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The predominant Learning Style in Physical Education students in secondary education and in the degree in Physical Activity and Sports Sciences: an empirical foundation for an emerging pedagogical method

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Abstract
The objective of this research was to make a contribution to the process of increasing knowledge through the exploratory empirical demonstration of an emerging pedagogical theory on the planning of sports training in Spain. For this purpose, a cross-sectional investigation was designed with a quantitative approach composed of a simple random sample of 120 students (n = 120) from secondary education and from the degree in Physical Activity and Sports Sciences, who were resident in Spain, and who were administered the Honey-Alonso Questionnaire (CHAEA) on learning styles (Alonso, Gallego, & Honey, 1994). The predominant learning styles were identified and the possible changes that occur in the learning styles of the students at their different educational stages were examined. The assumption of normality was calculated using the K-S test and the equality of variances using the Levene test. Student's t test was performed to compare the characteristics of both groups. The results showed the predominance of the "Reflective", "Pragmatic", "Theoretical" and "Active" styles, respectively. No significant differences were found in learning styles at stages studied. Given the importance that emerging pedagogical methods attach to individualised teaching it seems appropriate to discuss the planning of an emerging pedagogical method taking as a reference the characteristics of students based on the predominant learning styles.

Keywords: Pedagogy; Physical education; Learning styles; Secondary; Pedagogical model.

[es] Una fundamentación empírica para la planificación de un método pedagógico emergente de la Educación Física desde los estilos de aprendizaje predominantes

Resumen

La investigación tuvo por objetivo realizar una contribución al proceso de aumento de conocimiento, a través de la demostración empírica exploratoria, de una teoría pedagógica emergente sobre la planificación de la formación deportiva universitaria en España. Para tal finalidad se diseñó una investigación transversal con un enfoque cuantitativo compuesta por una muestra alatoria simple de 120 alumnos (n=120) de Educación Secundaria y del grado en Ciencias de la Actividad Física y del Deporte, residentes en España, a quienes se les administró el Cuestionario de Honey-Alonso (CHAEA) de estilos de aprendizaje (Alonso, Gallego, & Honey, 1994). Se identificaron los estilos de aprendizaje predominantes y se examinaron los posibles cambios acaecidos en los estilos de aprendizaje del alumnado en sus diferentes etapas educativas. El supuesto de normalidad se calculó mediante la prueba de K-S y la igualdad de varianzas mediante la prueba de Levene. Para comparar las características de ambos grupos, realizamos pruebas t de Student. Los resultados mostraron la predominancia de los estilos "Reflexivo", "Pragmático", "Teórico" y "Activo", respectivamente. No se encontraron diferencias significativas en los estilos de aprendizaje en las etapas estudiadas. Dada la importancia que los métodos pedagógicos emergentes conceden a la enseñanza individualizada, parece conveniente discutir sobre la planificación de un método pedagógico emergente tomando como referencia las características del alumnado a partir de los estilos de aprendizaje predominantes.

Palabras clave: Pedagogía; Educación Física; Estilos de aprendizaje; Secundaria; Modelo pedagógico.

Sumario: 1. Introduction. 2. Objectives. 3. General purpose. 4. Hypothesis. 5. 5. Material and method. 6. Discussion. 7. Conclusions. References.

Introduction

Emerging pedagogical methods have highlighted the importance of the individualised teaching and learning process, taking into account the individual characteristics of the students and the context where learning takes place. Since the first educational methods in Physical Education emerged based on the seminal contributions of Piaget (1980, 1981), Muska Mosston (1988) and with Ashworth (1986, 1990), and Parlebas (1967, 1993), the teaching style has been the common thread for many teachers within formal teaching (Aguilera Pupo, 2012; Chiang, Larenas, & Pizarro, 2016). It has aroused the interest of the scientific community for its acceptance as a method due to its relationship, among other factors, with academic performance (Cuta, Pulido, Cuta, & Geijo, 2016) and the attention paid to the teaching process from the regulation of representation in sport from a cognitive perspective (del Valle Díaz, & de la Vega Marcos, 2008) ahead of the methods and styles that diverge from a constructivist model, even from the new technologies (Requena, 2008), and from the theory of cooperative learning (Callado, 2015) or the recent contributions in Spain on education in values and emotional intelligence in Physical Education (Espada, 2011, 2012). As well as the importance of the contribution that Physical Education makes to the integral development of the individual, in recent years there seems to be growing scientific and academic interest in increasing and deepening knowledge of contemporary pedagogical theory, above all, towards the designing of proposals aimed at students' transversal and interdisciplinary development in order to facilitate the attainment of basic competences within the curriculum of secondary education (González Peiteado, 2013).

Moreover, sports training in Spain has been characterised since the last decade by enormous multidisciplinarity at the different educational stages, according to the type of teaching and the

ownership of the school. Since the composition in 2005 of the White Book of the Sciences of Physical Activity and Sports in Spain, the result of the social and organisational processes that have occurred in the development of these studies, it has been decisive for understanding both the organisational structure of such educational proposals, and the forms of teaching carried out in the different schools.

Until 1990, the training of sports technicians was the responsibility of the Sports Federations. In 1990 the Sports Law and the Organic Law of General Organisation of the Educational System in Spain allowed the regulation of sports education as special regime teaching (Blanco, 2006). This meant that it became part of the educational system, with an official and academic nature, and a set of university degrees related to the field of Physical and Sports Education; namely for teachers specialising in Physical Education, physical-sports animation technicians and sports technicians. Second, the consolidation of Bachelor's degree studies in Physical Activity and Sports Sciences in Spain with the arrival of the European convergence space for higher education made it possible to organise curricula into compulsory and optional subjects. Finally, despite the homogeneous incorporation of the contents into the different accredited study plans, the assimilation of the Bologna process favoured the liberalisation of educational means of production and allowed the arrival of new sports formations not necessarily destined for higher education. More recently, this made possible the appearance of other contributions focused on the analysis and discussion of the specific competences of the degree in Physical Activity and Sports Sciences in Spain (Rodríguez, Matute, Otín, & Anzano, 2014).

While the current social processes that were inherent to this stage were developing, 80% of the population in Spain did not perform physical activity on a regular basis (García Ferrando & Llopis-Goig, 2011). This is equally evident if we take as a reference that, in Spain, despite the consolidation since then of Physical Education at the different formal educational stages in Primary, Secondary and Baccalaureate, 40% of the child population is overweight or obese (Ministry of Consumer Affairs, 2020), bringing devastating effects to the physical and psychosocial risk of this population Ortiz Sánchez, del Pozo-Cruz, Alfonso-Rosa, Gallardo-Gómez & Álvarez-Barbosa (2020). Furthermore, this is even more serious in people who are in a situation of inequality or in those with different abilities, given the existence of barriers that prevent access to the aforementioned benefits conferred by Physical Education and the practice of physical and sporting activity in general (Mateu & Marques, 2020). Faced with this situation, the professional performance of Physical Educators seems decisive if they want to achieve the provision of a Physical Education service oriented towards quality and safety, as it is infrequent, unlikely and even dangerous that all the benefits associated with Physical Education are achieved without adequate teaching intervention. In addition to the already proven physical, social, affective and cognitive benefits of Physical Education in secondary education, the inclusion of a formative convergence method in higher sports studies seems imperative if one wants to face the identified organisational challenges. Likewise, this becomes even more evident when we are talking about people with different capacities or in a situation of inequality.

In order to try to discover organisational solutions to such issues, one of the essential factors in our theoretical assumption that has most influenced its foundation has been the epistemological genesis of undergraduate training in Physical Activity and Sports Sciences from an interdisciplinary, transdisciplinary and multidisciplinary perspective (Cagigal, 1975; Oña, 2002). The theoretical and ontological assumptions that point towards a Sports Science that starts from the object of study of movement oriented to teaching from a set of basic and other applied sciences - both scientific categories and their corresponding disciplines, understood in the plural - (Cagigal, 1975) evidence the need to achieve quality education for the solution of the identified social, organisational and academic needs, from the understanding of the principles of plurality and equality. However, when it comes to the comprehensive planning of the teaching and learning process, there are many factors that must be considered. Although there is a large volume of scientific literature on the criteria for the homogenisation of such factors, there is scientific consensus in considering learning styles as the nerve centre for students' acquisition of basic skills.

Learning styles are etymologically concentrated in the field of Psychology (Cabrera and Fariñas, 2005). Following the aforementioned authors, "one of the first authors who began to use it was H.

Witkin in 1954 from the importance of understanding how individuals receive and operate with information" (p. 2).

Currently there are multiple definitions, characterisations and theories that define the Learning Styles, within the bibliographic framework of this subject. We can define learning styles as "cognitive, affective, and physiological traits, which serve as relatively stable indicators of how learners perceive, interact, and respond to their learning environments." (Keefe, 1988, p. 40, as cited Alonso, Gallego and Honey, 2005, p. 48; Cabrera and Fariñas, 2005, p. 3 and Lago, Colvin and Cacheiro, 2008, p. 2). Given the disparity in the ways individuals learn, the scope of learning styles penetrates these different ways and methods that are used. A review of the literature on this issue shows that knowledge of the learning styles is a facilitator in the face of teaching tasks for improving students' teaching-learning processes. Beltrán established in 1993 that learning is an integrated set of processes to improve learning and its quality; learning being a kind of "process of processes" (Beltrán, 1993, p. 37). There are different classifications of learning styles depending on the different authors. The present study contemplates one of the most hackneyed, which is that of Alonso, Gallego and Honey (2005) who establish a categorisation of four learning styles: "Active", "Reflective", "Theoretical" and "Pragmatic", made up of a set of common traits and others based on learning preferences.

The four learning styles meet the following description: of each of the four learning styles: people who have an active learning style seek new experiences, they are open-minded, not skeptical, and enthusiastically undertake new tasks. Those who have a reflective style put reflection before action, carefully observing the different experiences. People who learn from a theoretical style seek rationality and objectivity, avoiding the subjective and ambiguous. On the contrary, pragmatic learners like to act quickly and confidently with ideas and projects that appeal to them (Honey and Mumford, 1992, as cited Orellana, Bo, Belloch and Aliaga, 2010),

Within the scientific nomenclature, numerous authors have approached this field of study in different educational settings, obtaining as a result a clear diagnosis of the predominant learning styles and obtaining the key to access and intervene through the use of appropriate strategies, with the students that required specific interventions based on their manifested Learning Style. Among them we can highlight a study carried out by Martínez (2004) who analysed the learning styles of teachers and their students in the first cycle of Compulsory Secondary Education in Laredo (Cantabria). But not only have studies been developed with students in different schools, we can also highlight investigations about learning styles within teaching itself, as reflected in a study carried out by the University of Cádiz (Gómez del Valle et al., 2003) that reflects the predominant teaching styles in teacher training students.

Comparing the results of similar studies, we can observe differences, generally subject to the personal preferences of each individual analysed to reveal their Learning Style. However, an analysis of the different studies found, shows most of them are merely descriptive, without using a more in-depth approach that can establish comparisons between different samples in the student environment. Moreover, reflection and the search for solutions to the problems raised are not only the objective for secondary education students, but also for the professional performance of future Physical Educators through teaching environments and spaces that encourage motivation and equal opportunities, posing an excellent challenge to carry out transformative social praxis through the power of education.

In Spain, there is no theoretical framework that makes it possible to know how Physical Education is learned or also, how one learns to teach and organise it´s associated the processes and resources. According to different studies, the active population in physical activity and sport has been around 100,000 jobs, with the practice of physical activity and sport constituting a 1% contribution to GDP in Spain (Martínez del Castillo, 2014). Based on the presentation of these facts, following the aforementioned author, it seems logical to foresee the ostentatious growth that could occur in sports employment and GDP in the country if progress were made towards the rates of regular practice of physical activity and sports, above the average of 80%, prevalent in the Nordic and Central European countries. Facing the organisational challenges indicated by starting from the learning styles of Physical Education students in Spain could enable the emergence of a fruitful frame of reference for the structuring of an emerging pedagogical method that encourages the comprehensive education of

the student through Physical Education, at the same time as discovering what the guidelines could be for the pedagogical organisation of a Physical Education in Spain capable of responding to the social, health and educational challenges that this discipline can tackle through transformative praxis. However, for such a task, it is important from a scientific point of view to first implement an empirical approach to the understanding of such theoretical assumptions.

The main differentiation presented by this research resides in the fact that it is not only a mere description of the predominant learning styles based on the previously cited literature, but rather that underlying the intention of the author is the idea of establishing a comparison of the results obtained from different student samples from the field of Physical Activity and Sports Sciences and the secondary school used in the sample. The ultimate goal is to infer whether there really are statistically significant differences between the analysed samples to be able to understand the evolution over time of such predominant styles and to determine, in this way, an exploratory frame of reference for the subsequent discussion of an emerging pedagogical method in Physical Education. This work cannot aspire to the conformation of a finished theory on the planning of Physical Education in Spain; however, in these primary ideas we will try to maintain whether age and academic development can be significantly influential factors within the predominance of different learning styles in Physical Education, so we are limiting ourselves simply to presenting it as an unfinished theory, for which we will first try to delimit the object of study, as well as present the set of variables that could be considered in future research. In the first place, we understand that it is important not only to establish a line of research that helps to make a diagnosis of the students' learning styles, but also to promote new pedagogical intervention strategies by proposing novel proposals and application methods with the different learning styles obtained from schools, age groups and even within different university courses, now that new teaching techniques are being addressed, especially considering the current European Higher Education Area (EHEA) that categorises university qualifications by degrees throughout the European continent.

Thus, starting from the constructivist theory (Piaget, 1980, 1981; Inhelder, 1976, & Bruner, 1964), from the theory of learning styles (Alonso, Gallego, & Honey, 1994, 2005) and from the theory of the planning of processes and resources of physical activity and sport (Martínez del Castillo, 1994, 1995), an attempt was made to empirically demonstrate the assertion that the predominant learning styles in Physical Education students do not vary at all throughout their academic training. Starting from such a theoretical assumption, the thesis that we hold then is that such identification could allow the elaboration of a pedagogical theory that would highlight the importance of planning an emerging pedagogical method, in a way that contributes to the planning and management of the intervening processes and resources in higher sports education in Spain. From the predominant learning styles, it is possible to know how the students learn, who will later dedicate themselves to professionally performing the functions of the Physical Educator in accordance with the pedagogical methods currently on the rise. If our theoretical assumption is corroborated, in the first place, a finding in itself could be how Physical Education students learn. Second, the objective could be established of finding a concrete response to the identified organisational social challenges; and, thirdly, to explore a specific pedagogical path consisting of the homogenisation of the study plans in Physical Activity and Sports Sciences in Spain that would contribute to the advancement of knowledge of the teaching and learning process, taking into account the students' characteristics, and according to their learning styles.

Until now, no study has been carried out on the predominant learning styles as a prelude to a pedagogical theory of university sports education in Spain (including women with disabilities), in a real sample of the group and the diversity of students in secondary and university education. In addition, it is unknown what their predominant learning styles really are today, and how these styles vary according to their different academic stages. These deficiencies in knowledge are in themselves factors that generate inequality because public and private educational entities are unaware of the social solvent demand that exists in this heterogeneous socio-demographic group. This makes it difficult for them to adapt their educational provision, and also infrastructures and programmes to the different existing segments of Physical Education students in Spain, by introducing all the innovations that would be necessary to reduce the high existing inequality, and for their adequate training for

professional performance once they graduate from the degree, as has been verified every five years in the studies by the CIS and García Ferrando since 1990 (García Ferrando, 2006), or the Higher Sports Council through the Sports Statistics Yearbook (Higher Sports Council, 2020) .

2. Objectives

Based on the reasons stated above, the following objectives were considered prior to the preparation of this study.

3. General purpose

To identify the predominant Learning Style in Physical Education students in secondary education and in the degree in Physical Activity and Sports Sciences.

Specific objectives

1. To determine if there are statistically significant differences in the predominant learning styles in second and fourth grade students of secondary education.
2. To examine whether there are statistically significant differences in the predominant learning styles in secondary education students and in the degree in Physical Activity and Sports Sciences.
3. To explore whether, in light of the results, it is possible to corroborate that there is homogeneity in the predominant learning styles in Physical Education students at different stages of their academic training.

Starting, therefore, from the objectives formulated, the study aims to empirically demonstrate the formulated thesis.

4. Hypothesis

General hypothesis

The predominant learning styles in the students of Physical Education of secondary education and of the degree in Physical Activity and Sports Sciences will be, in the following order, the "active" followed by the "reflective", "theoretical" and " pragmatic" styles, with scores defined as "very high" as established and validated in the scale proposed by Alonso, Gallego, & Honey (1994).

Specific hypotheses

1. No statistically significant differences will be found in the predominant learning styles between the second- and fourth-year students of secondary education.
2. There will be no statistically significant differences in the predominant learning styles between secondary education students and the degree in Physical Activity and Sports Sciences.
3. The results obtained will make it possible to corroborate the existence of homogeneity in the predominant learning styles in Physical Education students at the different stages of their academic training.

5. Material and method

Research design and approach

The research design used a quantitative cross-sectional approach, through a method or strategy based on an instrument applied to a previously estimated theoretical sample. Following the scientific literature on methods and techniques in social research through surveys (Cea D´ Ancona, 2001, 2004; Alvira, 2000) and the objectives of the work, the phases carried out in the research were proposed, as was determined by the instrument for obtaining the data.

Techniques in each of the phases of the investigation

The techniques used to obtain the data were carried out by administering a closed written questionnaire in person to the individuals in the selected sample. The universe, as this was a seminal study applied to a specific segment of the population, given the condition of a single researcher, was

estimated based on a finite universe of 246 people (n = 246) in order to offer initial global results for the segment of the population identified with a limit of error of ± 6.5%, a confidence interval of 95% and a variance for the most adverse cases of p and q = 50. The allocation of the administered instrument was proportional to the distribution according to the social size of each group of students. The chosen sampling procedure was simple random. The data treatment was carried out anonymously in accordance with the Organic Law on Protection of Personal Data and after each respondent had been informed about the characteristics of the study, having voluntarily accepted to be part of it.

Instrument

The Honey-Alonso Learning Styles Questionnaire (CHAEA) was applied to all subjects (Alonso, Gallego, & Honey, 1994). The instrument consists of 80 dichotomous questions distributed in 20 items for the different styles, which are answered. If the subject agrees, a positive sign (+ sign) is assigned; on the contrary, if the subject disagrees, a negative sign (sign -) is assigned. The questionnaire was carried out anonymously, it having previously been stated that there was no time limit for its completion, although no subject in the groups analysed took more than fifteen minutes to complete it. The intervention was carried out before the beginning of each session, with the students representing the sample at the beginning of the class (which indicated that the students, were visibly not tired and therefore their level of attention in the answers was higher). The maximum score obtainable in each style is 20 points, this being relative. The analysis of the results was carried out considering the general interpretation scale indicated by Alonso, Gallego, & Honey (1994) grouping the results of the styles into five categories: "Very high", "Moderate", "Low" and " Very low" (Honey and Munford, 1982). Coffield et al. (2004) studied the reliability of the instrument (test-retest). The instrument has also been validated for university students (Alonso, 1992). Likewise, Honey and Munford (1982) cited in Coffield (2004) found reliability values between 0.81 and 0.95 among the four styles.

Data analysis

The data obtained were reflected in the response form for their subsequent computerised statistical treatment, using the Statistical Package for the Social Sciences (IBM SPSS Statistics) v. 19. This statistical analysis consisted, first of all, of a descriptive analysis of the predominant learning styles by means of their tabulation. With the results obtained by applying the instrument, a table was prepared for each group of interest with the mean of the responses and their standard deviation according to the group and the predominant teaching style. The assumption of normality was demonstrated by the Kolmogorov-Smirnov test and the equality of variances by the Levene test. Student's t tests for the quantitative variables were performed to compare the characteristics of both groups.

Results

Predominant learning styles in Physical Education and in the degree in Physical Activity and Sports Sciences

The sample consisted of 120 subjects (n = 120): 40 students (n = 40) of the 83 (48.19%) students enrolled in the second year of secondary education, with a mean age of 14.30 years, and 40 (n = 40) of the 78 (51.28%) of those enrolled in the fourth year, with a mean age of 16.70 years. The same questionnaire was also administered to a sample of 40 (n = 40) students of the 85 (47.05%) with a mean of 22.50 years, studying the Bachelor's Degree in Physical Activity and Sport Sciences in the fourth year. The data distribution was adjusted to normality ($p > 0.05$). The total scores indicate that secondary education students obtained higher total scores in the learning patterns of the "Reflective" type (17.14 ± 1.84), followed by the "Pragmatic" (16.26 ± 2.19), "Theoretical" (16.21 ± 1.50) and "Active" styles (16.15 ± 1.81). These scores were very similar to those obtained within the subgroup of students corresponding to the fourth year of the degree in Physical Activity and Sports Sciences, who obtained a predominance of the "Reflective" learning style (16.71 ± 1.96) and, lastly, the "Active" style (14.89 ± 1.45) (Table 1).

Table 1.
Characteristics of the sample and total scores obtained for each learning style

Group of students	N	Age (M)	Universe (%)	Styles				p
				Active	Reflective	Theoretical	Pragmatic	
				M±SD	M±SD	M±SD	M±SD	
Second year of secondary education	40	14.30	48.19	15.62±2.50	17.20±1.93	16.67±1.73	16.38±2.13	>0.05
Fourth year of secondary education	40	16.70	51.28	16.69±1.13	17.08±1.75	15.75±1.25	16.14±2.26	>0.05
Total scores in secondary education	80	15.50	49.74	16.15±1.81	17.14±1.84	16.21±1.50	16.26±2.19	>0.05
Fourth year of the degree in Physical Activity and Sports Sciences	40	22.50	47.05	14.89±1.45	16.71±1.96	15.50±2.42	15.75±1.16	>0.05

Note. N=number of subjects; M=Mean; %=percentage weight associated with the universe segmented by group of students; p=p value Kolmogorov Smirnov (*p<0.05).

Determination of the existence of modifications between learning styles in Secondary Education

Table 2 shows whether or not there are modifications between the learning patterns of the different styles according to the year of secondary school students. No statistically significant differences were observed in any of the learning styles between the second- and fourth-year students of secondary education in the "Active", "Reflective", "Theoretical" and "Pragmatic" styles ($p = 0.137$; $p = 0.875$; $p = 0.366$; $p = 0.841$, respectively).

Table 2.
Differential analysis of the different styles according to the year of secondary education

Learning style	Year	N	M±SD	p
Active	Second year of secondary education	13	15.62±2.50	0.137
	Fourth year of secondary education	16	16.69±1.13	
Reflective	Second year of secondary education	10	17.20±1.93	0.875
	Fourth year of secondary education	13	17.08±1.75	
Theoretical	Second year of secondary education	9	16.67±1.73	0.366
	Fourth year of secondary education	4	15.75±1.25	
Pragmatic	Second year of secondary education	8	16.38±2.13	0.841
	Fourth year of secondary education	7	16.14±2.26	

Note. N=number of subjects; M=Mean; SD=Standard deviation; p=p value (*p<0.05).

Contrast of the results obtained in secondary education and from the students of the fourth year of Physical Activity and Sports Sciences Degree

When the learning styles were taken as reference within the students of secondary education and the degree in Physical Activity and Sports Sciences, no differences were observed in the learning styles between the different educational stages (p = 0.066; p = 0.481; p = 0.197; p = 0.713) for the "Active", "Reflective", "Theoretical" and "Pragmatic" styles, respectively (Table 3).

Table 3.
Differential analysis of the different styles according to the students of secondary education and of the fourth year of the degree in Physical Activity and Sports Sciences

Learning style	Year	N	M±SD	p
Active	Secondary education	29	16.15±1.81	0.066
	Fourth year of the degree in Physical Activity and Sports Sciences	9	14.89±1.45	
Reflective	Secondary education	23	17.14±1.84	0.481
	Fourth year of the degree in Physical Activity and Sports Sciences	17	16.71±1.96	
Theoretical	Secondary education	13	16.21±1.50	0.197
	Fourth year of the degree in Physical Activity and Sports Sciences	6	15.50±2.42	
Pragmatic	Secondary education	15	16.26±2.19	0.713
	Fourth year of the degree in Physical Activity and Sports Sciences	8	15.75±1.16	

Note. N=number of subjects; M=Mean; SD=Standard deviation; p=p value (*p<0.05).

6. Discussion

The objectives of our study were to compare the learning styles found in the Physical Education students of secondary education and the students in the fourth year of the degree in Physical Activity and Sports Sciences. The fourth-year students of Physical Activity and Sports Sciences, like the students of secondary Physical Education, presented a predominance of the "Reflective" style (16.71 ± 1.96), followed by the "Pragmatic" (15.75 ± 1.16), "Theoretical" (15.50 ± 2.42) and, finally, "Active" (14.89 ± 1.45) styles. In general, the results as a whole have been very similar to those found in secondary education. In this regard, if we make a comparison of the results obtained in secondary education with the scores on the general scale of Alonso, Gallego, & Honey (1994), it can be observed that the "Active" style presented an estimated score of "Very high", representing 80.75% with respect to the maximum score. On the other hand, the "Reflective" style showed a "Moderate" estimate, which represented 85.70% of the maximum score. Likewise, the "Theoretical" and "Pragmatic" styles presented a "High" and "Very high" representation in the scale, with 81.05% and 81.30% of the maximum score, respectively. The results suggest, firstly, and as Gómez del Valle et al. (2003, p. 3) have indicated that it is not necessary to work on the concrete improvement of any of the four styles since the minimum scores obtained by Alonso, Gallego, & Honey (1994) of 9, 14, 10 and 10 for the learning styles "Active", "Reflective", "Theoretical" and "Pragmatic", respectively, were reached.

At the international level, these results broadly coincide with those obtained by Lucila et al. (2008) with high school students from Mexico and, more specifically, at the National Polytechnic Institute. Moreover, they also correspond to those carried out by Martínez (2004) in his study with first-cycle secondary school students in Laredo (Cantabria). As can be seen in previous studies, the most predominant style is also the "Reflective" style, although the scores recorded in this study are visibly higher. Furthermore, according to the results obtained derived from our three specific hypotheses, the null hypothesis (H0) was accepted in all of them by finding the probability that the differences in the score of the different learning styles between the second and fourth year of secondary school education are due to chance, is greater than 5% in all styles, thus not achieving statistically significant differences when comparing the mean scores of the learning styles in the courses studied (p>0.05).

Regarding the third of the objectives, the results obtained in the undergraduate students in Physical Activity and Sports Sciences reflect an "Active" style, which recorded a "High" score with respect to the total score of 74.45%, the "Reflective" style with a score also rated High with 83.55% and the "Theoretical" and "Pragmatic", like the previous ones, also at a "High" level rating, as correspond to their scores of 77.50% and 78.75% respectively, according to the general scale (Alonso, Gallego, & Honey, 1994). With respect to the university field, the results found generally coincided with those of Alonso (1992), which reflects the higher studies in Humanities and the results obtained pigeonholed in Global Universities. Our hypothesis contrast did not allow us to find statistically significant differences in the scores obtained in the learning styles between the students of Physical Education in secondary education and the students of the fourth year of the Physical Activity and Sports Sciences degree. Our results did not allow us to corroborate our general hypothesis, according to which the predominant style located would be "Active", however, our results did allow us to locate the expected evidence regarding the non-existence of differences between the predominant styles in Physical Education in the second- and fourth-year of secondary education and, also, in comparison with students of the degree in Physical Activity and Sports Sciences.

These findings are not intended, as we stated previously, to show a conclusion that constitutes a finished theory on the design of a new pedagogical method of Physical Education in higher education in Spain. Their purpose is to make one more contribution as the result of a real research experience and theoretical reflection, through the empirical foundation collected. This has allowed us, on the one hand, to elaborate a concrete proposal about the organisational and social challenges identified, which seeks to initiate the theoretical discussion on the object of study and, on the other, to open up a way for the completion of more in-depth rigorous research in other fields of application (as in business organisations, for example); highlighting its relationship with professional development and performance. Ultimately, they underline the importance of delimiting the field of the Physical Educator through the suppression of the competence heterogeneity associated with their university training.

7. Conclusions

1. The predominant learning style in the students of Physical Education in secondary education and in the degree in Sciences of Physical Activity and Sports was "Reflective".

2. No statistically significant differences were found in the predominant learning styles between the second- and fourth-year students of secondary education.

3. There were no statistically significant differences in the predominant learning styles between secondary education students and students in the degree in Physical Activity and Sports Sciences.

4. In light of these results, it has been confirmed that there is homogeneity in the predominant learning styles in Physical Education students at different stages of their academic training. This homogeneity has made it possible to exploratorily affirm that the predominant learning styles in Physical Education students do not vary throughout their academic training. In this respect, within our unfinished theory, it is possible to sustain the thesis of the identification of the predominant styles as a prelude to the elaboration of an emerging pedagogical theory, of an individualised method based on the learning styles of the students, and in a way contribute to the planning and management of the processes and resources of higher sports education in Spain.

8. Limitations of the study and future lines of research

It is necessary to be aware of the evident need to put into effect a much more solid proposal to set the same or similar objectives, since, in this study, despite testing 120 subjects, it is possible that it is a representative sample that is insufficient to attain results much closer to the reality of what actually happens. However, we consider it essential to delve into the studies that address this issue in terms of its development, through future research that includes studies that not only identify the predominant styles, but also establish the existence or not of significant differences between the samples studied.

However, within the framework of an unfinished theory and according to the experience obtained, it would be very interesting in the future to develop a study with a quantitative design and longitudinal approach. It also highlights the need to delve into this field of study, taking into account the different sociodemographic variables such as gender and age in order to continue accumulating empirical evidence that would allow the elaboration of a finished theory. For future teachers in schools, it will undoubtedly encourage a personal approach of getting closer to students and the improvement of individual learning, since each person learns differently, despite the fact that studies with generalised samples are the most predominant in the scientific literature, because "as teachers we need to consider not only what we want our students to learn but also the way in which it is easiest for them to learn" (Gómez del Valle et al., 2003, p. 3).

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Conflict of interest

The author declares that there aren´t conflicts of interest.