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# *La educación agropecuaria del ingeniero agrónomo a través de la producción de alimento animal*

## *Agricultural education of agricultural engineer through the animal husbandry production*

**Lisandro Ricardo-Cruz**

**Daniel Thompson-Zulueta**

**Carlos Ezequiel Pino Pupo**

Universidad de Holguín, Holguín, Cuba.

**ORCID:** <https://orcid.org/0000-0003-1364-8757>

<https://orcid.org/0000-0003-3367-555X>

<https://orcid.org/0000-0002-8260-2210>

### **Correo(s) electrónico(s):**

[lcruz@uho.edu.cu](mailto:lcruz@uho.edu.cu)

[tompson@uho.edu.cu](mailto:tompson@uho.edu.cu)

[pinopupoce@gmail.com](mailto:pinopupoce@gmail.com)

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**Resumen:** A partir del insuficiente tratamiento metodológico a la educación a través de la instrucción en diferentes formas de organización del proceso educativo en la carrera de Ingeniería en Agronomía, se propone un procedimiento metodológico para la educación agropecuaria desde contenidos relacionados con la producción de alimento animal. El procedimiento es contentivo de cinco acciones y sus respectivas operaciones, las cuales, favorecen a que el estudiantado se eduque en el proceso. La pertinencia se constató mediante la aplicación del criterio de usuario, el trabajo metodológico de la disciplina integradora del currículo y los resultados que se tuvieron avalan su pertinencia.

**Palabras clave:** Educación agropecuaria; Producción de alimentos; Procedimiento metodológico; Educación instrucción.

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**Abstract:** Based on the insufficient methodological treatment of education through the instruction in different forms of organization of the educational process in the Agricultural Engineering career, a methodological procedure for agricultural education is proposed from contents related to the production of animal feed. Five actions and their respective operations are proposed, which favor the student being educated in the process. The relevance was verified through the application of the user criteria, the methodological work of the discipline integrating the curriculum and the results that were endorsed its relevance.

**Keywords:** Agricultural education; Food production; Methodological procedure; Education instruction.

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## **Introduction**

The vertiginous growth of humankind in a planet that is deteriorating ecologically, is facing important challenges that put food production under stress, for which the countries of the first world propose the accelerated application of technologies of all kinds, many of which do not take into account the differences in the economies of the

peoples and in other cases, knowing the inequalities, they are applied increasing poverty and hunger on a world scale (Machuca, Leyva, García, 1998, p.9). Today, in a new context where, in addition to globalization, competitiveness, knowledge-based development and technological innovation, there is the international economic and financial crisis, an element that weakens the availability and commercialization of food on a planetary scale.

The Food and Agriculture Organization of the United Nations (FAO) points out that agriculture in Latin America and the Caribbean needs to simultaneously achieve the objectives of equity, sustainability, profitability and competitiveness, and that there may be various alternatives for meeting these challenges, which requires "Adapting the training of professionals in the agricultural sector to these new challenges is an indispensable prerequisite" (FAO, 1993).

In analyzing FAO's proposals, it is necessary in agriculture to adopt technological alternatives that maintain or recover the productive capacity of the land, the health of plants and animals, and preserve natural resources and the environment, but education must be sensitized, committed and at the service of production, teaching and learning, and learning by producing.

Cuba, an underdeveloped nation blockaded by one of the largest food exporting countries in the world, the United States of America, suffers with greater impact this crisis. In such circumstances, Army General Raúl Castro Ruz in the Assembly of People's Power on August 1, 2009, expressed: "[...] to strategic tasks such as food production, which we have already pointed out constitutes a matter of national security, we must continue to add the greatest number of people, through all forms of existing property and with the required order" (Castro, 2009, p.2).

In the update of the guidelines of the economic and social policy of the Party and the Revolution for the period 2016-2021 approved at the 7th Party Congress in April 2016 and by the National Assembly of People's Power in July 2016, it is expressed in its chapters VI: Social Policy and VII: Agro-industrial Policy, guidelines 117, 160 and 164, proposing in them to continue advancing in the evaluation of the quality and rigor of the teaching-educational process, the substitution of imports of those foods that can be efficiently produced in the country and the development of livestock programs in the

bovine, buffalo, swine, poultry, and small livestock activities, enhancing national sources of food for animal use.

For our country, one of the greatest difficulties in livestock systems has been the insufficient creation of a food base that guarantees animal feed. In this way, by improving this situation, the production of milk, meat, eggs and other animal by-products could be increased, thus satisfying the consumption of proteins for our society. This idea has been analyzed by the authorities of the Ministry of Agriculture, and in its latest change to the policies of the delivery of land in usufruct, published on August 16, 2017, states among one of its changes, to establish the obligation to sow plants that are used in animal feed in the lands delivered for the development of large livestock in the country, until covering the food balance of the mass that the usufructuary owns.

As can be seen, both for the world and for Cuba, new challenges are posed to the educational systems in order to meet the demands of the skilled labor force required by the agricultural sector. Highly qualified technicians and workers are needed to help increase agricultural production volumes under sustainable conditions, based on the exploitation and integration of agriculture and livestock. There is currently a consensus in academic circles that agricultural education is one of the fundamental elements for achieving success in the production of food for both humans and animals. It is also recognized that it is influenced by different factors that need to be addressed comprehensively through the formal educational process.

In this sense, the Ministry of Higher Education, through the career of Agronomy Engineering, has the social task of training a professional that generates agricultural production of animal and vegetable origin in a stable way, with efficiency and quality, through the productive processes that are developed in the production systems. To this end, the student, when passing through the different fields of action, among which is Zootechnics, in which the subject of the discipline establishes an adequate link with the preceding knowledge and while fulfilling its objectives, will guarantee the knowledge, methods and skills required for the subsequent subjects, ensuring the articulation of the zootechnical component horizontally and vertically.

Likewise, the Professional Model foresees that with the fulfillment of the educational objectives, the future agronomists will develop intrinsic values in the formation of the

young revolutionaries of today's Cuba, such as: responsibility in the exercise of the profession, respect for the profession, love for nature, solidarity, honesty, patriotism and internationalism.

All these analyzed elements lead us to the high need to train a professional who produces material goods (food), solves technological problems in conditions of sustainable development, and actively participates in the care of the environment and in the improvement of the Cuban social economic model. In this way, it is valid to emphasize that the treatment to the educational potentialities of the contents related to the production of animal feed are very favorable for the simple reason of being one of the major problems of the livestock systems in our country. It is for this reason that special interest should be taken by teachers when developing these contents. Taking advantage of the educational potential of these contents will allow for greater motivation and appropriation of them.

The controls to teaching activities from the course 2015 to the present and the demands of the use of education through instruction in higher education revealed the existence of problems of methodical character in the treatment of education through instruction. Several teachers when stating the objective of their classes do not have clarity in the treatment to the rest of the components: contents, methods, means, forms of organization, evaluation. Similarly, it is not common to state the problem as a starting point for the treatment of the rest of the components of the teaching-learning process, which limits the understanding of the scope of the objective and the importance of its fulfillment. In addition, learning tasks do not always reflect the educational intentionality, which limits their transcendence in the formation of a committed and responsible professional.

These inadequacies have a negative impact on the achievement of an integral formation of the professional in training, starting from educating them for the solution of professional problems with a high level of responsibility in their professional activity as Cuban agricultural producer. We should also add that the incorporation of novice teachers who serve the discipline group was also taken into account in order to plan and develop activities aimed at these purposes, which is why the following conceptual methodical problem is formulated: Insufficient methodological treatment to education

through instruction in different forms of organization of the formative process in the career of Agronomic Engineering limits the education of the personality according to the modes of action stated in the model of the professional associated with the production of animal food.

The conceptual connotation of the problem lies in the bases of Cuban education, on the relation education-instruction and because several teachers do not master these bases or the theoretical foundations related to this relation and present limitations to apply it in the forms of organization of Higher Education. It is methodological because it proposes how to solve the problemal problem by means of alternatives susceptible of improvement and contextualization, as a result of the experience of the collective of teachers of the discipline. That is to say, to offer ways for teachers to do what up to now is not done or is done with limitations.

The solution of this methodological conceptual problem will have a direct impact on the improvement of the preparation and professional performance of the discipline's teachers and, as a consequence, on the fulfillment of the educational purposes of the subject in the curricular design of the training of agricultural teachers. From the above, a dialectic contradiction is deduced, which lies between the social demands to the teachers of Higher Education, related to the increasingly efficient management of the formative process of the students; and the limitations of some teachers of the Zootechnical discipline to develop education through the instruction in the class systems.

In order to solve the problemal problem, the following objective is proposed: To argue a methodological procedure for education through instruction from the contents related to the production of food for animal use, from the different organizational forms of Higher Education.

## **Development**

Based on the consultation carried out, it is considered that: "Methodological procedures constitute the educational practices that promote the active participation of all personal categories and that are carried out by students in order to facilitate the construction of their own learning. Methodological procedures are a complement to teaching methods;

they constitute "tools" that allow the teacher to implement achievement indicators, through the creation of activities, which allow him/her to guide and direct the student's activity".

The value of this methodological procedure lies in the possibility of taking advantage of the educational potential of the contents and educating through instruction. Therefore, the following category and dimensions are assumed for the treatment of education through instruction: Content as a pedagogical category, expresses that part of the culture related to the object of study whose assimilation is necessary during the formative process to achieve the proposed objectives (Horruitinier, 2006, p.21)

Instructional dimension. No training is possible without instruction. This means equipping them with the knowledge and skills essential to their profession (Horruitinier, 2006, p.18). Educational dimension. This dimension becomes a first-order element in the training process, it must be assumed by all teachers from the very content of each discipline (Horruitinier, 2006, p.20). Education from instruction. This idea leads to the understanding of the need to educate man at the same time that he is instructed, taking advantage of all the possibilities offered by society in general, the university community with emphasis from the contents of the Disciplines and Subjects (Horruitinier, 2006. P.21).

The assumed definition of methodological procedures, as well as the content category and dimensions assumed from Horruitinier (2006), constitute the theoretical reference for the elaboration of the methodological procedure for education through instruction based on the contents related to the production of food for animal use. The essential elements that comprise the methodological procedure for educating through instruction are presented below.

### **Determination of the educational potential of the content.**

Political significance: It lies in the great need of the current Cuban livestock industry to increase its production from the different productive forms and gradually get out of the great deterioration suffered as a result of the deep crisis of the 1990s, with the use of breeding technologies and the creation of a food base adjusted to tropical conditions and

thus replace imports of basic foods such as meat, milk and its derivatives. This idea is reflected in the Guidelines and in the professional's model.

In particular what is stated in PCC (2016), guidelines 160 and 164 in this sense, 160 refers "... to continue prioritizing the production of food that can be efficiently obtained in the country... and 164 to develop the livestock policy, prioritizing the cattle, swine and poultry species. Cattle raising should be based on the use of the land fund, the recovery of infrastructure, pastures and fodder".

**Social significance:** The high need for proteins and other nutrients of animal origin to satisfy food and nutritional deficiencies for the achievement of physical and mental development of people, with emphasis on the sick in hospitals, age groups such as children, pregnant women and the elderly; schools, children's circles, among others.

**Economic significance:** Emphasis will be placed on the students, the productive purposes of animal species of economic interest, the main varieties of pastures and forages, and food preservation technologies. In addition to the economic importance of animal food production for productive behavior and thus meet the needs of meat, milk and eggs in society, taking advantage of national, territorial and local potentialities and thus replace imports and stop spending money from the state budget to buy food that can be produced in our country.

**Environmental significance:** To the extent that the management and feeding of animals of economic interest and crops that serve as pasture and fodder are carried out correctly and sustainably, the appearance and propagation of pests and diseases would be avoided, reducing the use of medicines and toxic substances that damage the environment, such as: the large number of phosphorous compounds used in pesticide baths and the elimination of pests in crops.

### **Contextualization of the educational potential of the content.**

Political contextualization of the content in the local productive agroecosystem (municipality, locality, popular council, district, farm, etc.).

Social contextualization of the content in the local productive agroecosystem.

Economic contextualization of the content in the local productive agroecosystem.

Environmental contextualization of the content in the local productive agroecosystem.

The contextualization of the political, economic, social and environmental meanings of the content will have to be carried out within the framework of local development and the achievements and difficulties obtained in the local productive agroecosystems, where the solution of productive technical conflicts and their corresponding meanings must be the same as those used in our province, its municipalities, popular councils, farms, etc.

**Determination of the values to be strengthened in students.**

These values will not be all those described in the professional's model or in the objectives of the year, but will emanate from the diagnosis of the group and the result of the contextualization. Values such as responsibility, honesty, industriousness and collectivism will be strengthened, reflected in the treatment of technological discipline for the management and feeding of animals of economic interest and the application of technologies for the production and conservation of food for animal use. Emphasis is placed on systematicity in these tasks, because if these values are not developed, technological discipline will be affected and as a consequence, all productive and reproductive indicators in livestock systems will be affected.

**To conceive and apply teaching and learning methods that favor a favorable socio-psychological climate to achieve education through instruction.**

Use methods that achieve the student's protagonism for the solution of productive technical situations or conflicts.

Apply methods that enable the student to perform in local contexts.

To use methods that encourage research, hypotheses and proposed solutions.

Apply methods that facilitate the unfolding of the students' axiological potentialities such as commitment, criticism, self-criticism, sensitivity, responsibility and discipline, among others. Responsibility and discipline, among others.

The use of problemical methods, with emphasis on the partial search, where students, once guided by the teacher, carry out small partial investigations in some material, production center, among others, that lead to satisfactorily solve a problemical situation

and the axiological deployment of their personality. **Concretization of learning tasks that contribute to achieving education through instruction.**

Clarify the problemal that constitutes the starting point for the treatment of a content in order to determine the formative intentionality.

That the objective reflects the need it obeys and what it solves in terms of the professional's training.

That the learning tasks are elaborated in function of solving the problem and fulfilling the objective from its formative intentionality.

Concretization of the formative potentialities and contextualization of the content in the solution of learning tasks and professional problems.

## **Conclusions**

A methodical procedure that solves the problemal problem by instituting methodological steps to educate through instruction is argued.

Indicators are constructed in terms of education based on the analysis of the content associated with the production of animal feed.

A structure is declared for the formulation of teaching tasks that motivate and mobilize the student's thinking and force him/her to search for information and to reveal not only the conceptual and procedural contents, but also the attitudinal contents in his/her own learning, so that he/she can make evaluations and find the social significance of the contents dealt with.

It provides students with the bibliographic base they need to carry out teaching tasks and allows them to prepare themselves for life and their future professional work through independent work.

It enables the development of the creativity of the students and the teacher.

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