PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

Translated from the original in spanish

System of integrative teaching tasks to promote interdisciplinary of the professional of Physical Culture

Sistema de tareas docentes integradoras para favorecer la interdisciplinariedad del profesional de la Cultura Física

Yolanda Valdés André,[1] Ana Esther Fernández Hernández,[1] Yeny Marlies Traba Montejo[2]

[1]Universidad de las Ciencias de la Cultura Física y el Deporte "Manuel Fajardo", La Habana, Cuba. E-mail: yoliar6301@gmail.com, thaliavilla@inder.cu
[2]Universidad Nacional de Loja, Ecuador. E-mail: travayeny@gmail.com

Received: July 1st, 2019.
Approved: September 9th, 2019.

ABSTRACT

The performance of the Physical Culture professional in the base link in Cuba requires a solid interdisciplinary formation that the university as a training entity must propitiate; however, the desired levels are not reached in this aspect. In view of this affirmation, the objective of this research is to propose integrative teaching tasks to favor interdisciplinarity in the process of formation of the Bachelor in Physical Culture, from the subject Theory and Methodology of Physical Education, which is of great importance as an appropriate way to conduct the formation with an interdisciplinary character in the University of Sciences of Physical Culture and Sport "Manuel Fajardo". For this purpose, the following methods were used: synthetic analytic, deductive inductive, documentary analysis. The results were evaluated through the statistical packages SPSS v. 20 and Epidat v. 4.2, and Wilcoxon's nonparametric docima, which allowed the elaboration of twenty integrative teaching tasks, which were validated as a result of the criteria of thirty experts and constitute an alternative solution to the problem revealed in the research. It was corroborated through a pre-pedagogical experiment carried out in the third year of the 2017-2018 academic year.

Keywords: formation; interdisciplinary relation; professional; integrative teaching tasks.

RESUMEN

El desempeño del profesional de la Cultura Física en el eslabón de base, en Cuba, requiere de una sólida formación interdisciplinaria que la universidad, como ente formador, debe propiciar, sin embargo, no se alcanza en este aspecto los niveles deseados. Ante dicha afirmación, el objetivo de esta investigación es proponer tareas docentes integradoras para favorecer la interdisciplinariedad en el proceso de formación del Licenciado en Cultura Física, desde la asignatura *Teoría y metodología de la Educación Física*, la cual reviste gran importancia como una vía acertada para conducir la formación, con un carácter interdisciplinario en la Universidad de Ciencias

PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

de la Cultura Física y el Deporte "Manuel Fajardo". Con este propósito se, utilizaron los métodos: analítico, sintético, inductivo-deductivo y análisis documental. Los resultados fueron valorados mediante los paquetes estadísticos SPSS v. 20 y Epidat v. 4.2, y la dócima no paramétrica de Wilcoxon, lo cual permitió la elaboración de veinte tareas docentes integradoras, que fueron validadas como resultado del criterio de treinta expertos y constituyen una alternativa de solución al problema revelado en la investigación. Se corroboró a través de un preexperimento pedagógico, realizado en el tercer año del curso académico 2017-2018.

Palabras clave: formación; interdisciplinariedad; profesional; tareas docentes integradoras.

INTRODUCTION

The challenge of the Physical Culture degree is the training of an innovative and creative professional, possessing a scientific and pedagogical culture, with a high social commitment, so interdisciplinary is essential. For this reason, alternatives are sought through strategies, models, actions or other means, which are specified in this research, through the system of integrative teaching tasks that is exposed.

There are studies related to the development of systems and teaching tasks for the training of professionals, which were important references for research, such as Martínez, (2004), Chaos, Valdés, Estrada and Llanes (2015), Del Valle and Douglas, (2016), García and Vargas, (2018), Lage et al., (2018).

In the particular context of Physical Culture, some studies have been carried out, including those by Amador, Lanza and Cordero (2012), Velázquez, Prieta and Martínez (2013).

In the analysis of the aforementioned researches, revealing aspects were examined that allowed to make deductions of great utility in the elaboration of the system of integrating teaching tasks applied, using as an integrating axis the subject Theory and methodology of Physical Education, due to the meaning it has in the discipline of the exercise of the profession Theory and practice of Physical Education. It gives way to one of the spheres of action of the professional: Physical Education teacher.

The subject Theory and methodology of Physical Education facilitates the integration of the contents of different disciplines and provides the student with the necessary tools for training in correspondence with the professional's mode of action where skills are put into practice that respond to the "knowledge", "know how to do" and "know how to be" of the specialist in Physical Culture.

In spite of the outstanding evaluations, the articulation between disciplines and subjects is still insufficient, in the University of Sciences of the Physical Culture and Sport "Manuel Fajardo". Particularly, in the subject Theory and methodology of Physical Education, there are deficiencies of interdisciplinary treatment, which evidences the need to train the graduate in Physical Culture, based on the requirements stipulated in the professional model.

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

Hence the importance of this research. Its main objective is to propose a system of integrative teaching tasks that favors interdisciplinary in the process of training the Bachelor in Physical Culture, from the subject Theory and methodology of Physical Education.

MATERIALS AND METHODS

This study was carried out at the University of Sciences of Physical Culture and Sport "Manuel Fajardo". A pedagogical experiment was carried out in its pre-experimental design modality, with a population of 72 students (three groups) in the third year, in the academic year 2017-2018, with the objective of analyzing the results of the practical application of the system of integrative teaching tasks developed, which was validated by the criterion of 30 experts (Delphi method).

The investigative methods and techniques used were the analytical-synthetic method; by means of this method, the tasks foreseen in the construction of the conceptual theoretical framework were fulfilled and the specialized bibliographical search was deepened.

The inductive-deductive method. Inferences were made about the existing situation in relation to interdisciplinary, in the third year students of the academic year 2017-2018, in the University of Sciences of the Physical Culture and Sport "Manuel Fajardo".

System approach: it allowed basing the system of integrative teaching tasks, determining their features, demands, structure, stages and the relations between them.

Documentary Analysis and Tax Matrix: to determine the nodes of interdisciplinary articulation, relating the knowledge system of the subject Theory and methodology of Physical Education and the knowledge systems of the specific basic disciplines such as: Biological Sciences, Morphology-Biomechanics, Psychopedagogy, Direction of Physical Culture and Research and Methods of Analysis of Physical Culture. All of them are taught in the first and second year and in the first semester of the third year of the degree in Physical Culture.

The sociometric method was used in the pre-experiment to evaluate group relations, an indicator that is included in the sociocognitive dimension. It makes it possible to analyze the functioning of interrelations, i.e. the most important aspects of group dynamics.

The statistical methods used were the statistical packages SPSS v. 20 and Epidat v. 4.2. Empirical distributions of absolute and relative frequencies were calculated, as well as Wilcoxon's nonparametric docile.

RESULTS AND DISCUSSION

For the foundation of the system, the conception of Valle Lima is assumed, which takes up again the General Theory of Systems, initiated by Ludwig Von Bertalanffy in 1925, Bertalanffy, L.(1976) and the conceptual and methodological adjustment for the social sciences of the German sociologist Niklas Luhmann, (1984), emphasizing that, in the pedagogical sciences, this theory can be assumed because its approach

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

has multiple applications in a field where the interrelations and interconnections are varied, emphasizing that a system is composed by the following elements: "objective, functions, components, structure (relations between components and their hierarchy), forms of implementation and forms of evaluation"(p.56).).

The proposed system includes the elements required by Valle de Lima (2010) and has three stages: first stage (Entry), second stage (Processes) and third stage (Exit). Its general objective is aimed at promoting interdisciplinary in the process of training professionals in Physical Culture, in the subject *Theory and methodology of Physical Education*.

Below there are some specific aspects to be considered in each of the stages of the system presented:

- First stage (Entry). As part of the reference components, a study was carried out on the main concepts of interdisciplinary and integrative teaching tasks (TDI).
- The second stage (Processes). It highlights the operational components, specifying three subsystems called: elaboration, implementation and evaluation.

The subsystem one, called elaboration, is conceived from the conception that is transmitted in the research where the meaning of the integrating teaching task is emphasized as "expression of a didactic conception to favor interdisciplinary, in the formation of the Licentiate in Physical Culture. The stipulated by Velázquez, Prieta and Martínez, (2013) is assumed, who emphasize: "The integrating teaching task is the one that integrates the contents of the different disciplines and once they are dialectically assimilated, in their cognitive structure, they make it possible for the student to apply them in his practical activity" (p.8).

In this stage, three essential aspects are needed for the elaboration of the tasks, which are presented below:

Determination of the nodes of interdisciplinary articulation and interobjects and their link with the themes of the subject Theory and methodology of Physical Education, as well as the determination of the contents to be included, through the elaboration of the contribution matrices

Fernández, (2000) refers to the interdisciplinary articulation nodes used in Higher Education and conceptualizes them as:

> The contents of a subject in a discipline or subject, which include knowledge, skills, and the values associated with it, and which serve as the basis for a process of interdisciplinary articulation, in a given university degree, in order to achieve the most complete formation of the graduate, that is, the professional future. (p.19)

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

Fiallo, (2001), considering the nature of interdisciplinary articulation, establishes three types of nodes:

- Potential node of type one: when it refers to a highly structured content and can serve as a basis for articulation with other identified content in other disciplines.
- Potential node of type two: when it refers to unstructured content and can be the point of convergence and/or application of content from other disciplines.
- Potential node of type three: when nodes of type one or two cannot be established, however, it has the possibility of integrating with other potential nodes and constituting a new content of a higher level of integration or professional generality.

From these conceptions, the contents included in the Integrative teaching tasks that make up the proposed system are needed:

- Fundamental concepts, laws and principles related to Physical Education (Theme Fundamental theoretical concepts of Physical Education).
- Physical and motor skills. (Theme II. Physical Development and Motor Learning)
- Physical Education Class (Theme III. Management and evaluation of the teaching-learning process of Physical Education)

Determination of the structure of integrative teaching tasks.

The conception is assumed that the teaching task constitutes the basic cell of learning. Álvarez, (1996) and Gutiérrez, (2004). In the tasks elaborated, the components of this process (objective, content, means, methods, and evaluation) are included as part of the structure.

The teaching tasks that integrate the system are ordered from the simplest to the most complex, facilitating a logical and hierarchical order to the contents of the subject and are described by taking up some aspects of the structure established by Valdé's (2005), which was adapted on the basis of the systematization carried out and which is shown below:

Number: they are listed according to the calendar plan of the subject Theory and methodology of Physical Education in correspondence with the contents included.

Title: so that the student can identify with the contents to be worked on.

Topic: the topic in which the tasks are to be used is specified, based on the contents included.

Objective: the objectives seek the interconnection of several subjects corresponding to more than two disciplines and, in them, skills to be developed by the students are included.

Contents (disciplines and subjects): the contents determined as interdisciplinary articulation nodes are included (potential node of type one) and in brackets the disciplines and subjects with which they correspond, with the purpose of orienting the student on the probable associations to establish to solve the activities.

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

Means: cards, cardboard or poster with the names of the subjects received by the students from the first year of the career to the first semester of the third year. Different materials in digital support or other means that the teacher considers necessary to guide the student in the solution of the task.

Methods: problemic exposition, heuristic conversation and plenary discussion. Problemic methods that favor the group work because it is a distintive of the interdisciplinarity, Martínez, (2004). The use of one or the other method will be in correspondence with the solution that the students contribute to the task, according to the form of organization that the professor determines.

Introduction: it is a paragraph where the student is guided, in a synthetic way, about the content that will be developed or a situation is described where the performance of the teacher is evidenced in the context of the Physical Education class.

Activities to be developed by the students: they are conceived on the basis of the introduction described, instructions are given to the students and some questions are included. The solution of these questions will be possible through the relationship between subjects corresponding to two disciplines. This should involve the work of two or more students as determined by the teacher, which will favour collective work.

Methodological details to be taken into account by the teacher for the orientation of the task: the aspects on which the teacher must emphasize to guide the student in the solution of the task are highlighted. The methodological clarifications to be taken into account by the teacher for the orientation of the task are generally common. The following are described:

- Clearly explain how the task will be carried out, read the task, insist on the objective, the evaluation criteria and the bibliography.
- Emphasize the disciplines and subjects that allow the activities to be carried out. In the case of the subjects of the third year, first semester, involved, they must take into account the contents taught up to the moment of their orientation.
- Determine the duration of the activity. (Date of delivery) and the organization of the students that will be collective, preferably in trios or quartets, according to the enrollment of the group.
- Orient students to the bibliographic consultation of the basic texts of the subjects involved in the task. To elaborate a material in digital support if he considers it pertinent and to stimulate the search of others, if necessary.
- To relate the solution of the tasks, whenever possible, with the experiences acquired by the students, in the Investigative Labor Practice.

The flexibility of the Integrating teaching tasks gives the teacher the means to establish variants, which incorporates new content without modifying its essence. For example, in integrative teaching task number three, it is possible to vary the grade, the units, the component of the psychoregulatory system of motor actions and the exercise diagram, using athletic motor skills from other sports, based on the symbolism established in the different sports disciplines that constitute the object of study of Cuban Physical Education.

Bibliography: the teacher must guide the search of basic texts of the preceding subjects and, if he considers it pertinent, he can elaborate materials in digital support to deliver to the students.

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

Evaluation: will be collective (trios or quartets). The teacher will establish an evaluation key. The evaluation of the tasks will be in written form and in the next class a team will be randomly selected to be evaluated orally.

The number one integrative teaching task was used as the initial diagnosis in the pre-experiment and was performed individually. The remaining tasks were solved collectively.

Design of integrative teaching tasks

The 20 integrating teaching tasks were designed, which structure was outlined, taking into account the criteria of Valdés, (2005). Some examples are given below:

Integrative teaching task #1

Name. Fundamental concepts of Physical Education. Theme I.
Objective: to recognize the fundamental concepts of Physical Education and their importance.
Disciplines and subjects: Languages (Spanish), Marxism Leninism (Philosophy and Society), Biological Sciences (Physiology, Biochemistry and Biological Foundations), Morphology-Biomechanics (Morphology), Psychopedagogy (Psychology and Pedagogy) and Theory and practice of Physical Education (athletics, basketball, basic gymnastics, football, volleyball, rhythmic education, Theory and practice of games, Theory and methodology of Physical Education).

Introduction

Conceptual mapping is a technique used for the graphical representation of knowledge. A concept map is a network of concepts. In the network, nodes represent concepts that are arranged in order of importance or "inclusiveness. The most inclusive concepts occupy the top places of the graphical structure. In a concept map, the same concept must appear once.

Activities to be developed by students:

- To elaborate a conceptual map integrating the fundamental concepts of Physical Education approached in conference number one, with the contents of the preceding subjects.
- Base the established connections between the concepts that you use in the conceptual map.
- Highlight the meaning, from your experience, of the connections established between the concepts you use in the map.

Integrative teaching task #2

Name. Laws, principles and biological changes that are manifested in Physical Education. Theme I.
Objective: to identify the main laws, principles and biological changes that are manifested during the execution of sports motor skills.
Disciplines and subjects: Languages (Spanish), Biological Sciences (Biochemistry, Biological Foundations), Morphology-Biomechanics (Morphology) and Theory and

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

practice of Physical Education (football and Theory and methodology of Physical Education).

Introduction

In order to perform the sport motor skill, hitting the inside of the foot, the teacher explains to the 5th grade children, in a theoretical way, the methodology to be used by means of plates that show the sequence of the movement and, subsequently, guides the students to form two rows, one in front of the other, and perform 15 repetitions.

Activities to be developed by the students:

a) Mention which law is manifested. Argument.
b) Tell what science it responds to.
c) Say what principle it refers to, based on the way the teacher uses it to explain the motorsport skill. Ground the rules that distinguish it, as well as its application in the Physical Education class.
d) Mention the muscles and bones that intervene in the execution of the sport motor skill.
e) Mention the changes that occur in the blood during the performance of the oriented repetitions.
f) Write a paragraph highlighting the importance of the ball hitting the inside of the foot and its use as a content of Physical Education. Reflect the stages used to write it.

Integrative teaching task #3

Name. What is motorsport skill? Theme II.
Objective: to explain the psychological, biological and methodological foundations for learning sports motor skills. Disciplines and subjects: Biological Sciences (Biological Foundations), Morphology-Biomechanics (Morphology), Psychopedagogy (Psychology) and Theory and practice of Physical Education (basketball, Theory and methodology of Physical Education).

Introduction

In the class plan corresponding to the second class of one of the sport motor skills of basketball, in the fifth grade, the teacher illustrates through the diagram, shown below, an exercise to correct the difficulties that became evident after the diagnosis was made. There is a lack of will on the part of the students during the conduct of the class.

PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

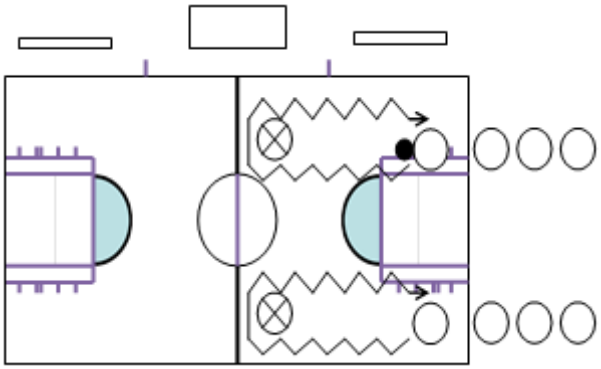

Fig. 1. - Exercise to correct the difficulties that became evident after the diagnosis was made

Activities to be developed by the students**:**

1. Describe the exercise illustrated in the diagram.
2. Mention the methodological steps for teaching sports motor skills.
3. Dosage the exercise according to class number (repetition, time, micro-pause, macro pause and methods).
4. What test would you use to evaluate the will of the students and what tasks do you propose to develop it within the class?
5. Which joints intervene in the motor sport ability and which are the functions of the muscles that have more incidence in the movement?
6. Based on the characteristics of fifth graders, explain how the cardiovascular system reacts to exercise at these ages.

Integrative teaching task #4

Name. Physical Skills in Physical Education. (I). Theme II.
Objective: To assess the methodological, biological and psychological foundations for the development of conditional physical capacities in Physical Education.
Disciplines and subjects: Languages (English), Research and Methods of Analysis of Physical Culture (Data Analysis), Biological Sciences (Biological Foundations), Psychopedagogy (Psychology) and Theory and Practice of Physical Education (Theory and Methodology of Physical Education).
Introduction

During the physical efficiency tests, the Physical Education teacher of the 7th grade of the Basic Secondary School "José Martí", in the municipality of Centro Habana, observed that his students showed disinterest in the accomplishment of the plates and the abdominals so that more than 50% of them were placed in the IV level and without level.

Activities to be developed by the students:

1. Say what the physical capacity in which students have difficulties is. Develop an English-language concept.
2. Explain the biological foundations to take into account for the work of this capacity in Physical Education.

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

3. Describe and dose three exercises to improve these difficulties
4. Base which component of the inductive regulation is revealed and elaborate three tasks for its development.
5. Tell which descriptive statistic you would use to compare the results obtained in the physical efficiency tests. Basically.

Integrative teaching task #5

Name. Planning of the Physical Education class in primary education (I). Theme III
Objective: to explain the main aspects to be taken into account for the planning of the Physical Education class in primary education.
Disciplines and subjects: Biological Sciences (Biological Foundations); Morphology-Biomechanics (Morphology), Psychopedagogy (Pedagogy, Psychology) and Theory and practice of Physical Education (football and Theory and methodology of Physical Education).

In a Physical Education class, students play driving games, contents of the Pre-sport Games unit, and the teacher observes that 68% of students do not identify with the weight and size of the ball, as well as their possibility of rebound due to hitting the ball with the tip of the foot and stepping on the ball when they receive a pass from their classmates, exhausting themselves easily, after a continuous run for seven minutes in the main part of the class. At the end of this one, his heartbeats are quite high.

Activities to be developed by the students:

1. Indicate the degree to which the contents worked on in the class correspond and elaborate the objectives of the class.
2. Tell the reasons for the high pulsations of schoolchildren and fundamentally the adaptive changes that occur in the cardiovascular system because of the systematic practice of physical exercises.
3. Disseminate and elaborate three exercises to fulfill the stated instructional objective.
4. Which bones are involved in the ball hitting? Transcribe three of them into English.
5. Characterize the perception of the ball by the schoolchildren. Say what tasks you propose to develop the same, within the class.

Integrative teaching task #6

Name. Planning of the Physical Education class in basic secondary education. (I). Theme III
Objective: to explain the main aspects to be taken into account for the planning of the Physical Education class in Basic Secondary.
Disciplines and subjects: Biological Sciences (Biochemistry), Morphology-Biomechanics (Morphology), Psychopedagogy (Psychology and Pedagogy) and Theory and practice of Physical Education (volleyball and Theory and methodology of Physical Education).

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

Introduction

To teach Physical Education class number five, in-group two of 8th grade, Professor Carlos teaches volleyball and makes a circuit with eight work zones. During the class, a student suffers from respiratory acidosis and the other members of the group are not interested in the exercises performed.

Activities to be developed by the students:

1. Elaborate the objectives of the class and tell what its basic functions are.
2. Tell which component of the inductive regulation the students in the group affect and what tasks you propose to develop it within the class.
3. Create and dose three exercises for teaching volleyball.
4. Say which are the joints and muscles that intervene in the realization of the sports motor skill mentioned above.
5. Describe biochemically the alterations suffered by the acid base balance, when a respiratory acidosis occurs.

Subsystem 2: implementation. It includes the validation of the system of integrative teaching tasks through the criteria of experts and the orientation of tasks during the teaching-learning process, subject Theory and methodology of Physical Education.

In the validation of the system, two rounds were carried out, where the 30 experts selected issued their value judgments using the following scale: MA (very adequate), BA (quite adequate), A (adequate), PA (not very adequate) I (inadequate). They were asked to argue their positions when awarding ratings of: adequate, inadequate and inadequate, and also to reflect their criteria if they considered anything valuable, worth noting, when awarding ratings of very adequate and fairly adequate.

One hundred percent of the experts consider the overall objective of the system, the correspondence between its components and its subsystems, to be very appropriate; 100 % consider the inclusion within the tasks of all the components of the teaching-learning process to be very novel. They also stated that the system is quite adequate to favour interdisciplinarity, since the tasks constitute a pleasant way to integrate knowledge and make students reflect on the search for scientific information in order to solve them, through collective work.

Of the total of 20 tasks in the first round, five (2, 5, 6, 15 and 18) were assessed as inadequate by 21 experts (70 %). The need to reformulate the objectives is highlighted; four (7, 8, 13 and 19) were evaluated as inadequate; 17 experts (57 %) emphasized the revision of the methodological clarifications to be taken into account by the teacher for the orientation of the task and four (4, 10, 11 and 14) were qualified as adequate by 12 experts (40 %) with the recommendation to revise the symbology used for the preparation of the diagrams. In general, 100 % of the experts recommended the inclusion of the names of the subjects reflected in the tasks, in addition to incorporating, as part of the methodological clarifications, the orientation of the bibliography on the part of the teacher.

Subsequently, the assessments and suggestions made by the experts were analysed, the tasks were improved and the questionnaire with the modifications made to the tasks was handed over again for a new analysis (second round).

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

The Kendall Concordance test was applied to analyze the results obtained and to look for the correspondence between the criteria given by the experts in the two rounds. This test shows that the value points to a very significant concordance between the rounds applied to the experts, which allows confirming the validation of the system of integrative teaching tasks by means of the Delphi method.

In summary, the application of the method to experts confirmed that the system of integrative teaching tasks is feasible as a solution to the problem, which is the subject of the research.

Third stage (output). Evaluation of the system of integrative teaching tasks.

This last stage of the system addresses the results obtained when the application of integrative teaching tasks is completed, at the end of the semester, through an integrative examination where the system as a whole will be evaluated.

Once the system of integrative teaching tasks has been founded and each stage and subsystems have been specified, the pedagogical pre-experiment carried out is described, for which the following working hypothesis is established:

If a system of integrated teaching tasks is applied in the subject Theory and methodology of Physical Education, interdisciplinary will be favored in the professional training process of the Graduate in Physical Culture, in the University of Sciences of Physical Culture and Sport "Manuel Fajardo".

As part of the pre-experiment, before applying the system of integrative teaching tasks, a diagnosis was made through the analysis of the first systematic evaluation of the integrative character of the subject Theory and methodology of Physical Education, which was evaluated in the sociocognitive dimension, established by Martínez (2004), which takes into account the formation of integrated knowledge in the students and the skills they have developed to establish intra- and interdisciplinary relations between the contents learned in the different subjects and to interact in groups. This dimension includes as indicators intra- and interdisciplinary relations, the relationship between theory and practice and group relations.

To evaluate the first three indicators of this dimension, an instrument established by Martínez (2004) was used with an evaluative scale that integrates three levels: high, medium and low, which are explained below.
High level: when the student adequately establishes intra- and interdisciplinary links and relationships, with more than two disciplines and one or two subjects from each of them. It bases and relates concepts, methodological procedures or other aspects to solve the tasks or activities developed in the work, establishing, in addition, links between theory and practice, adequately extrapolating diverse knowledge to new situations.

Intermediate level: when the student adequately establishes intra- and interdisciplinary links and relationships with two disciplines and one or two subjects from each of them. It bases and relates concepts, methodological procedures or other aspects to solve the tasks or activities developed in the work. In addition, links are established between theory and practice, adequately extrapolating diverse knowledge to new situations.

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

Low level: when the student establishes with difficulty some intra- or interdisciplinary relationships or fails to establish them, manifesting fragmented knowledge during the solution of the tasks or activities developed at work. Confronts difficulties that do not allow him to base, from the theoretical point of view, the practice regularly or to apply theoretical contents to the practice, establishes and extrapolates with difficulty some knowledge to new situations.

By means of the analysis of the obtained results, once evaluated the indicators in the Sociocognitive dimension, as initial evaluation of the pre-experiment, it was possible to determine that only 7 (10 %) works were evaluated, in the high level; 20 (28 %) in the middle level and the low level prevails, with a higher percentage, with a total of 45 works (62 %), which reflects that the students establish, with difficulty, some intra or interdisciplinary relations or do not establish them, manifesting fragmented knowledge during the solution of the tasks or activities to develop in the work.

The indicator group relations was evaluated by means of the sociometric method, with the objective of knowing the group learning strategy and the character of the interpersonal relations of the members of the three selected groups before applying the System of Integrating Teaching Tasks and after applying it.

From the preferences indicated by the members of both groups, related to the students with whom they would always like to study and to whom they would never select to study, it was possible to determine the degree of acceptance-rejection that each one of them possessed.

In relation to this aspect, in order to give greater objectivity to the results obtained as a function of the pretensions of the research, each of the selected groups was assessed independently.

In general, in the initial diagnosis, all the groups analyzed, in relation to the position that the members occupy in each one of them, emphasize the tendency to reach average levels of group acceptance. This aspect is considered favorable for its functioning, while it is indicated that the elections among the members, for this activity, are carried out in a proportionate manner.

Nevertheless, in a general sense, the determination by the members of the groups of similar and different aspects between the students they chose and themselves, which explained their selection, became imprecise, and answers such as: "I do not know", "none", or simply not, were abundant, completing the question.

From this, it can be inferred that a good part of the members of the groups did not yet have the necessary tools to establish similarities and differences between them.

In relation to this, it is interesting the fact that, in most cases, they do not consider having any aspect similar to them and they need as different aspects the following: it is very individualistic and immature, self-sufficient, tends to divert the attention of the group, is irresponsible, has a rare character, has a strange way of thinking and being, believes itself "know-it-all", wants to impose its criteria, is unsociable and does not help its companions.

The aspects analyzed so far, corresponding to the general characterization of the structure of interpersonal relations that were established among the members of the

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

groups selected for the pre-experiment at the beginning of the semester, were very useful and were taken into account for the organization of the students during the implementation of the system of integrating teaching tasks, they were organized in trios and, in exceptional cases, in quartets, according to the enrollment of the group.

After the initial analysis, the system of integrating teaching tasks was applied to the three selected groups (72 students) in the first semester of the 2017-2018 school year, during the teaching period of the subject Theory and Methodology of Physical Education. The tasks were oriented in the corresponding classes according to the topic and content to work, they were located as independent study, for which the teacher organized the students in trios or quartets according to the enrollment of group and the results obtained by means of the sociometric method.

The integrative teaching tasks had to be submitted in writing and the teacher randomly selected a team to carry out the control evaluation in the next class and if he considered it pertinent he could choose another team to be evaluated as well.

Once the system of tasks was applied and the first semester concluded, an integrating examination was carried in the subjects of Biological Foundations, Psychopedagogy and Theory and Methodology of Physical Education, for which the students had to elaborate a course work.

A group of teachers of the subjects involved in them, who integrated the courts that received prior preparation, evaluated the integrative exams, which correspond to the final evaluation.

Through the analysis of the first three indicators of the Sociocognitive dimension, carried out as a final evaluation of the pre-experiment, it was corroborated that, after applying the system of integrative teaching tasks, 51 (71%) students were evaluated in the integrator exam, at the High level; 16 (22 %) at the middle level and only five (seven, at the Low level).

In order to further corroborate the results obtained in the pre-experiment, the medians were found before and after applying, the system of integrative teaching tasks and it was detected that in the initial measurement, it is one and in the final, it is three. What points to the improvement achieved in the students and the feasibility of the system of integrative teaching tasks applied, which favors interdisciplinary in the training of the professional of Physical Culture. This shows that students properly establish intra- and interdisciplinary links and relationships with more than two disciplines and one or two subjects in each of them. All of this bases and relates concepts, methodological procedures or other aspects to give solution to the activities to be developed in the work; it also establishes links between theory and practice and extrapolates, adequately, diverse knowledge to new situations.

Another aspect, which showed the significant improvement reached by the 72 students that integrate the three groups where the pre-experiment was carried out, were the results of the application of the non-parametric docile, of difference between the averages of the Wilcoxon ranges, whose significance was $\alpha = 0.0000 < 0.01$. This shows the changes that occur in students with the application of the system of integrative teaching tasks, from the subject Theory and methodology of Physical Education, which allowed them to acquire skills to adequately establish links and intra and interdisciplinary relationships.

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

In order to evaluate group relations at the end of the application of the system of integrative teaching tasks, the sociometric method was also used, in which the same positive trend was maintained, once the questions of the sociometric questionnaire that was already appreciated during the initial diagnosis were analyzed, with predominance of the average levels of group acceptance.

An important aspect to consider are the criteria presented in relation to the reason for their choices, which changed completely and are associated with personal characteristics and learning strategies of each of the selected students, which affect the success of group work. Hence, it shows that the relationship with these is mediated by the content of the activity.

An important aspect that indicates the development achieved by the groups studied in terms of understanding and acceptance of the differences and similarities of the other is the fact that, in all cases, students are able to specify the similar and different contents that justified their choice.

This fact is considered highly positive because it is indicating that, among the members of the groups, a mechanism of group identification has been operated that implies not only the understanding and acceptance of the differences and similarities of the other in the intellectual plane, but also in the affective and behavioral plane, the assimilation of the other, of the group, to one's own behavior.

Some of the characteristics conceived as similar are the following: "We coincide in our interests, we are similar in the way of thinking, we are equal in the way of working in the classroom, we have equal motives, there is mutual understanding when it comes to studying and solving tasks, it works very well in a team and helps others a lot".

From them, one can infer the existence of shared ways of approaching the object of knowledge.

As for the different aspects, the following were raised: he has a good capacity to summarize ideas, he likes to type when we have to do work on the computer, he copies all the classes perfectly, he is good at processing the data from the tests of the practical classes, he applies the knowledge better than I, who am very theoretical, and he immediately grasps the essence of the problems.

It is interesting how the different aspects referred to are considered in this way, insofar as they contribute to the success of the activity, which in some way indicates that the development of the activity itself in relation has been modifying the content of differentiation, which now appears fundamentally centered on the value of heterogeneity for personal and group growth, and all of this favors the realization of the system of integrating teaching tasks.

In the conclusion phase of the pre-experiment, which corresponds to the verification of the hypothetical formulation and conclusions of the same, it can be asserted that the system of teaching tasks Integrating the subject Theory and methodology of Physical Education applied, favored interdisciplinarity in the process of professional training of the Bachelor in Physical Culture, in the third year of the career. Therefore, the formulated working hypothesis was confirmed.

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

BIBLIOGRAPHICAL REFERENCES

Amador-Cabrera, A. B., Lanza-Escobar, N., & Cordero-González, A. T. (2012). Sistema de tareas docentes para el desarrollo del trabajo independiente desde la asignatura Pedagogía para la carrera de Cultura Física. *PODIUM - Revista de Ciencia y Tecnología en la Cultura Física*, *7*(3), 121-142. Recuperado de http://podium.upr.edu.cu/index.php/podium/article/view/316

Bertalanffy, L. V. (1976). *Teoría general de los sistemas: fundamentos, desarrollo, aplicaciones* (Edición: Anniversary; J. Almela, trad.). Recuperado de https://www.amazon.es/Teor%C3%ADa-general-los-sistemas-aplicaciones/dp/9681606272

Del Valle, M., & Douglas, C. (2016). *La tarea docente para el aprendizaje en la Educación Superior: desarrollo e innovación*. Presentado en 10mo. Congreso Internacional de Educación Superior Universidad 2016. «Universidad innovadora por un desarrollo humanos sostenible».

Fernández, B. (2000). *La interdisciplinariedad como base de una estrategia para el perfeccionamiento del diseño curricular de una carrera de ciencias teóricas y su aplicación a la Ingeniería en Automática en la República de Cuba* (Tesis doctoral, ISP. Enrique José Varona). Recuperado de https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwiM6_SzuqXjAhXww1kKHYTDCi8QFjAAegQIARAC&url=http%3A%2F%2Fcujae.edu.cu%2Fpublicaciones%2Freferencia%2FNo6%2Farticulos%2Farticuloberta.pdf&usg=AOvVaw3EI_cdROLq3FvBtE3bLAo2

García, T. R. G. (2017). La interdisciplinariedad: Un reto para la universidad actual. *Revista Cubana de Tecnología de la Salud*, *8*(1), 53-58. Recuperado de http://www.revtecnologia.sld.cu/index.php/tec/article/view/879

Gómez, A. G., & Rodríguez, M. V. (2018). Acciones metodológicas, una vía para elaborar tareas docentes integradoras, desde el trabajo metodológico (Original). *Redel. Revista granmense de Desarrollo Local*, *2*(5), 91-98. Recuperado de https://revistas.udg.co.cu/index.php/redel/article/view/582

Gutiérrez, M. (2004). Interdisciplinariedad en la formación del Licenciado en Estudios socioculturales. *Revista Pedagogía Universitaria.*, *9*(4), 85-101. Recuperado de http://webcache.googleusercontent.com/search?q=cache:QOEC4J9RW78J:cvi.mes.edu.cu/peduniv/index.php/peduniv/article/download/299/294+&cd=6&hl=en&ct=clnk&gl=cu&client=firefox-b-d

Lage, M. R., Rojo, C. V., Fernández, B. D. C., & García, L. M. P. (2018). Propuesta de procedimientos para elaborar tareas integradoras en asignaturas de la carrera Medicina. *Gaceta Médica Espirituana*, *20*(3). Recuperado de http://revgmespirituana.sld.cu/index.php/gme/article/view/1628

Luhmann, N. (1984). *Sistemas Sociales*. Lineamientos para una teoría general. Anthropos Editorial. ISBN: 84-7658-493-8. Recuperado de

ISSN: 1996–2452 RNPS: 2148
Sept.–December. 2019 Vol.14(3):509-526

https://es.scribd.com/document/341613501/Luhmann-Niklas-Sistemas-Sociales.

Martínez, B. N. (2004). *La formación de saberes interdisciplinarios en los estudiantes de la carrera Licenciatura en Educación Física Preescolar* (Tesis doctoral, ISP "Pepito Tey "). Recuperado de https://docplayer.es/18983635-La-formacion-de-saberes-interdisciplinarios-en-los-estudiantes-de-la-carrera-licenciatura-en-educacion-preescolar.html

Valdés, M. B. (2005). *Sistema de tareas docentes integradoras con un enfoque interdisciplinario para la formación laboral de los alumnos en la Secundaria Básica* (Tesis presentada en opción al Grado de Doctor en Ciencias Pedagógicas). Recuperado de https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjQ0oqVy6XjAhWlr1kKHR0FABIQFjAAegQIARAC&url=http%3A%2F%2Froa.ult.edu.cu%2Fbitstream%2F123456789%2F3725%2F72%2FSistema%2520de%2520tareas%2520docentes%2520con%2520-%2520Valdes%2520Rojas%252C%2520Martha%2520Beatriz.pdf&usg=AOvVaw2D2Wl -Bp9P7iJYfmPAD2qZ

Valle Lima, A. (2010). *Meta modelos de la investigación pedagógica* (Instituto Central de Ciencias Pedagógicas (ICCP). Ministerio de Educación). Recuperado de https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjXsuH9y6XjAhVCzlkKHQMUA6kQFjAAegQIARAC&url=http%3A%2F%2Frepos.uclv.edu.cu%2Fpa_que_te_eduques%2FInteresante%2Fayuda_para_maestros%2FPara%2520ense%25C3%25B1ar%2520a%2520leer%2F En%2520herramienta%2520OPALE%2Fres%2F19-libro_META_MODELOS_DE_LA_INVESTiGACION_PEDAGOGICA.pdf&usg=AOvVaw3FVsazZwpgqNBnRb23Ps -J

Velázquez, M. V., Prieta, M. I. y Martínez, C. (2013). Las tareas docentes integradoras en las clases de Educación Física. Revista Digital Efdeportes.com 18(179). Recuperado de https://www.efdeportes.com/efd179/las-tareas-docentes-integradoras-en-educacion-fisica.htmhttp://www.efdeportes.com

Zayas, C. M. A. de. (1996). *Hacia una escuela de excelencia*. Academia. ISBN 9590201814 p. 94. Recuperado de https://books.google.com.cu/books/about/Hacia_una_escuela_de_excelencia.html?id=DGDnPgAACAAJ&redir_esc=y