



Original article

## Interdisciplinarity in the integrating teaching tasks of the Investigative Labor Training discipline

La interdisciplinarietà en las tareas docentes integradoras de la disciplina Formación Laboral Investigativa

Interdisciplinaridade nas tarefas docentes integradoras da disciplina Formação Laboral Investigativa

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### ABSTRACT

Study Plan E in the Bachelor's Degree in Agricultural Education has Investigative Work Training as its main integrating discipline and brings together the contents of the exercise of the profession, the Educational Research Methodology and Agricultural Didactics. In the exploratory study, weaknesses were observed related to the planning, orientation, execution and evaluation of teaching tasks with an interdisciplinary nature for the solution of professional problems and these do not always stimulate students to search, investigate and problematize the content they they learn. . For this reason, this article aimed to socialize methodological indications for the treatment of interdisciplinarity in integrative teaching tasks and its contribution to the development of modes of action harmonizing different systems of influences according to educational contexts. The general dialectical-materialist method was used, as well as theoretical level methods such as: historical-logical analysis, induction-deduction and analysis-synthesis. At the empirical level, the review of documents, the survey, the interview, performance observation and visits to the work practice were used. A workshop was held to validate the methodological indications for their practical assessment. This result was introduced five years ago in Pinar del Río, showing satisfactory partial results in the integrative exams applied.

**Keywords:** self-learning; Investigative Work Training; interdisciplinarity; modes of action; integrative teaching task.

### RESUMEN

El Plan de Estudio E en la carrera Licenciatura en Educación Agropecuaria tiene como disciplina principal integradora la Formación Laboral Investigativa y agrupa los contenidos del ejercicio de la profesión, la Metodología de la Investigación Educativa y la Didáctica Agropecuaria. En el estudio exploratorio se observaron debilidades relacionadas con la

planificación, orientación, ejecución y evaluación de tareas docentes con carácter interdisciplinar para la solución de problemas profesionales; estas no siempre estimulan a los estudiantes a la búsqueda, indagación y problematización del contenido que aprenden. Es por ello que este artículo tuvo como objetivo socializar indicaciones metodológicas para el tratamiento de la interdisciplinariedad en tareas docentes integradoras y su contribución al desarrollo de modos de actuación, armonizando diferentes sistemas de influencias según los contextos educativos. Se empleó como método general el dialéctico-materialista, así como métodos del nivel teórico: el análisis histórico-lógico, la inducción-deducción y el análisis-síntesis. Del nivel empírico se empleó la revisión de documentos, la encuesta, la entrevista, la observación del desempeño y visitas a la práctica laboral. Se realizó un taller de validación de las indicaciones metodológicas para su valoración práctica. Este resultado se introduce hace cinco años en Pinar del Río, mostrando resultados parciales satisfactorios en los exámenes integradores aplicados.

**Palabras clave:** autoaprendizaje; Formación Laboral Investigativa; interdisciplinariedad; modos de actuación; tarea docente integradora.

## RESUMO

O Plano de Estudos E do Bacharelado em Educação Agrária tem como principal disciplina integradora a Formação para o Trabalho Investigativo e reúne os conteúdos do exercício da profissão, a Metodologia da Pesquisa Educacional e a Didática Agrícola. No estudo exploratório foram observadas fragilidades relacionadas ao planejamento, orientação, execução e avaliação de tarefas docentes de caráter interdisciplinar para a solução de problemas profissionais; Nem sempre estes estimulam os alunos a pesquisar, investigar e problematizar o conteúdo que aprendem. É por isso que este artigo teve como objetivo socializar indicações

metodológicas para o tratamento da interdisciplinaridade em tarefas docentes integradoras e sua contribuição para o desenvolvimento de modos de ação, harmonizando diferentes sistemas de influências de acordo com os contextos educacionais. Utilizou-se como método geral o método dialéctico-materialista, bem como métodos de nível teórico: análise histórico-lógica, indução-dedução e análise-síntese. No nível empírico, foram utilizadas revisão documental, levantamento, entrevista, observação de desempenho e visitas ao consultório. Foi realizada uma oficina para validar as indicações metodológicas para sua avaliação prática. Este resultado foi apresentado há cinco anos em Pinar del Río, apresentando resultados parciais satisfatórios nos exames integrativos aplicados.

**Palavras-chave:** autoaprendizagem; Treinamento em Trabalho Investigativo; interdisciplinaridade; modos de ação; tarefa de ensino integrativa.

## INTRODUCTION

The transformations in today's world influence the accelerated development of knowledge. This problem poses a challenge for Higher Education institutions, by virtue of graduating competent professionals for the labor and productive sphere. In Cuba, this search is manifested in the desire for continuous improvement of university teaching on scientific-pedagogical bases, which supports methodological work and research as an objective necessity.

Curricula must respond to changes in the social environment, which implies redesigning the teaching-learning process based on professional problems, so that the student is able to solve them with an integrative vision of the contents.

The course modality by meetings constitutes one of the most demanded forms of study, due to the possibility it offers of simultaneous study and work. The growing development of science and technology also has a significant impact here, modifying from a didactic point of view the procedures of teachers and students to achieve the planned objectives.

The current Study Plan E requires the Bachelor's degree in Agricultural Education to provide training where self-learning constitutes the center of the training process, with a systematic dedication of the student towards independent work, independence, creativity and a high development of the ability to manage your own knowledge. The fields of action of this graduate require the mastery and integration of the technical contents of Agricultural Sciences with the Pedagogy of Technical and Professional Education, Didactics, Philosophy, Psychology and Educational Management.

This graduate is a professional with knowledge, skills and values that allow him to serve humanity, the development of science and technology, linked to the sustainable production of food on agroecological bases, with rationality, proper use of resources and mitigation of the deterioration of the Environment, preserving the ethical principles of society and the economic development of the country.

In the training process, the student receives a cycle of general disciplines among which General Pedagogical Training stands out, common to all pedagogical careers and those specific to the specialty: Biological Sciences, Agricultural Production, Livestock Production, Agricultural Administration and Technical Services, in addition to Investigative Labor Training. The latter constitutes the main integrating discipline and brings together the contents of the exercise of the profession, the Educational Research Methodology and Agricultural Didactics. It responds to objectives outlined in the

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professional model, develops the modes of action that are linked to the different professional problems to be solved by the student and is structured under the logic of science and the profession of the investigative work component.

Authors such as: Cutiño, Gómez and González (2018); Rojas, Moreno and Valle (2018); and Bell, Orozco and Lema (2022) consider that it is a discipline that crosses the curriculum from the first to the fifth year and focuses the academic, labor, research and extension training actions based on the contribution of the remaining disciplines of the curriculum; Therefore, interdisciplinarity requires a deepening of the content of the disciplines that each professional studies, considering the interrelationships and contributions of other subjects for the solution of professional problems.

From the subjects of the discipline, systems of diverse activities are conceived in correspondence with the academic years (of familiarization, systematization, consolidation and deepening), with a high cognitive independence of the student in the process, through independent work, with the guidance of the teachers, tutors and other agents who participate.

An exploratory study of the career allowed for some empirical investigations (performance observations, visits to work practice activities and the review of documents of the methodological and investigative work) of the different groups, where limitations in planning, orientation, execution and evaluation of teaching tasks, with an interdisciplinary nature, for the solution of professional problems in the main integrative discipline. Furthermore, the potential of the content is not taken advantage of to establish interdisciplinary relationships, which results in a fragmentation that sometimes does not stimulate learning.

Taking into account the above, the objective is established: to socialize the methodological indications for the

establishment of interdisciplinarity in integrative teaching tasks that guide the solution of professional problems from the Investigative Labor Training discipline.

## MATERIALS AND METHODS

The research was developed from 2018 to 2022. It covers the five academic years of the Bachelor's Degree in Agricultural Education at the University of Pinar del Río "Hermanos Saíz Montes de Oca". We worked with a population made up of the 22 teachers who make up the pedagogical group. The dialectical-materialist method predominated as a general method, which made it possible to operate with its laws, categories and principles.

For the diagnosis of the object of study, methods of the theoretical level were used: the historical-logical analysis made it possible to determine the evolution of the Investigative Labor Training discipline and the establishment of the concepts of integration with the other disciplines of the current study plan; Induction-deduction allowed us to move from the particular to the general in the direction of the process and the identification of the features, assumptions and demands, as well as reaching the elaboration of methodological indications.

The analysis-synthesis, in interrelation with the remaining methods, was used in the processing of all the information and in the study of bibliographic sources to determine the scientific problem.

At the empirical level, performance observation was used to verify in reality the students' exercise with the study guide in work practice activities.

Surveys were applied through questionnaires to diagnose the students' satisfaction rates with the training process, particularly the investigative work practice.

Methodological documents were reviewed in the different teaching groups and teachers, tutors and production specialists were interviewed to learn about the potential of educational contexts. In addition, a workshop was held to validate the methodological indications for professional reflection, analysis of results and decision making.

## RESULTS

The theoretical analysis carried out made it possible to identify the guiding role of the main integrative discipline in competent professional training and reveal its interdisciplinary nature in the study plan. In the analysis of the discipline's program, it was possible to corroborate that no methodological actions are required for the treatment of interdisciplinarity.

Study Plan E specifies the need to achieve integration between academic, work, research and extension activities; Furthermore, the need to include intradisciplinary, interdisciplinary and transdisciplinary approaches, which would avoid the unnecessary reiteration of knowledge that reinforces the identification and solution of problems specific to the profession. However, in 45% of the revised Work Practice guides the intention of integrating knowledge for the solution of professional problems with the optimal use of the work and research component for the solution of tasks is not visualized.

It is necessary for teachers to resort to exhaustive methodological work in the different groups, which allows students to assimilate the content and methods of theoretical and practical cognitive activity, as well as linking students to research projects that respond, essentially, to sustainable food production.

These aspects are extremely important today, due to the conditions of the teaching-learning process and, in

particular, due to the demands that arise for the permanent preparation of teachers, and what interdisciplinarity means from the epistemological and methodological assumptions for its application in the educational teaching process.

Surveys and observation were applied to the performance of each student in the development of the Work Practice to assess the following indicators:

Satisfaction level: means the assessment, interest, attention and motivation of those involved.

Performance level: included levels of content appropriation through collaborative learning in work teams.

Level of transfer to the teaching-productive process: refers to the applicability of the appropriate contents.

In the analysis carried out, the need to conceive methodological indications for the treatment of interdisciplinarity in integrative teaching tasks was determined to achieve, from the combination of independent and investigative work, access and appropriation of knowledge with a holistic vision, which allows the solution of professional problems, an aspect identified by 40% of those surveyed.

### **Methodological indications for the conception of the teaching task in the Investigative Labor Training discipline**

Interdisciplinarity emerged as an essential aspect in the development of scientific knowledge, as a need to integrate knowledge to solve complex problems. Espinoza (2018) considers that it tends to internal, reciprocal action between the contents of two or more disciplines, approaching the unity of science and

knowledge, a philosophy that is at the base of the interdisciplinary approach.

It is an unavoidable necessity for the comprehensive training of students, a way of thinking and proceeding to know the complexity of objective reality and solve any of the complex problems inherent to the profession. It must cover the links established between the content systems of the disciplines and the contribution of each one to the development of modes of action.

Interdisciplinarity in academics is a process based on the similarities between various disciplines that maintain their independence, but are linked in projections for the achievement of prioritized teaching and educational objectives.

It is necessary to enhance the methodological work in the different groups, in a way that allows students to assimilate the knowledge systems and methods of theoretical and practical cognitive activity; also admitting the horizontal and vertical integration of subject content, the curricular strategies of the degree and the linking of students to research projects that essentially respond to sustainable food production.

These aspects are extremely important today due to the conditions of the teaching-learning process and, in particular, due to the demands that arise for the permanent preparation of teachers, which means interdisciplinarity from the epistemological and methodological assumptions for its application. in the educational teaching process.

It is essential to update integration agreements with Technical and Professional Education, agricultural production and services entities, research centers, as well as with other local actors, in order to carry out professional training from a management perspective. integrated.

The degree will coordinate with the polytechnic center, the productive company or research center, the moment and form of completion within the framework of the time fund established for job training, through collaboration agreements for the use of the facilities and the technological equipment in this activity. Relations will be strengthened with the Delegation of Agriculture in the Urban and Suburban agriculture programs, as well as the relationship with the Territorial Programs and corresponding projects, the Association of Agricultural and Forestry Technicians (ACTAF), the Cuban Association of Animal Production (ACPA) and the Agrarian Extension System in each territory.

Reference farms and leading farmers must be identified, to systematize the best experiences as a learning path, as well as the most experienced teachers from the Polytechnic Centers, to carry out the tutor's pedagogical advice.

The potential of integration between educational contexts allows the training and development of professional skills, given that this process is developed in the dialectical interaction between the student and the sociocultural context (socio-labor environment), allowing the development of personality, based both in the relationships between students-specialists of the entity and teachers-social agencies of the community.

Increasing interdisciplinary actions in agricultural labor entities is significant, since they have a greater possibility of perceiving the changes that are taking place in the world and a greater capacity for rapid response to transform; Furthermore, they have the real material conditions and the scientific-technical knowledge of specialists for the development of skills from practical activities and research through experimentation in agricultural designs.

The components: extension, work and research allow the student to develop the

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theoretical and practical content received from the academy and, at the same time, these are enhanced from the experiences and experiences that the students acquire and socialize in practice.

The insertion of students in teaching-productive areas requires study guides, specifying the professional problems to be solved, the objectives, the content, methods, means, duration, rotation areas, the program of activities or training guides. training, forms of evaluation and the transfer of results to the Technical and Professional Education process.

That is why the methodological work of the main integrating discipline is structured under the logic of agricultural sciences, it is nourished by the rest of the disciplines of the curriculum and assumes them in its integration, to respond to the demands of professional work, therefore that they must analyze and explore content, acting as interdisciplinary nodes.

It is important to insist on the teacher's guiding function, which implies creating favorable environmental conditions to encourage students to go through the entire management cycle (planning, organization, execution and control), so that they can understand that the direction of the process Educational has the character of a system, with the consequent increase in the level of complexity of the activities to be developed towards the profession from the class, depending on the academic year through which it goes (Leal and Bolaño, 2021).

Education at work is the form of educational organization par excellence, so the theoretical bases that support the discipline are the link between theory and practice, the study-work principle, the active nature of the personality and the unity of activity and communication.

We agree with Pérez, Hernández and Pérez (2017), considering that there is a limitation in the pedagogical theory with respect to the didactic foundation of the

use of the problem method mediated by Information and Communications Technologies, constituting these and the means natural resources essential to activate the appropriation of content.

Information and Communications Technologies allow us to generate new forms of communication. They are made up of a series of media where images, texts, sound, videos, photographs, modeling of phenomena, etc. are handled. Among its advantages: they stimulate interpersonal communication, the exchange of information and debate between all subjects, it enables the systematic control of tasks at an individual and collective level, coexisting different forms of evaluation.

The study guide as a basic guiding tool to achieve the objectives must contemplate work with computer resources; Likewise, you must consider the use of problematic teaching methods operating with its three categories:

A. The problematic situation is given by the contradiction between the known and the unknown, questions are formulated for the students, based on the motivation to search for information.

B. The teaching problem, when the student perceives the funds of information he has and identifies those he needs to study to resolve the concern arising from the problematic situation. The solution to the problem focuses on the system of teaching tasks harmonized with the levels of logical thinking and the essences of the content, which is why it responds to conscious planning from the study guide.

C. The problematic is determined by the particularities of the questions, ascending in complexity to the creative and precise level of investigative concerns.

The criteria of Gómez (2018) and Rodríguez and Dorta (2022) are assumed when considering that these methods

influence the development of the student's productive thinking, allowing them to: search for information; raise hypotheses; reach conclusions; answer problematic questions; encourage reflection; prepare summaries; confront ideas, concepts; determine what is essential; improve students' self-esteem and flexibility; promote self-knowledge; promote motivation when working with real situations; foster an environment of exchange and dialogue, with more individual and group responsibilities.

Taking into account the previous criteria, the general integrative objective of the subject is conceived: to direct activities of the Technical and Professional Education Process in Agricultural specialties, through the introduction of solutions to problems of a technical-pedagogical nature, with the application of research methods. scientific, related to the activity of the Technical and Professional Education centers, production, services and the community, taking into account the environmental conditions, the socioeconomic and cultural characteristics of the environment, which allows interaction with a knowledge system and values for the promotion of revolutionary and patriotic attitudes expressed in humanism, solidarity and dignity in the exercise of the profession.

The distribution of time is gradual and is supported by essential content for the profession such as Special Didactics, which systematizes the topics of General Didactics and are particularized in the contents of each specialty, and the Educational Research Methodology, all of which are useful. for the development of the study culmination exercise that has been determined.

The planning, execution and control of integrative teaching tasks is proposed that allows students to evaluate their professional performance in the different educational contexts where university extension activities are carried out, based on the demonstration of mastery of the fundamental contents that make up the

disciplines and professional skills that allow them to satisfactorily develop the educational work of the students for whom they are responsible.

Integrative teaching tasks begin to be guided from the first year, through the application of various instruments that provide partial but continuous information on their development (scientific observation, simple experimental tests, field work, teamwork, among others).

### Exemplification of an integrative teaching task of the subject Labor Practice III

**Table 1-** Interdisciplinary relationships

Interdisciplinary nodes	Discipline	Subject
Digestive system	Biological Sciences	Animal Anatomophysiology
Influence of environmental factors	Biological Sciences	Fundamentals of Agroecology
Zootechnical categories, facilities	Animal production	Monogastric Animal Husbandry
Sketch	Agricultural Administration and Technical Services	Agricultural Technical Services I
animal improvement	Biological Sciences	Genetics and Agricultural Improvement

The selection of the professional problem generates a contradiction between the need for learning and the mastery of the contents to provide a timely solution. Seen in this way, creativity, self-knowledge, decision making, and group communication are stimulated from the dialectical vision of the relationships between learning and development.

Objectivity, relevance and feedback are ensured, in accordance with the results obtained. The following question then arises: how to encourage, from the integrative teaching task, the stimulation of the development of productive-creative activity?

The determination of the professional problem enables the integration of scientific-technical knowledge with the student's work activity, for which the solution of pertinent situations of collective interest, individual interest and, above all, social interest must be prioritized.

To treat professional problems, the following must be taken into account: the analysis of current social demands and perspectives related to the process, scientific-technical advances and technological changes that arise in educational contexts, in line with social demands.

### Professional problem

Evaluation of alternatives for improving agricultural productivity under adverse physical-productive conditions, scarce resources and low-cost technological equipment in the exploitation of production areas, under conditions of sustainability.

### Integrative objective

Explain the management and feeding of the cunny species, taking into account agroecological actions that guarantee the stability of the production cycle.

### Problematic situation

The exploitation of the rabbit (*Oryctolagus cuniculus*) constitutes one of the most economical strategic lines in meat production, guaranteeing an offer of animal protein of excellent dietary quality; However, the productive indicators of the species are significantly affected.

- It is a monogastric animal that digestion is more efficient than the horse and to a lesser extent than that of ruminants. Explain the adaptations of the digestive system and eating behavior that allow this use of fibrous foods.
- The complexity of the species' behavior is determined by the



interaction of animal-food-environment factors. Argue the previous approach. Make a sketch of an installation taking into account the endogenous resources of the locality.

- The formation of groups by zootechnical category is very convenient for the nutritional, productive and reproductive management of the herd. Explain taking into account the intensive breeding system.
- Genetic improvement aims to obtain greater reproductive efficiency in rabbits. Inbreeding deteriorates productivity and limits the development of the species. Explain the indicators to take into account in the genetic improvement program to avoid this problem. The trunk is determined by the stallion and up to 10 breeders/stallions/trunks are accepted. Mention the possible contributions for each line.
- Investigate the plant species grown in production areas and which of them compete with human food. What sustainable alternatives do you recommend in these cases to guarantee feeding for the rabbits?
- Carry out an assessment of the agroecological treatment given to the area's solid waste. Establish the economic benefits.

## DISCUSSION

In the validation workshop carried out by the group of the Bachelor of Agricultural Education degree, based on their experience, the proposed methodological guidelines have been considered correct, since they focus on the integration of the contents to achieve a quality process. The complexity and level of self-management and autonomy of the processes are recognized, with an impact on the comprehensive training of the professional in training. In this regard, it coincides with

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the results obtained by Domingos, Hechavarría and Moreno (2022), in that competent practical activity promotes significant learning from the cooperation of several disciplines, leading to a more integrated organization of reality and the professional problems that students must face in their professional activity.

Other authors, such as Fornaris and Huepp (2019), propose elements to consider when planning integrative exercises in the Investigative Work Training discipline: subjects that are integrated, integrative axis (professional problem), cognitive nodes, integrative objective, interdisciplinary tasks (content of the exercise) and, the key, elements contemplated in the established methodological guidelines and assumed in this study.

These criteria also correspond to those obtained by Mirabal, Llanes, Cadenas, Carvajal and Betancourt (2020), referring to the conception of a system of tasks that allows them to go from the general to the particular and, at the same time, makes it possible to see the integration of the content based on the links between the different subjects, thus promoting interdisciplinary thinking and the development of competent modes of action.

Another measurement criterion is the results of the satisfaction survey applied. An evaluation scale from 1 to 10 was used and students evaluated the questions with the highest score, which demonstrates satisfaction rates with the training process. These data allowed us to confirm that 89% are satisfied with the professional preparation they receive, with a notable impact on work practice, considering that the teaching-research-work activity trains them to solve problems of the profession, although the increase is a complaint of tasks related to forest content.

94% of the integrative teaching tasks developed obtained grades of 4 and 5 points, corresponding to the need to

conceive scientific development through the integration of content, conceptual and methodological interpenetration of the disciplines of the Study Plan.

In conclusion, the conception of interdisciplinarity in the methodological work of the Investigative Work Practice discipline reveals a valuable tool for the self-learning of students, through the design of integrative teaching tasks with the techniques of information, communications and scientific research methods.

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The authors participated in the design and writing of the article, in the search and analysis of the information contained in the consulted bibliography.

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