness and culture environmental, So as the lack of coherence in the application of environmental protection areas in Mexico and the world. Before this problematic, the great challenge that faces the humanity in the 21st century consists in create systems of production and consumption that reduce their impact in the natural resources, it which has to reach considering social aspects, so that do not compromise human existence the balance of the organisms in the planet.

For this reason, science and universities work to generate knowledge that allows people to reduce the impact of their lifestyles and even change the logic of civilization that generates environmental problems, which requires understanding and improving complex relationship between people and the natural environment (Tobón, 2015). For example, various organizations, such as the United Nations Environment Program (Estermann, 2012), promote the active participation of the public and the local communities as a warranty for the protection environmental.

Likewise, the growing demand for animal products in an efficient, sustainable and ecological due to the increase in population highlights the importance of professions such as zootechnical veterinary doctor. This profession, which addresses aspects such as public health, livestock, environmental protection, sanitation and food technology, has acquired relevance so much in Mexico as in the global ambit (Abraham, 2018 y Ojeda, 2021).

In answer to this demand, the universities, so much public as private, incorporate professional competencies as a way to continuously improve health and Animal production. These skills are fundamental in vocational training, since allow that the graduates take decisions informed based in knowledge, skills and attitudes associated to his profession, and perform a paper crucial in the development human, already that encompass learnings in three dimensions: conceptual, procedural and attitudinal.

Based on the above, it is evident the need to institutionally promote in the education vet the development of abilities and skills for ensure that the professionals count with the tools necessary for acquire competencies professionals, it that they will allow deal with success the complexity of situations in the ambit of the production and the animal health to the length of his life professional.



In this sense, the World Organization for Animal Health (WHO) establishes that veterinary practice must be supervised and controlled by a veterinarian, who must have the competencies required to carry out their work effectively (OMSA, 2012). The development of these capabilities is aimed at maximizing the specific abilities of each student, hence competency-based education plays a fundamental role in this process (Guzmán-Cedillo *et al.*, 2015).

According to Pastor *et al.* (2020) and Berumen *et al.* (2023), competencies are defined as interactions holistic, reflective and functional of knowledge and goals cognitive, procedural and attitudinal based in values. Are produce evidence and Actions transferable in diverse contexts, and are built in social practice and dialogic processes, by which They are also flexible and always can be improved.

Capabilities are understood as a set of knowledge and skills of thinking that leads to problem-solving skills and abilities. These are found aligned with a set of values previously analyzed and accepted, which shows a specific way of acting regarding the performance carried out, so they constitute skills that they develop gradually throughout the entire educational process. In short, they are resources cognitive formed by knowledge, attitudes and skills that serving for Act effectively in diverse situations, reply to questions either solve issues specific (Davó -Blanes *et al.*, 2018).

When UNESCO establishes that training and learning programs and projects based in competencies they must line with the needs social and labor current and future in the 21st century, competency-based guidelines reflect fundamental trends in international education, especially in Europe. In this regard, Ortega *et al.* (2017) point out following:

The most relevant project in higher education in the European community, which has expanded both in this continent and in Latin America and Mexico, it is the project called Tuning Educational Structures in Europe. This has as aim fine tune the educational structures of Europe (p.2004).

The Tuning project proposes to modify the curricular structures and their contents to procure to integrate points common between the plans and programs of study of all the European universities, regardless of their academic outputs. Its main focus is to achieve points of reference shared, without limit the autonomy and independence, is say, without exclude the diversity not minimize local and national authority. Furthermore, it does not focus on systems educational. This aims to determine generic and specific competencies, as well as the capabilities that all graduate has to demonstrate to the get into to the field labor. The knowledge necessary in the European Higher Education Area (EHEA) include the accumulation and transfer of credits by level or modules to

achieve true flexibility and exchange educational, besides of evaluations that generate indicators comparable to level international.

The purpose of all of the above is to adapt to rapid social, political and technology worldwide (Ortega *et al.*, 2017). Vargas (2006) and Tuning (2007) present a list of generic competencies, abilities and classified skills, which are detailed below continuation:

Competencies generic

Ability of abstraction, analysis and synthesis

Ability of apply knowledge

Ability to organize and plan time

Knowledge about the area of study and the profession

Responsibility social and commitment citizen

Ability of communication oral and written and communication in a second language

Ability of investigation

Ability of learn and update permanently

Comprehensive skills with information sources

Ability criticism and self-criticism

Ability creative and of job in equipment

Ability to identify, formulate and solve problems

Ability for take decisions and skills interpersonal

Ability to drive and motivate common objectives and

Commitment with the preservation of the half atmosphere goals

Commitment with your environment sociocultural

Ability for work in contexts international

Ability for work in shape autonomous

Ability to formulate and manage projects

Commitment ethical and with the quality.

Changes in society imply modifications in all aspects of life human, by it that organizations world they have had that intensify their efforts for designplans of development strategic in the ambit of the education, the which looking for develop competencies disciplinary specific and

competencies generic transversal desired for each he profile professional wanted (Fonseca-Constantino, 2021).

By hence, HE requires adopt a new vision in planning of the education superior university that attend the characteristics that they demand the needs social. The training educational has to trigger new trainers with competencies that facilitate the transition of the training initial to the training keep going, aspect essential for the life of each individual. This suggests the revision of concepts fundamental of the planning strategic in the universities and the definition of competencies specific for each career professional (Cambiaggi *et al.*, 2012).

The purpose of the competencies is to coordinate policies of training, plans institutional and professional certifications that allow teachers to stimulate significant improvement in the learning of a new concept of the capabilities (attitudes and skills) of the student. To do this, the focus of education must be on the student, who must be able of learning collaboratively (Salazar and Chiang, 2007; Viveros *et al.*, 2011). This is due to that today employers demand competent management leaders capable of surviving and thrive in view of the threats. This involves forming to the student for that understand and in front he changes with a professional demeanor appropriate.

As Serpa (2021) indicates, the key areas of human development in a company must trigger results tangible. By it so much, the orientation based in competencies has to ensure that the professional has the ability to solve problems that arise, establishing a training approach that optimizes meaningful and lasting learning. Calderon and Naranjo (2004) stand out that the possibility of build a advantage competitive founded in the talent human resources requires human resources leaders to develop competencies that respond to the challenges in the professionally.

In Mexico, the competency-based education model adopts an approach similar to that of America of the North, which focuses in the knowledge of the skills and attitudes necessary for perform and stand out in the practice. The learning packages result very useful to provide instructions precise about each issue and to the prepare tasks that offer feedback about his application (Hernandez *et to the.*, 2009; Hernandez Martinez, 2019).

Delors (1996) mentions that the new orientation of education has as an element central is the foundation in pedagogical ideas, which seeks a comprehensive education that I developed to the person in four big aspects:

1. Aspects educational. Learn to learn.
2. He knows of the practice. Ability for do forehead to different experiences.
3. Aspects of democracy. Learn to live together, managed to the comprehension, interdependence and resolution of conflicts.
4. Dimension ontological. Learn to develop the autonomy, he judgment and the responsibility.

Competencies in the educational field focus on knowledge, skills and attitudes inherent to



a skill that responds to discipline and values, so that allows evaluation of achievements through performance. This approach should include the process of teaching-learning, the competencies by build, the skills by develop and the promotion of attitudes about values and discipline. The planning, diagnosis and evaluation of the learning they must orient to results integrated in the learning, and abarbar diverse scenarios and situations. These processes they must be based in the performance and serve as experience, feedback and self-assessment. In summary, the importance of current skills is linked to the need to adapt to the new realities of today's society (Alcántara and Zorrilla, 2010).

On the other hand, regular evaluation of the curriculum is essential to promote changes that allow achieve with the profile professional required in the market labor and in the self-employment. In this sense, the teachers play a key role in deepening in knowledge, plan classes in a structured way, transmit knowledge with learning strategies appropriate and create an appropriate environment. Simply put, feedback through evaluations is essential, while that the relations personal, the collaboration and he development of competence emotional are vital for improve the practices daily in the institutions educational superior (Climént, 2014).

The competencies disciplinary, by so much, they lead to the training of students according to his profile of egress, and are composite by skills, attitudes and knowledge. They build on the logic of the disciplines, but are not universally relevant to all, still so, allow establish spaces, activities and sequences centered in the learning that support generic competencies (Barrón-Tirado and Díaz Barriga, 2018) and (Estela-Galarza and Falcon, 2022). The competencies professionals are fundamental for to form to the students in the profile of egress, well It allows define the capabilities productive in terms of knowledge, skills and attitudes necessary in a specific work environment (Guzmán-Cedillo *et al.*, 2015), of there that the institutions educational must certify His plans curricular.

The Autonomous University of Zacatecas, for example, currently promotes programs educational programs planned in conjunction with productive and social sectors to adapt to the needs of the around. By it so much, is imperative update he improvement and the training of who form, it which can see reflected in the phase of diagnosis of the needs of assessment defendants in the job academic. In this context, the teaching has to be realized with responsibility, professionalism, ethics and he domain of the competencies necessary for the practice professional.

In the case concrete of the doctor vet zootechnician (MVZ), has to tackle diverse areas of knowledge that also encompass the conservation and protection of the environment as a pillar important of his training professional. By it so much, this study has as aim identify and define the competencies of the axis of conservation and protection of the atmosphere, so as the subjects that compose it, to establish the current demands of the MVZ at the University Autonomous of



Zacatecas.

Materials and methods

For reach he aim established, were used methods bibliographic, revision, synthesis, analysis and description of articles. The powers of conservation and protection of the environment analyzed are aligned with the current study plan of the Academic Unit of Veterinary Medicine and Zootechnics (UAMVZ) and with the competencies what are wanted in the veterinarians newly graduates with the purpose of guarantee services veterinary doctor nationals of quality (OMSA, 2012).

He study was carried out in the Unit Academic of Medicine Vet during sessions work with the participation of 50 MVZ teachers and 2 experts in veterinary education. They carried out 5 work workshops with a total duration of 40 hours, held in the building of postgraduate degree from the UAMVZ of the UAZ. These workshops focused on the review, analysis and discussion documentary film of articles of investigation in education vet, selected after a search bases of data as Scopus, Web of Sciences, Google scholar and Dialnet. The process of revision and analysis was carried out by work teams formed for this purpose. After carry out collaborative work during the workshops, the competencies and subjects were defined that present in the results.

Results

This type of research in education vet contributes significantly to the scientific community in this field of knowledge, as it offers results on the axis of conservation and protection of the atmosphere, issue that usually be outcast in the study of the education in medicine vet and zootechnics in Mexico and America Latina.

With base in the revision and analysis of the literature scientific related with the competencies in the axis of conservation and protection of the environment, both in Mexico and in Latin America, identified the competencies for the degree of Medicine Vet and Zootechnics of the University Autonomous of Zacatecas (UAMVZ-UAZ), So as the subjects that the they compose. He aim was grasp the requirements current that requires he doctor vet and zootechnician. On the other hand, the academies of the conservation and environmental protection axis of the unit academic they elaborated a report aim identifying the competencies that the students of the degree of Medicine Vet and Zootechnics of the UAZ they must have, know and to dominate. Are competencies They integrated to the academic program of the subjects of the plan curricular so that the students the curse

The detailed review of the professional competencies in veterinary medicine of the Pan



American Association of Veterinary Sciences and other sources consulted, analyzed by the work team highlights the importance of the competencies identified for training comprehensive veterinary zootechnical doctor in the area of conservation and protection of the environment, the which are essential for face to the market labor. In addition, was described the methodology and evidence presented to the UAMVZ-UAZ Unity Council to validate the powers by subject inside of the axis studied.

The board 1 sample the three competencies professionals that has to have the doctor vet zootechnician in the axis of conservation and protection of the environment, along with the subjects that must be study for face the processes within this axis curricular.

Table 1. Competencies and subjects of the licensed at Medicine Vet and Zootechnics(axis conservation and protection of the atmosphere)

Competence	Subjects that the develop
Carry out proper management and disposal of the RPBI (waste dangerous biological infectious) and CRETIB (corrosive, reactive, explosive, toxic, flammable and biological infectious) generated by the activity medical and agricultural for avoid the pollution of the atmosphere and propitiate the health public.	Driving Comprehensive of Agricultural Waste.Health Public. Disasters and Management of Risks.
Carry out comprehensive waste management produced by the activity agricultural fortake advantage of them and avoid contamination of the atmosphere.	Driving Comprehensive of Waste and ByproductsAgricultural. Quality and Safety of Products Livestock. Health Public.

<p>Design and apply methodology for the conservation and use of resources natural.</p>	<p>Systems of Production Organic. Production and Driving of Forages. Driving Comprehensive of Waste and Byproducts Agricultural. Livestock Production Apiarian. Ecology. Grassland Management and Ecology. Production and Driving of Forages.</p>
--	---

Fountain: Teachers of the UAMVZ

The UAMVZ of the UAZ offers a study plan in Veterinary Sciences that expresses clearly its intention to focus on the conservation and protection of the environment during the student training. The graduation profile seeks for students to intervene in a way effective in the workplace with the aim of conservation and environmental protection standards environment in the markets where they are inserted, in line with the ideas expressed by Ojeda (2021) and Berumen *et al.*,(2023). Priority competencies established are the following:

1. Makes a driving of the RPBI and CRETIB generated by the activity medical and agriculture to avoid environmental pollution and promote public health. Subjects integrated into the curricular plan: Comprehensive Management of Agricultural Waste, Health Public, Disasters and Management of Risks.
2. Carry out comprehensive management of waste as a product of agricultural activity and so avoid the pollution of the atmosphere. Subjects integrated in the plan curricular: Driving Comprehensive Waste and Agricultural Byproducts, Product Quality and Safety Livestock and Public Health.
3. Design and apply methodologies for the conservation and exploitation of resources natural. Subjects integrated into the curricular plan: Organic Production Systems, Production and Driving of forage, Driving Comprehensive of Waste and Byproducts agricultural, Cattle raising Regenerative, Production Apiarian, Ecology and Driving, and Ecology of the Pastureland and Production and Management of Forages.



Discussion

The definition of competencies was based in the categories of abilities and skills established by Vargas (2006) according to the Tuning project (2007). In this sense, the powers identified match with the Calderón and Naranjo criteria (2004), who highlight the need of advance quickly in diverse areas of knowledge for adjust them to the demands in how much to competitiveness, development and progress of the country. In addition, the competencies Defined professionals align with the idea of competent leaders with human talent, according to the criteria mentioned by these authors. In fact, the definition of competencies fits with the statements of Salazar and Chiang (2007), who maintain that these should adapt to the changes taxes by around professional global.

In such sense, supports the idea expressed by Alleys *et to the.* (2017), who they arguethat are competencies they must be directly related with the units of business in healthand production animal, of there that HE owe assess constantly the programs of training forimprove so much he program as the competencies to the length of the career.

On the other hand, the competencies identified in the axis of conservation and protection of the environment for veterinary education at the Autonomous University of Zacatecas coincide with the beginning established by Shepherd *et to the.* (2020) and Berumen *et al.*, (2023), who consider that Competencies are powers and knowledge that enable the professional to perform. their functions effectively, in accordance with the objectives and goals of the livestock company or of veterinary medicine, always preserving the principle of conservation and protection of the atmosphere. These statements agree with what was explained by Barrón-Tirado and Díaz Barriga (2018) and Estela-Galarza and Falcon (2022), who they underline that in the competencies has to prevail he art, the moral, he right, the traditions, so as habits and capabilities developed.

Conclusions

In conclusion, he process of assessment of the axis of conservation and protection of the atmospherein the area of veterinary sciences seeks to propose a methodology that allows students acquire knowledge and capabilities related with the development of competencies professionals. Upon graduating from the academic unit as professionals in the labor market, wait that validate are competencies to the apply their knowledge in the protection and conservationof the environment, as well as in the provision of veterinary services or in the productive sector. This would achieve doing more efficient the processes from a perspective global, it which it implies aspects such as project preparation, project management, rural development models sustainable, communication efficient and collaboration with colleagues and other professionals.



For it, the competencies professionals defined by the collective of teachers of the unit academic education must be dynamic and be constantly reviewed to ensure that professionals in medicine vet and zootechnics are aligned with the needs changing of the around in the ambit of the conservation and protection of the atmosphere. By hence, suggests a revision periodic, at least every five years as a generational break. Furthermore, the subjects that make up each competence must be subject to frequent review by the core academic core of the teachers who constitute each axis. This approach involves periodic curricular changes in the degree program to be able to effectively address the demands of the livestock sector and of the health animal.

Future lines of investigation

Based on the results of this research, which establishes the competencies and necessary subjects in the curriculum of the Veterinary Medicine and Zootechnics career, especially in the axis of conservation and protection of the environment, the importance of inserting the graduates of the degree effectively in the workplace of the profession. This, in turn, highlights the need to investigate the other five curricular axes defined for the degree in Medicine Vet and Zootechnics of the University Autonomous of Zacatecas (health, production animal, sociohumanistic, conservation and protection of the atmosphere, and hygiene and technology of food).

Investigation of these additional curricular axes will provide crucial information on the professional skills necessary for each specific area of the profession. This will translate into subjects within the curricular plan that will contribute to strengthening the curriculum and align the profile of the graduate of the Autonomous University of Zacatecas with the demands of the labor market and the needs of the profession in the field of veterinary medicine and zootechnics.

References

- Abraham, J. G. (2018). *New scenarios and job opportunities for veterinary doctors zootechnist*. First and Second Interinstitutional Meeting.
- Alcántara, A. and Zorrilla, JF (2010). Globalization and upper secondary education in Mexico: in seeks of the relevance curricular. *Profiles educational*, 32 (127), 38-57.
- Barrón-Tirado, M. c. and Diaz Belly Arceo, F. (2018). Resume and processes of change, deliberation, conversation and human agency. *Magazine of the School of Sciences Education*, 1 (13), 5-18.

- Berumen, FLR, Frausto, HR and Fernández, EDJR (2023). Specific competencies of the Organization world of Health Animal (WHO) fundamental, that requires he graduate of Medicine Vet and Zootechnics. *Inter Disciplin* , 11 (31), 195-208.
- Caballo, VE, Salazar, IC, Olivares, P., Iurtia, MJ, Olivares, J. and Toledo, R. (2014). Assessment of the skills social: structure factorial and others properties psychometrics of four measures of self-report. *Behav Psychol* , 22 (3), 375-99.
- Calderon, g. and Orange tree, J. C. (2004). Competencies labor of the managers of talent human. *Innovate*, 14 (23), 79-97.
- Callejas J. C., Horse Ramos, AND., Lujan Lopez, J. and Alleys Saturday, J. C. (2017). Methodology of curricular design based on professional competencies. *Epistemia Scientific Magazine*, eleven). <https://doi.org/10.26495/rev.111.573>
- Cambiaggi , VL, Fontana, PA, Barros, M., Garavaglia , C., Mazzone , N., Piove , ML and Zuccolilli , G. Either. (2012). *Is possible the teaching by competencies in disciplines basic?* In IV National Congress and III International Congress of Science Education Agricultural.
- Climent , J. B. (2014). Typology of the competencies in education vet. *Magazine of Veterinary Research of the Perú* , 25 (2), 293-316.
- Davó-Blanes, M. D. C., Vives-Cases, C. and Huerta, B. (2018). Competencies and contents of health public in Veterinary Degree programs in Spanish universities. *Gazette Sanitary*, 32 (6), 526-532.
- Delors, J. (1996). The four pillars of education. In *Education Contains a Treasure* (pp. 89-103). Santillana-Unesco.
- Estela-Galarza, M. and Falcon, N. (2022). Experiences of intervention of the medicine vet in the development of Municipalities Healthy in Latin America and the Caribbean. *Magazine of Veterinary Research of the Perú*, 33 (3).
- Estermann, J. (2012). Crisis civilizatoria y vivir bien. Una crítica filosófica del modelo capitalista desde el allin kawsay/suma qamaña andino. *Polis. Revista Latinoamericana*, 11(33). <http://dx.doi.org/10.4067/S0718-65682012000300007>
- Fonseca-Constantino, M. g. (2021). Assessment by competencies in the comprehension reader. *With-Science Scientific Bulletin of the school High School No.*, 8 (16), 78-79.
- Guzmán-Cedillo, I., Moreno Alcántara, S. I. y Lima-Villeda, N. (2015). The competencies disciplinary, educational and socio-affective in a university teaching profile. *ReiDoCrea*, 4 , 228-244. <http://hdl.handle.net/10481/37268>

- Hernandez Martinez, d. c. (2019). Of the approach adequationist to the approach based in competencies: a look at the insertion into the labor market of Sociology graduates. *Sociological (Mexico)*, 34 (98), 189-219.
- Hernandez, g. C., Giraldo, c. M. TO. and Valencia, J. c. N. (2009). Orientation strategic and resources competitive: a study in large industrial companies in Colombia. *notebooks administration*, 22 (38).
- Ojeda, N. (2021). *Development of professional skills in medical students Vet that participate of a exchange student international in the year 2019* (thesis of master's degree). National University of the Litoral.
- Organization world of Health Animal (WHO) (2012). *recommendations of the OIE about the competencies minimal that HE are waiting of the veterinarians newly graduates for guarantee services veterinarians national of quality*. Organization world of HealthAnimal.
- Ortega, C., Passailaigue, R., Febles, A. and Estrada, V. (2017). The development of skills scientific from the programs of postgraduate. *REDVET. Magazine electronics of Vet*, 18 (11), 1-16.
- Pastor, D., Arcos Medina, GDL and Lagunes Domínguez, A. (2020). Capacity development of investigation for students university students through the use of strategies instructional in virtual learning environments. *Apertura (Guadalajara, Jal.)* , 12 (1), 6-21.
- Salazar, c. M. and Chiang, M. (2007). Competencies and education superior. A study empirical. *Horizons Educational*, 12 (2).
- Serpa, GR (2021). Ethical training of professionals and professional ethics of teachers. *Magazine Conrado*, 17 (S3), 62-69.
- Tobón, S. T. (2015). *Training comprehensive and competencies* (vol. 227). Editorial Macro.
- Tuning (2007). *Report final of the project Tuning America Latin: reflections and perspectives of the higher education in Latin America* .
http://tuning.unideusto.org/tuningal/index.php?option=com_docman&Itemid=191&task=view_category&catid=22&order=dmdate_published&ascdesc=DES
- Vargas, R. (2006). "Methodology Tuning". *Meeting general of directors of the Association National of Engineerin* . Veracruz.
- Viveros, G. A., González, C. B., De-Paz, M. D. J. B., Ramírez, C. C., Herrera, T. D., Alonso, A. C. D. y González, R. V. (2011). Secretary of Extension Academic Coordination of

Training teacher Services Educational Integrated to the State of Mexico Module "Teaching of science with the Approach by "Competences."

Rol de Contribución	Autor (es)
Conceptualización	Daniel Rodríguez Tenorio
Metodología	Regina Compeán González
Software	Marlen Hernández Ortiz
Validación	Regina Compeán González
Análisis Formal	Alejandro Espinoza Canales
Investigación	Alejandro Espinoza Canales
Recursos	Regina Compeán González
Curación de datos	Marlen Hernández Ortiz
Escritura - Preparación del borrador original	Daniel Rodríguez Tenorio
Escritura - Revisión y edición	Alejandro Espinoza Canales
Visualización	Francisco Javier Gutiérrez Piña
Supervisión	Francisco Javier Gutiérrez Piña
Administración de Proyectos	Daniel Rodríguez Tenorio
Adquisición de fondos	Daniel Rodríguez Tenorio