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*Translated from the original in spanish*

**Original article**

## **Formation of healthy habits and lifestyles in university students: an intervention strategy**

## **Formación de hábitos y estilos de vida saludables en estudiantes universitarios: una estrategia de intervención**

## **Formação de hábitos e estilos de vida saudáveis em estudantes universitários: uma estratégia de intervenção**

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## ABSTRACT

This article addresses the establishment of an intervention strategy to improve the physical fitness of Cuban university students, from the training process. It includes actions to maintain a healthy lifestyle based on the self-concept and conscious self-regulation of each individual. The objective was to propose an intervention strategy that contributes to the solution of the existing limitations, both in the methodological order and in the instrumental plane, and promotes the evaluation of the presence of systematic physical activity in the formation of habits and lifestyles health in Cuban university students. Among the theoretical methods used are the historical-logical, the analytical-synthetic and the induction-deduction. Empirical methods such as documentary review, statistics and survey were used. In data collection, measurement and descriptive statistics were used for information processing. The implementation of the strategy used students from the University of Informatics Sciences as a sample. As a result, the design of an intervention strategy that incorporates the systematic practice of physical activity and provides direct benefits in the quality of the university graduate is achieved.

**Keywords:** Physical activity; Lifestyle; University formation; Healthy habits.

## RESUMEN

El presente artículo abordó el establecimiento de una estrategia de intervención para el mejoramiento de la condición física de los estudiantes universitarios cubanos, desde el proceso de formación. En ella, se incluyen acciones para mantener un estilo de vida saludable a partir del autoconcepto y la autorregulación consciente de cada individuo. El objetivo consistió en proponer una estrategia de intervención que tributa a la solución de las limitaciones existentes, tanto en el orden metodológico como en el plano instrumental y propicia la evaluación de la presencia de la actividad física sistemática en la formación de hábitos y estilos de vida saludables en estudiantes universitarios cubanos. Entre los métodos teóricos utilizados se encuentran el histórico-lógico, el analítico-sintético y el inducción-deducción. Se emplearon métodos empíricos como la revisión documental, la estadística y la encuesta. En la recopilación de datos, se utilizó la medición y la estadística descriptiva para el procesamiento de la información. La implantación de la estrategia utilizó como muestra estudiantes de la Universidad de las Ciencias Informáticas. Como resultado se logra el diseño de una estrategia de intervención que incorpora la práctica sistemática de actividad física y aporta beneficios directos en la calidad del graduado universitario.

**Palabras clave:** Actividad física; Estilo de vida; Formación universitaria; Hábitos saludables.

## RESUMO

Este artigo trata do estabelecimento de uma estratégia de intervenção para a melhoria da condição física dos estudantes universitários cubanos, a partir do processo de formação. Inclui ações para manter um estilo de vida saudável baseado no autoconceito e no auto regulação consciente de cada indivíduo. O objectivo consistia em propor uma estratégia de intervenção que contribuisse para a solução das limitações existentes, tanto metodológica como instrumentalmente, e favorecesse a avaliação da presença da atividade física sistemática na formação de hábitos e estilos de vida saudáveis nos estudantes universitários cubanos. Entre os métodos teóricos utilizados estavam os



métodos histórico-lógicos, analítico-sintéticos e de indução-dedução. Foram utilizados métodos empíricos tais como revisão documental, estatística e inquérito. Na recolha de dados, foram utilizadas medições e estatísticas descritivas para processar a informação. A implementação da estratégia utilizou estudantes da Universidade de Informática como amostra. Como resultado, é conseguida a concepção de uma estratégia de intervenção que incorpora a prática sistemática da atividade física e proporciona benefícios diretos na qualidade do licenciado universitário.

**Palavras-chave:** Atividade física; Estilo de vida; Educação universitária; Hábitos saudáveis.

## INTRODUCTION

Physical activity and its influence on improving health and quality of life has been one of the most studied topics over the years by experts in the field of physical activity, health and sports sciences; the positive impact it brings to the benefit of people's psychosocial development is well known.

The presentation by the World Health Organization (WHO) of the new "WHO Global Action Plan on Physical Activity 2018-2030: More active people for a healthier world", confirms the importance of ensuring that people stay physically active as a crucial aspect for health, despite the increasing challenges in our modern world; hence the need to find ways for people to take a step towards health, which is possible especially in the cities, where the responsibility to create healthier spaces is mainly manifested (WHO, 2019).

Physical activity should be taken as a regular and systematic practice in the lives of all people regardless of age, sex, social status or occupation, due to the large number of benefits for organic, emotional and psychic health of people, since it offers tools that allow the individual to face life with a different aptitude, with better health, strengthens diligence and perseverance, with a sense of honesty, responsibility and compliance with regulations; in short, it allows people as individual entities to have the fundamental vitality, vigour, strength and energy to fulfill their duty in the social group to which they belong (Rodríguez *et al.*, 2019). It has been shown that regular physical activity reduces the risk of coronary heart disease and stroke, type II diabetes, hypertension, colon cancer, breast cancer, and depression. In addition, it is considered a determining factor in energy consumption, so it is essential to achieve energy balance and weight control (González, 2016) and (Basurco, 2019).

The WHO (1986) defined lifestyle as a general way of life based on the interaction between living conditions in a broad sense and individual patterns of behavior determined by sociocultural factors and personal characteristics (Moreira *et al.*, 2018); hence, several factors that must work in complete harmony are integrated into the healthy lifestyle. Bennassar (2017) states that some of the variables defined as most influential in a healthy lifestyle are: eating habits, physical activity, sedentary lifestyle and stress.

Like many countries, intense work is being done in Cuba to offer better care to the population with the aim of increasing quality of life. The Cuban experience is based on the harmonious development of participatory sports based on a stable system of Physical Education aimed at the physical, aesthetic and intellectual values of man.



Due to its impact on economic and social development, it is essential that universities maintain high levels of production, health and well-being. In this sense, they can be considered recognized institutions as a reference framework for the consolidation of psycho-healthy habits, since university students are in one of the main stages of consolidation of habits and lifestyles.

The level of relationship that is established between man and technology results in the individual having to specialize organs and systems because otherwise they would not be able to obtain favorable productive results and, much less, counteract a group of occupational and postural injuries and illnesses that affect him/her. Hence, the need to transversally achieve, throughout the professional training process, a high capacity for professional and physical work (Núñez, 2020). This circumstance reinforces current public health recommendations to follow healthy habits and lifestyles and, as these habits are often acquired during the formative stages of life, it is especially important to start teaching healthy living early (WHO, 2020).

Health education in schools, institutes and universities helps to promote healthy habits and lifestyles, restructures customs and reduces, among other problems, the prevalence of overweight and obesity.

The universities are key in the processes of production, dissemination and use of relevant knowledge for development, and are decisive in the provision of the human potential that sustainable development demands (Nieves *et al.*, 2020). In the formation process, these institutions have the responsibility to improve study plans, which guarantee "competent teachers who know how to approach their teaching practice based on the needs of their students, and who take into account the differences and participate in their own learning" (Valdés *et al.*, 2021 p.426).

In the university setting, physical-sports practice seems to have beneficial effects on improving students' coping strategies, self-esteem, the cognitive pattern of self-perception and the abilities to establish stable social networks (Sáez and Caravaca, 2021).

Currently, spending hours in front of the television or video games, using computers and cell phones, among others, are some of the daily activities preferred by young people in their leisure time. They remain passively in them much of the time and, therefore, are involved in the problem of sedentary lifestyle (Tolano, 2020).

A preliminary approach to the essence of the matter addressed in the research allowed to point out as generalized behaviors in these ages, the practice of physical activity in a spontaneous non-systematic way, the presence of alcoholism and smoking, as well as inadequate nutritional behaviors. In this population, diseases such as overweight, diabetes and hypertension are reported to a greater extent.

Most of the studies carried out deal with the diagnosis of these diseases, but few add to the analysis aspects related to body image, physical behavior, psychosocial factors and eating behavior disorders, so they do not propose actions aimed at maintaining a healthy lifestyle based on the self-concept and conscious self-regulation of each individual. This reinforces the importance of an active lifestyle that accompanies the child's growth and continues throughout life (de Oliveira *et al.*, 2022).



This fact is associated with the fact that there has also been little educational influence to reverse this situation and that the proposals that have been put into practice focus on diagnosing the problems associated with obesity and adopting proactive measures with the intervention of specialists or the improvement of existing physical education programs. In the consulted bibliography, no results are found that contribute to the solution of the existing limitations, both in the methodological order and in the instrumental plane, that propitiate the evaluation of the presence of systematic physical activity in the conformation of habits and styles of healthy life in university students, which forms the problematic situation in which the research is framed.

The work that is presented aims to propose an intervention strategy that contributes to the solution of the existing limitations, both in the methodological order and in the instrumental plane and propitiates the evaluation of the presence of systematic physical activity in the habits formation and healthy lifestyles in Cuban university students.

## **MATERIALS AND METHODS**

The research was carried out at the University of Informatics Sciences (UCI in Spanish); three stages were defined for its development. The first related to theoretical analysis; the second with the diagnosis and design of the research strategy and the third with its application and evaluation.

A non-experimental, descriptive and exploratory research design was fulfilled. An analysis of documentary sources on the referents of physical activity and its relationship with healthy habits and lifestyles was carried out. Among the empirical methods used is the documentary review that allowed assessing the information around the possible indications contained in the official documents, related to Physical Culture in the context of university professional training. In addition, interviews and surveys were conducted with managers in order to clarify the knowledge on the subject addressed and to investigate the importance given to the formation of healthy habits and lifestyles in university students.

The structural systemic approach was used to conceive the strategy, determine its components and the relationships established between them.

For the theoretical assessment of the viability of the intervention strategy, in terms of its structural quality and social utility, the expert criteria were applied. An important premise for the selection was that the possible expert mastered aspects related to the attention to university students and, in particular, what concerns the application of Physical Culture within the professional formation process.

The list of possible experts included a total of 30 candidates, from which the 21 that showed the highest coefficient of competence were selected.

Descriptive statistics made it possible to obtain, analyze, elaborate and simplify the information used.



## RESULTS AND DISCUSSION

As a result of the review of official documents, the following was verified:

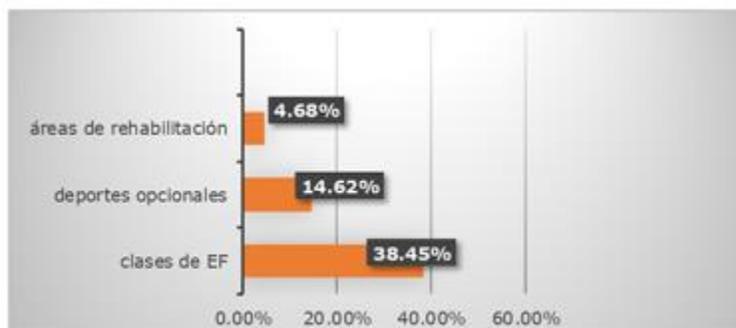
The methodological indications for the implementation of Physical Culture activities linked to the formation of habits and healthy lifestyles of university students, contain aspects to be taken into account for a correct selection of the components that should not be missing in the programs of the subjects that make up the discipline of Physical Education that is taught in all university careers, as well as for the extension work system developed by the country's universities, oriented, in both cases, to the comprehensive formation of university professionals.

No methodological indications are established for the care of students who, for various reasons, do not join Physical Education classes, the practice of optional sports or complementary activities.

Aspects that can and should be associated with Physical Culture, such as the assessment of body image, the fight against addictions that are detrimental to proper organic functioning, and the formation of habits and lifestyles, are not addressed with the required depth healthy lives.

In the documentation issued by the National Institute of Sports Physical Education and Recreation (INDER in Spanish) there are no indications for the control and care of people who practice physical activity independently.

Through the information collected, through interviews with institutional directors, it was possible to establish that, of a total of 3,181 students enrolled in the first two years of the different careers, 1,223 regularly attend Physical Education classes; 465 participate in optional sports and 149 are treated in rehabilitation areas, spaces from which the development of curricular and extracurricular activities is encouraged (Figure 1).



**Fig. 1** - Percentage of 1st and 2nd years students who practice physical activity

Students incorporated into the practice of physical activity, in its entirety, are attended by professionals, from curricular activities (PE classes, sports, therapeutic areas) and extracurricular activities (sports games, marathons, community activities) designed for this purpose.

All the directors state that the main difficulties are given by:

A poor application of current trends in attention to the formation of healthy habits and lifestyles.



The terminology used when teaching classes is sometimes limited. It shows a narrow horizon that does not include other aspects that are not foreseen in the current Physical Education programs.

The directors recognize that it is important, and it is the main objective of the institution, to increase the incorporation of students to activities related to Physical Culture as an element that contributes to the comprehensive training of the future professional and they consider, in general, that the most important is to increase the practice of physical activity.

From the information collected through a survey of Physical Education teachers, it was found that , in relation to the preparation of teachers to carry out attention to Physical Culture as an important component in the formation of habits and styles of healthy life in university students, 85.7 % state that their preparation to face the task is regular, due to the fact that they have little time for self- preparation; 71.8 % has little bibliographical material, in printed form, that facilitates the preparation of classes, especially on topics related to the topic addressed in the research.

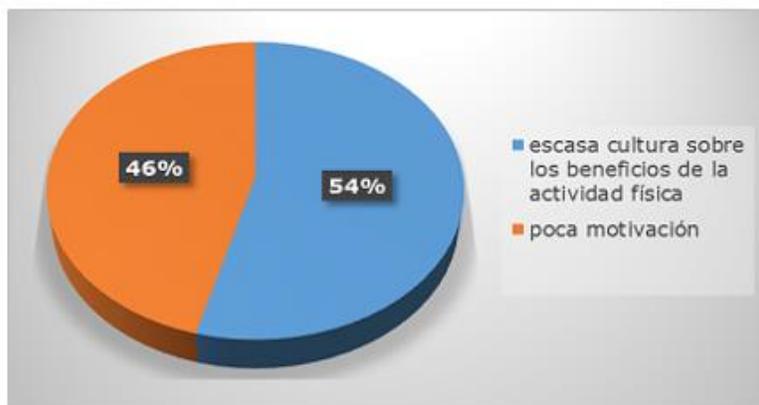
Only 29 % state that the topics in the methodological preparations are not enough, however, 83.2 % consider that it is necessary to raise the level of preparation and made several proposals in this regard:

Through practical activities, with demonstration classes by the most experienced teachers.

Carry out exchange workshops with other pedagogical groups, both at the University itself and at other institutions where conferences are also given by professionals trained in the proposed topics.

The 100 % consider that the program lacks the necessary methodological components that allow the teacher a better preparation for the planning of physical activities for the benefit of the formation of healthy habits and lifestyles in students.

Regarding the incorporation of students to activities related to Physical Culture in its different manifestations, all teachers consider that, although they attend classes with the expected enrollment, the figure does not correspond to the number of students enrolled. Figure 2 shows the identified causes.



**Fig. 2** - Main causes of the non-incorporation of students to physical activities

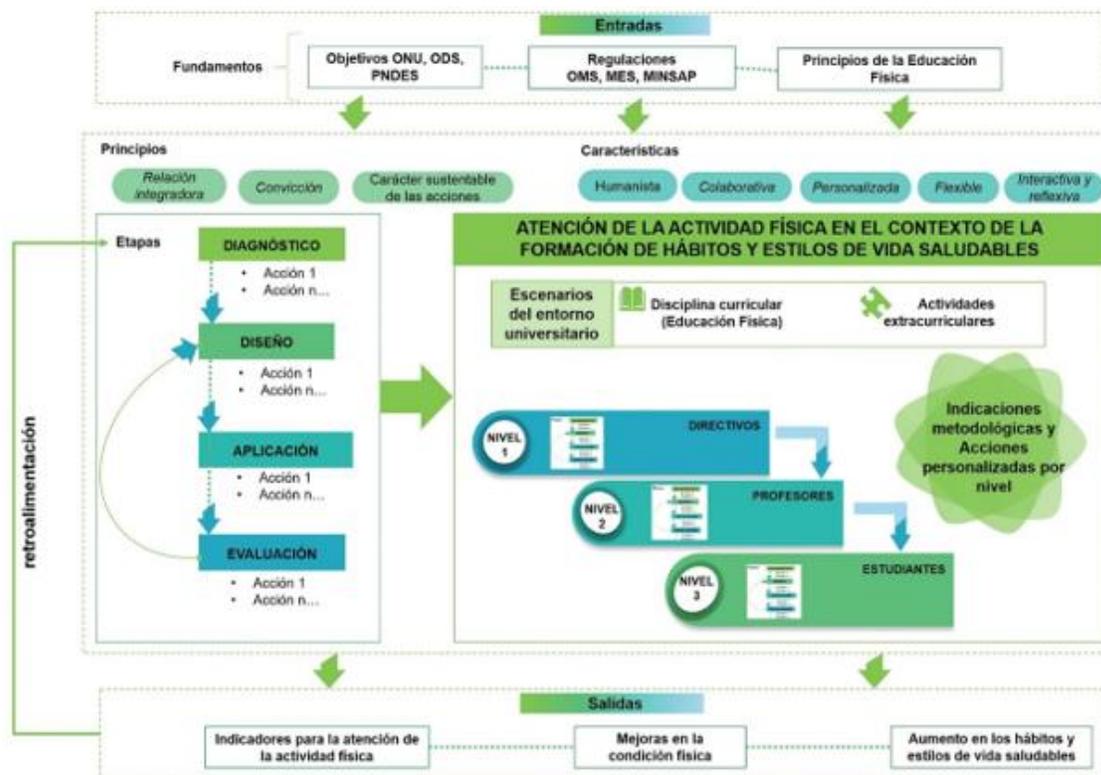


The disinterest on the part of the students arises is given by two fundamental aspects: insufficient orientation on the practice of physical activity in its different manifestations and the lack of methodological orientations that propitiate that these influence the formation of habits and healthy lifestyles in the students.

Related to the link with professors of other disciplines and with Guide Professors, in 37.2 % of the answers it is declared that good relations are maintained with these professionals; 44.9 % of those surveyed say the opposite, rating it in the order of regular. 76.3 % state that these professionals are not systematically involved in the integration of Physical Culture into the professional formation process.

### Intervention strategy

Based on the analysis of the results, the structuring of a work strategy that promotes the improvement of physical activity care in the context of the formation of healthy habits and lifestyles in university students is considered essential. In this context, professional work in institutional intervention is decisive to achieve a qualitative leap in the transformation of modes of care for the training of future professionals. In Figure 3, it can be seen the graphical representation of the proposed strategy (Figure 3).



**Fig. 3.** - Intervention strategy for the improvement of the physical fitness of the university student

The proposal is based on the postulates defined by the UN and expressed in ECLAC (2019) and the WHO (2020). Likewise, it is based on the principles of Physical Education, on philosophical, sociological, psychological, pedagogical and biological foundations that contribute to the attention of the physical fitness of the healthy adult. From pedagogy,



the intervention strategy is based on the laws declared by **Álvarez de Zayas (1995)**; **Álvarez de Zayas (1999)** the first, which establishes the relationship of the pedagogical process with the social context and the second, derived from the previous one, which establishes the relationships between the personal and personalized components of said process, as well as its categorical system: instruction education, teaching- learning and formation-development.

### **Strategy objective**

Implement a procedure that encourages attention to Physical Culture in the formation of healthy habits and lifestyles in university students.

### **System of principles**

From the theoretical supports defined in the preceding analysis, the particular principles that support the strategy emerge; these are set out below:

**Integrating relationship:** This establishes the need for permanent communication between all the actors identified in the process.

**Conviction:** expresses the need to consciously assume, by the university student and by the agents in charge of his/her care, the need to improve physical fitness.

**Sustainable character of the actions:** it proposes an integral character, so that the available resources are used so that the actions last over time.

### **Characteristics**

The strategy interprets the institution, the teachers and the students as the main agents of change to achieve the desired result, especially due to the leading role of young people. All this indicates that it brings together a set of characteristics that give it its unique character.

**Humanist:** because the university student is considered the center of the intervention process.

**Collaborative:** insofar as it considers that in the process that is organized, interrelationships between directors, teachers and family members are established, work is done together and ideas are exchanged on the care of the physical fitness of the university student.

**Personalized:** because the individual particularities of each subject are valued to organize collective work and attend to each of their needs and interests; each young university student interprets the phenomenon from their environment and their needs and faces it in this way.

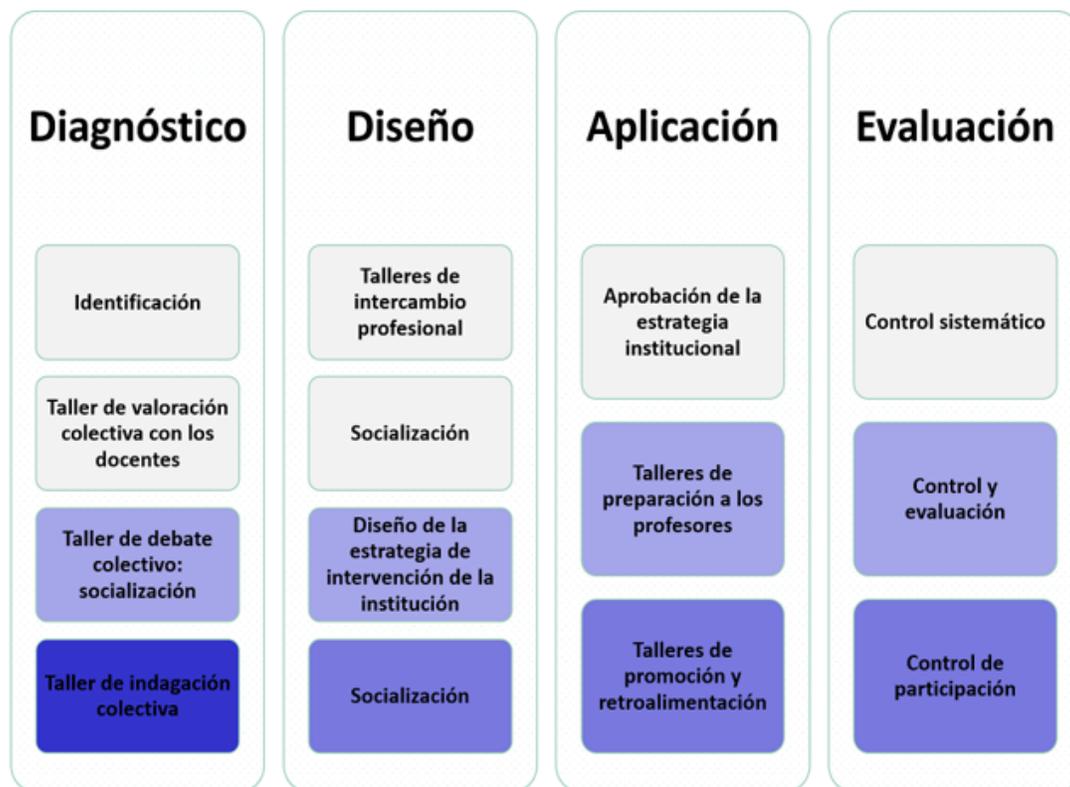
**Flexible:** it is manifested in that the proposed strategy admits modifications in its conception, in correspondence to the needs of university students and the work dynamics of the different factors that intervene in its application.

**Interactive and reflective:** to the extent that a more efficient and effective relationship is established between the people in charge of carrying out the application of the strategy and its recipients.



## The stages of the strategy

The proposed strategy is built in an structural framework, which considers four successive and interrelated stages: diagnosis, design, application and evaluation. These can be interpreted as sliding elements, as they are completed at all three levels. Each one has its actions and operations. Figure 4 shows the actions of each stage, personalized by levels (Figure 4).



**Fig. 4** - Personalization of the actions of the strategy by levels

## Actions system

The system of actions takes into account, in order to achieve a greater presence of Physical Culture in the formation of habits and healthy lifestyles in university students, the unity of theory with practice, as well as the interrelation between the different socializing agents: the institution, the teacher and the student himself, in the development of the practical and transformative activity that, as a result of their social interactions, allow the proposed objective to be achieved.

It comprises three levels of intervention that constitute the main scenario for the application of the strategy.

Level 1. - Directors: the actions included in this level are designed to be developed with and by the managers of the university institutions, in charge of conducting and controlling the presence of Physical Culture in the student's training. Within the framework of the proposed strategy, the planning, implementation and methodological control of activities related to the improvement of the student's physical fitness must be



guaranteed based on the formation of knowledge and skills that contribute to the formation of habits and styles of healthy life.

Level 2. - Teachers: the actions at this level were formed based on the requirements that are posed to teachers - both Physical Culture and other profiles - based on attention to the needs, likes and preferences of the university student. In this sense, it is intended for this level of the proposed strategy, to prepare Physical Culture teachers in such a way that they promote changes in the habits and lifestyles of students that contribute to the improvement of health and physical fitness.

Level 3. - Students: the actions are aimed at students, in their role as main actors in improving their habits and lifestyles, as a way to achieve a better quality of life. This level of the strategy aims to prepare university students for an adequate use of Physical Culture for the benefit of the formation of healthy habits and lifestyles.

### **Methodological indications**

The application of the proposed strategy requires taking into consideration compliance with the declared principles and the application of the methodological indications that are specific to the participation of each of the identified levels. For this reason, it is essential to assume as such the following:

- Develop organizational actions for the correct implementation of each activity.
- Guarantee the attendance of the teachers involved in the actions planned for the second and third levels.
- Create an online information distribution center on physical activity and its influence on the formation of healthy habits and lifestyles.
- Use understandable language for students.

When developing the planned workshops, the following must be taken into account: that the selected topic is in correspondence with the interests of the group; the presenter must be prepared with current data; have a guide and select the teaching aids to be used.

The workshops affect the three planned levels and must be conducted by professionals with adequate training. The content will be taught in a time of up to 30 minutes per frequency, twice a month. The evaluation will be carried out using the group discussion technique.

In the debate workshops, besides the Physical Culture teacher, the guide teachers and students also participate. It will be used to modify opinions, erroneous beliefs and taboos related to the practice of physical activity.

Emphasis should be placed on linking theory with practice, to achieve better attention to Physical Culture in such a way that a common position is achieved in relation to the importance of physical activity for the benefit of health. Each one will have a bimonthly frequency, lasting two hours. In the last workshop, the experiences and results achieved for each level will be presented.



Self-preparation should be encouraged with the aim of stimulating the acquisition, expansion and continuous improvement of knowledge to carry out physical activity both in an organized and independent manner. The conditions must be created for its development, permanently, by the students.

### **Assessment of the proposal by expert criteria**

An instrument was developed for the consultation with closed questions, through which the experts expressed their criteria on certain aspects of the intervention strategy. To do this, in their answers they had to follow the following value scales: Very Adequate (MA); Fairly Adequate (BA); Adequate (A); Little Adequate (PA) and Not Adequate (NA). In this way, in the statistical order, they constitute variables with an ordinal measurement scale.

The aspects that the experts were asked to assess were the following:

1. Structure and determination of the components of the strategy.
2. Formulation of the general objective as a guiding element of the strategy for the possible application of actions.
3. Pertinence of the three levels of intervention proposed in the strategy for the application of actions.
4. Clarity and precision of the indications for the methodological treatment that must be applied at each level.
5. Precision of the established principles and coherence with the actions proposed in the strategy for each level.
6. Organization and methodological relationship of the actions proposed at each level of the strategy.
7. Accessibility of the proposed strategy for its implementation within the Higher Education system.
8. Novelty and practical utility of the strategy.

As a final part of the survey, the experts were given the opportunity to add ideas, criticisms, recommendations or other questions related to the aspects they valued. In order to guarantee a better understanding and the possibility of prosecuting, together with the questionnaire, documents containing the proposal of the intervention strategy submitted for evaluation were delivered.

In this research it is assumed that with a final evaluation of "Very Adequate" or "Fairly Adequate" the indicator does not need to be re-evaluated.

Statistical processing depends on the number of experts ( $n$ ) used ( $n < 30$  or  $n \geq 30$ ), given that the number of experts in this research is less than 30, the Kendall concordance coefficient ( $W$ ) was calculated, to determine if there is consensus on the criteria issued by them, on the proposed strategy as a solution to the problem posed. The value obtained  $W=0.630$  indicates that there is consensus among experts in general.  $W$  is significantly different from 0 ( $0.000 < 0.01$ ). The term consensus is assumed according



to Mesa *et al.*, (2015) as obtaining the same result based on the criteria of different experts.

As *W* offers the value that makes it possible to decide the level of agreement between the experts in general, but does not inform about the agreement by aspects, it was necessary to calculate the coefficient of variation for each one of them, in addition to statisticians that allow an evaluative analysis to be carried out (Table 1).

**Table 1.** - Statisticians for the analysis of the indicators (coefficient of variation)

Statisticians	Indicators evaluated by experts							
	1	2	3	4	5	6	7	8
Mean	1.72	2.23	1.66	1.71	2.21	1.76	1.01	1.36
Typical deviation	0.562	0.436	0.482	0.562	0.438	0.539	0.000	0.496
Coefficient of variation (%)	4.75	23.82	0.000	4.74	23.79	4.75	0.000	0.000

The greatest concordances of the 21 experts who collaborated in the research are registered in aspects three, seven and eight. Aspects one, four and six do not show a great coincidence, but since it was considered not to reassess the questions with answers with the two highest evaluations (ranks one and two), then these do not require transformation. If it is assessed that the higher the percentage of variation, the lower the coincidence of the experts, the aspects that show the least coincidence are two and five.

Before deciding to refine or change questions that correspond to these two aspects to submit them again to the experts' assessment, other descriptive measures were calculated that helped make a final decision (Table 2).

**Table 2.** - Statisticians used for the analysis of the indicators

Statisticians	Indicators evaluated by experts							
	1	2	3	4	5	6	7	8
Mode	2	2	2	2	2	2	1	1
Minimum	1	2	1	1	2	1	1	1
Quartile 1	2	2	2	2	2	2	1	1
Median	2	2	2	2	2	2	1	1
Quartile 3	2	2	2	2	2	2	1	2
Maximum	2	3	2	3	3	3	1	2

The responses with the greatest discrepancies correspond to aspects two and five. It is observed that in aspect two there is no criterion evaluated with the MA evaluation category, however, the most frequent range is two, which corresponds to the BA evaluation category. Aspect five has a similar behavior to two, in addition it is observed that quartile three refers that, in both aspects, more than 75 % of the experts valued them as BA, therefore, it is considered that it is not necessary to change them to submit it to a new assessment.



However, it was considered opportune to take into account the elements recommended by the experts, in terms of achieving greater synthesis in the principles, reformulating the wording of the objective of the strategy and including a proposal for workshops at the student level, this allowed a more consistent and rational.

In general, the values identified provide consensus among the responses, considering that all the experts consulted estimated that the accessibility possibilities of the proposed strategy for its implementation within the Higher Education system are Very Adequate. In most aspects, rank two is more frequent, which belongs to the Quite Adequate evaluation scale, also expressed in quartile three, which indicates the validity of the proposed strategy.

In conclusion, it must be said that carrying out the diagnosis of the current situation of the object of study allowed identifying the needs that are manifested in the attention to Physical Culture as a means for the development of healthy habits and lifestyles in university students.

The design of the intervention proposal for the improvement of attention to Physical Culture as a means for the development of habits and healthy lifestyles in university students not only collects their needs, it also takes into account the professional performance of the specialists, those in charge of its application and of those responsible for its implementation and control, for which the three declared levels are identified.

There are various criteria on how to promote healthy habits and lifestyles in university students where studies allude to the determining role of physical exercise and physical activity.

The aforementioned results are related to those of:

**Schroeter *et al.*, (2021)** using the Myplate Healthy Lifestyle Program (HLP) My Plate, for nutrition education applied to the US population showed that educating college students with the help of incentives strengthens good nutritional habits.

**Yang Xu -Hao *et al.*, (2019)** in their experimental study on sessions and courses on lifestyles and physical activity, 532 university students participated, divided into intervention groups (IG) and control group (CG). The IG students received classes for 7 weeks on healthy eating behaviors; physical activity, stress reduction, mental health, healthy sleep and internet addiction prevention, each weekly session lasted two hours. CG students received regular courses, without attending health education courses. As a result, IG participants, compared to CG participants, reported a significantly higher prevalence of high physical activity and improved health behavior scores ( $p=0.040$ ). The authors conclude that health education generates positive changes in the lifestyles of Chinese university students.

**Lothes and Nanney (2019)** applied a 50-minute physical education course PED 101 twice a week to a sample of 1,544 students. There were significant differences for health and well-being between those who exercised frequently and those who exercised infrequently. They conclude that regular exercise throughout the week is important for general health and well-being.



Heeren *et al.*, (2019) intervened through the Wake-Up!, physical activity sessions in an African population of interactive exercises, games, brainstorming and role-playing combined with aerobic exercises for 30 minutes at moderate intensity for 5 days, 20 minutes of vigorous intensity for four days and strengthening activity for at least two days and found that strategies based on context-appropriate behavioral and social cognitive theories increase physical activity performance among college students.

Mansukhani *et al.*, (2019) used the mobile application for food in the US population raised awareness about the nutritional habits of university students.

Renz *et al.*, (2016) implemented a 30-minute bicycle aerobic exercise protocol and found that a single session of aerobic exercise can significantly facilitate learning mechanisms in the visual field and motor domain, and that these positive effects can persist for at least 30 minutes after the exercises. In addition, that physical activity promotes cardiovascular and brain health in their study sample.

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**Authors' contribution:**

The authors have participated in the writing of the work and analysis of the documents.





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