




Article

Physical Literacy and Teacher Training: Pilot Study

Ariadna Hernaiz-Sánchez ^{1,*}, Eloy José Villaverde-Caramés ², Miguel González-Valeiro ² and Maria A. Fernández-Villarino ¹

¹ Faculty of Education and Sport Sciences, Universidade de Vigo, 36004 Vigo, Spain; marianfv@uvigo.es

² Faculty of Sport Sciences and Physical Education, University of A Coruña, 15179 La Coruña, Spain; eloy.villaverde@gmail.com (E.J.V.-C.); miguel.gonzalez.valeiro@udc.es (M.G.-V.)

* Correspondence: hernaiz@uvigo.es

Abstract: With the appearance of physical literacy, a new approach to physical education has emerged, aimed at promoting lifelong physical activity. With the intention of exploring whether physical education teacher training programmes are in line with this trend, we analysed the conceptions of pre-service teachers. The aim of this study was to design and validate a questionnaire analysing the conceptions of students taking the degree course in the Science of Physical Activity and Sport with regard to what it means to be a physically well-educated student. A questionnaire was designed for data collection. A chi-square test was used to analyse the statistically significant differences and Cramer's V was used to quantify the degree of association. The results show that pre-service teachers consider a physically well-educated student to be one who maintains a healthy lifestyle and has overall motor competence and self-awareness. Differences have been found between the conceptions of pre-service teachers, between universities and between the beginning and the end of training programs. A valid and reliable instrument has been obtained for analysing the conceptions of pre-service teachers. The studies reinforce the conceptions related to an active lifestyle and overall motor competence. The conceptions of pre-service teachers are within closer range of physical literacy after their studies.

Keywords: physical literacy; professional development; physical education; pre-service teachers



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1. Introduction

Physical education has been studied from a pedagogical perspective with a view to its improvement and optimisation, giving rise to diverse and progressive changes that have transformed it into what we understand physical education to be today. These changes derive from, among other elements, teachers themselves, given that they are one of the pillars on which the development of education is founded.

Teacher training begins before a future teacher even knows that education is to become their profession [1]. Different authors point out that experiences and beliefs acquired by teachers at the student stage impact on their personalities, conditioning their ideas on teaching [2–5]. This process, called socialisation, is for life and comes from interaction and learning among individuals, their experiences and the environment [6]. Specifically, the occupational socialisation process refers to the development of skills, capabilities and behaviours to be adapted to the work environment [7]. In this context in particular, in which future teachers are at the training stage, it is given the name “acculturation” [7]. On the other hand, other authors [8] emphasise the importance of the teacher's role in creating learning opportunities for pupils. A considerable amount of research exists pointing to the quality of teachers and the way in which they influence students as salient factors when explaining pupils' results [8,9]. A study has been carried out that measuring pupils' results in terms of the quality of teachers, reaching the conclusion that the quality of teaching has a definitive impact on learning [10]. Along these lines is also revealed the need to adapt all of the aspects of the education system (structures, organisation, resources and working) to

the advances that are occurring in education in order to obtain quality training [11]. In the same way, this adaptation should also include social and economic transformations and, specifically, in teacher training, providing training strategies that can be adapted to the academic context and that enable the imbalances that go hand in hand with said advances to be put right.

With the appearance of physical literacy [12] emerges a new physical education approach, aimed at the development of physically literate individuals, giving them the knowledge, skills and confidence to enjoy a life of healthy physical activity [13–16]. In addition, the importance of identifying the intrinsic value of physical education, refraining from justifying it as a means to an end, emphasising that it should not be an aim or goal to be achieved, but rather a route in itself that everyone must embrace and adhere to, which would enable all pupils to have the opportunity to experience their own physical literacy journey through physical or sports activities [17]. Continuing with this approach, is considered that physical education should be adapted to each individual, regardless of their abilities [18]. Physical literacy is considered to be a construct comprised of multiple dimensions, including the behavioural, psychological and physical dimensions of each individual [19]. This is why physical literacy could be regarded as a physical education approach which encompasses and guides the learning of all pupils individually.

This study aims to explore the thought processes of future physical education teachers, focussing its attention on the early educational stage, in which teachers' thought processes are forged and the foundations of their identity as teachers laid [20]. This stage of teachers' early training is vitally important for their subsequent professional development as it is a key moment in determining the future direction physical education classes will take [21]. We have considered it appropriate to look more closely at the conceptions that students have on the Physical Activity and Sports Sciences Degree course when they begin and when they finish their studies. By doing so, our aim is to ascertain whether the educational process future physical education teachers undergo influences their conceptions and thinking and in what way. We can, therefore, determine whether their university education guides them towards conceptions more closely related to physical literacy or, on the contrary, it leads them away from this line of thinking. The aims of this study, therefore, were:

1. To ascertain the opinion of students on the Physical Activity and Sports Sciences Degree course on what being a physically literate student means.
2. To construct and validate a questionnaire analysing the thoughts of students taking the Physical Activity and Sports Science Degree course.

2. Materials and Methods

2.1. Sample

A total of 265 Physical Activity and Sports Science students from two Spanish universities where this degree course is offered (the University of A Coruña and the University of Vigo) took part in the study. The sample comprises students in First and in Fourth year (156 in First and 109 in Fourth), with an average age of 22.4 (± 3.1). The description of the sample is shown in Table 1.

Table 1. Distribution of the sample according to gender, University and grade.

| | UDC ¹ | | | | UVIGO ² | | | |
|--------------|------------------|------|----------|------|--------------------|-----|----------|------|
| | Female | | Male | | Female | | Male | |
| | <i>n</i> | % | <i>n</i> | % | <i>n</i> | % | <i>n</i> | % |
| First Grade | 18 | 6.8 | 74 | 27.9 | 9 | 3.4 | 55 | 20.7 |
| Fourth Grade | 13 | 4.9 | 41 | 15.5 | 10 | 3.8 | 45 | 16.9 |
| Total | 31 | 11.7 | 115 | 43.3 | 19 | 7.2 | 100 | 37.6 |

¹ UDC: University of A Coruña; ² UVIGO: University of Vigo.

2.2. Instrument

The instrument used to collect the data is a questionnaire containing 36 questions, of which 25 are closed-ended and 11 open-ended. These questions are divided into three segments.

1. Personal data. Comprising 7 questions relating to: gender, date of birth, weight and height. A voluntary section on contact information is also included.
2. Biographic characterisation. A total of 16 questions organised in three blocks: (i) social, regarding academic background and parents' profession; (ii) professional, containing questions on the reasons behind students' choice of degree course and university; (iii) prior and current experiences of physical education and sports teaching, which covers experiences relating to physical education and sports before studying the degree course and while on it.
3. Conceptions of the professional activity. This segment comprises 13 questions divided into two blocks: (i) past experiences in physical education, both at primary and secondary education levels; (ii) conceptions regarding initial physical education teacher training.

The following steps were followed during the questionnaire's construction process:

1. Review of existing literature on the matter in question: physical literacy.
2. Expert discussion group, whose purpose was to explore this subject in order to reach a consensus on the construction of the questionnaire to be used.

Once the research aspect was defined, the next step was to determine the profile of the expert group's participants. In this case, specialist experts were chosen, all of whom were members of the teaching staff of different European universities with more than ten years of experience in the sector. The group of experts was made up of 4 doctoral degree holders with more than 20 years' experience from the following institutions: the University of A Coruña (Spain), the University of Guadalajara (Mexico), the Lusófona de Lisboa University (Portugal) and the University of Lisbon (Portugal). The criteria that defines them as experts, besides their more than 20 years of teaching, include their high-impact scientific publications within the scope of our study topic. The next step was to carry out the rounds of consultations, using questions that included the synthesis of the group's thinking. The aim of the rounds of consultation was to obtain the consensual thinking of the group and draw up a first draft of the questionnaire using the Delphi method [22]. On the basis of the initial questionnaire, the participants' discrepancies were analysed and debated. The step prior to the end of the process was a draft proposal drawn up by the participants in order to obtain the final report. The process was considered concluded when the stability and desired consensus of the group's opinions were reached [22]. As a result of this dual process, and bearing the mind the aims of the research, the different questions that would make up an initial questionnaire were drafted and structured.

This initial questionnaire was subjected to the scrutiny of experts to ensure its methodological and content validity. The experts issued their opinion on it and suggested some possible modifications be carried out. In order to ensure the validity, reliability and feasibility of the process to be undertaken, this initial questionnaire was used, by way of a pilot study, on the sample previously mentioned.

The nature of the questions was taken into account for their treatment and analysis and, on this basis, different procedures were developed. The closed-ended questions were entered directly into the SPSS statistical analysis programme and Cronbach's alpha was used for the internal consistency analysis. It was calculated for the entire questionnaire and for each of the dimensions comprising its structure. The result for the whole questionnaire was 0.76; for the dimensions, from 0.70 to 0.96. Personal data dimension and biographic characterization dimension was 0.70 and conceptions of the professional activity was 0.96. In the case of the open-ended questions, a categorisation process, characteristic of content analysis, was followed, summarising the data which would subsequently be subjected to a statistical analysis. This process was reviewed and analysed by experts, leading to the reformulation, elimination and creation of categories and resulting in a list of categories for

each of the questions. The next step involved coding each of the questions individually, using the sentence as the unit of analysis.

The categorisation process was carried out by three researchers. 10 questionnaires were chosen at random and each question categorised. When this process was finished, a month was allowed to pass before it was validated. With the results of the initial categorisation and those corresponding to the validation process, we applied the kappa coefficient [23] of agreement to test both intra and inter-rater reliability. The values obtained in this process (irrespective of the questionnaire) ranged between 0.615 (moderate) and 1 (very good) for both intra and inter-rater. Once the validity tests had been carried out, the data was entered into a data base created in the statistical analysis programme IBM SPSS Statistics 25 for Macintosh (IBM Co., New York, NY, USA) for subsequent treatment.

2.3. Study Elements

One of the questions from the questionnaire was chosen to carry out this study, in this case, “What does being a physically literate pupil mean?” A process categorising all of the possible responses to this question was undertaken in order to facilitate the analysis of the responses, which were grouped around the 13 categories previously established by the group of experts. The categories are shown in Table 2.

Table 2. Categories of responses to the research question.

| Categories | Description |
|-------------|--|
| Category 1 | Overall motor competence: all the answers that talk about motor skills. |
| Category 2 | Sport competence: all the answers that talk about sports skills. |
| Category 3 | Physical fitness: all the answers that talk about physical fitness. |
| Category 4 | Physical competence: all the answers that talk about the attitudes related to physical abilities. |
| Category 5 | Sport-related physical fitness: all the answers that talk about one or more sports. |
| Category 6 | Health-related physical fitness: all the answers that talk about health. |
| Category 7 | Active lifestyle: all the answers that talk about the importance of healthy lifestyle. |
| Category 8 | Knowledge: all the answers that talk about knowledge in general. |
| Category 9 | Sport knowledge: all the answers that talk about knowledge related to sport. |
| Category 10 | Health-related knowledge: all the answers that talk about knowledge related to health or physical condition. |
| Category 11 | Self-awareness: all the answers that talk about the knowledge related to the own body. |
| Category 12 | Personal competence: all the answers that talk about the values of physical activity. |
| Category 13 | Attitudes/enjoy: all the answers that talk about positive feeling towards physical activity. |

2.4. Procedure

The study required the permission of the heads of the two faculties in which the data was collected: Faculty of Education Sciences and Sports (University of Vigo) and the Faculty of Sports Sciences and Physical Education (University of A Coruña). When consent was given for the study to be carried out, the participants were informed of its aims and procedure and invited to take part. The questionnaires were administered to first-year students during the first week of class and to fourth-year students during the last week of class. The study was carried out in accordance with the ethical standards of Sports Sciences and Physical Activity [24].

2.5. Statistic Analysis

All of the analyses in the study were carried out using the statistics package IBM SPSS Statistics 25 for Macintosh (IBM Co., New York, NY, USA). The chi-square test with a significance level of $p < 0.05$ was used to look for significant differences. The effect size was determined using Cramer’s V.

3. Results

Table 3 shows the differences in thinking revealed by the sample with regard to each university in response to the question “What does being a physically literate student mean?”

Students from the University of A Coruña perceive the characteristics of a physically literate student to consist of maintaining an Active lifestyle (34.7%) and having Overall motor competence (13.7%). Similarly, the response of the majority of students from the University of Vigo refers to an Active lifestyle (35.2%), but they also point to the important characteristics of a physically literate student being overall motor competence (26.1%) and self-awareness (23.5%). Significant differences ($p < 0.05$) were found between the thinking of the students from the two universities with regard to the following items: In item 1, the students from the University of Vigo consider a physically literate pupil to be one who possesses Overall motor competence to a greater extent than the students from the University of A Coruña. In item 6, the students from the University of Vigo consider that physical fitness linked to health is a characteristic of a physically literate pupil to a greater extent than the students from the University of A Coruña. In item 9, the students from the University of A Coruña consider that sports knowledge is a characteristic of a physically literate pupil to a greater extent than the students from the University of Vigo. In item 11, the students from the University of Vigo consider that physically literate pupils should possess self-awareness to a greater extent than the students from the University of A Coruña.

Table 3. Comparison of opinions depending on the university.

| | University | | | | χ^2 | p | V de Cramer |
|------------------------------------|------------------|------|--------------------|------|----------|-------|-------------|
| | UDC ¹ | | UVIGO ² | | | | |
| | <i>n</i> | % | <i>n</i> | % | | | |
| 1. Overall motor competence | 20 | 13.7 | 31 | 26.1 | 6.436 | 0.011 | 0.156 |
| 2. Sport competence | 5 | 3.4 | 4 | 3.4 | 0.001 | 0.977 | 0.002 |
| 3. Physical fitness | 9 | 6.2 | 7 | 5.9 | 0.009 | 0.924 | 0.006 |
| 4. Physical competence | 5 | 3.4 | 9 | 7.6 | 2.244 | 0.134 | 0.092 |
| 5. Sport-related physical fitness | 0 | 0 | 2 | 1.7 | 2.472 | 0.116 | 0.097 |
| 6. Health-related physical fitness | 0 | 0 | 4 | 3.4 | 4.983 | 0.026 | 0.137 |
| 7. Active lifestyle | 50 | 34.2 | 42 | 35.2 | 0.032 | 0.859 | 0.011 |
| 8. Knowledge | 8 | 5.5 | 8 | 6.7 | 0.179 | 0.673 | 0.026 |
| 9. Sport knowledge | 10 | 6.8 | 2 | 1.7 | 4.051 | 0.044 | 0.124 |
| 10. Health-related knowledge | 9 | 6.2 | 10 | 8.5 | 0.521 | 0.470 | 0.044 |
| 11. Self-awareness | 7 | 4.8 | 28 | 23.5 | 20.075 | 0.000 | 0.275 |
| 12. Personal competence | 1 | 0.7 | 2 | 1.7 | 0.581 | 0.446 | 0.047 |
| 13. Attitudes/Enjoy | 1 | 0.7 | 3 | 2.5 | 1.487 | 0.223 | 0.075 |

¹ UDC: University of A Coruña; ² UVIGO: University of Vigo.

Table 4 shows the differences in thinking revealed by the sample with regard to the academic year students were in regarding the question “What does being a physically literate pupil mean?”. The first-year students consider that the most relevant characteristics of a physically literate pupil are: an active lifestyle (24.2%), self-awareness (17.9%) and overall motor competence (17.3%). However, the fourth-year students consider that a physically literate pupil is one who maintains an active lifestyle (49.5%) and possesses overall motor competence (22%).

Significant differences ($p < 0.05$) were found between the thinking of the first-year and the fourth-year students with respect to the following items: In item 7, the fourth-year students consider that a physically literate pupil is one who maintains an Active lifestyle to a greater extent than the first-year students. In item 9, the first-year students consider that Sports knowledge is a characteristic of a physically literate pupil to a greater extent than the fourth-year students. In item 11, the first-year students consider that a physically literate pupil is one who possesses Self-awareness to a greater extent than the fourth-year students.

Table 4. Comparison of opinions depending on the grade.

| | Grade | | | | χ^2 | <i>p</i> | V de Cramer |
|------------------------------------|----------|------|----------|------|----------|----------|-------------|
| | First | | Fourth | | | | |
| | <i>n</i> | % | <i>n</i> | % | | | |
| 1. Overall motor competence | 27 | 17.3 | 24 | 22 | 0.916 | 0.338 | 0.059 |
| 2. Sport competence | 6 | 3.8 | 3 | 2.8 | 0.234 | 0.629 | 0.030 |
| 3. Physical fitness | 8 | 5.1 | 8 | 7.3 | 0.553 | 0.457 | 0.046 |
| 4. Physical competence | | 4.5 | 7 | 6.4 | 0.480 | 0.488 | 0.043 |
| 5. Sport-related physical fitness | 2 | 1.3 | 0 | 0 | 1.408 | 0.235 | 0.073 |
| 6. Health-related physical fitness | 1 | 0.6 | 3 | 2.8 | 1.924 | 0.165 | 0.085 |
| 7. Active lifestyle | 38 | 24.2 | 54 | 49.5 | 17.954 | 0.000 | 0.260 |
| 8. Knowledge | 8 | 5.1 | 8 | 7.3 | 0.553 | 0.457 | 0.046 |
| 9. Sport knowledge | 11 | 7.1 | 1 | 0.9 | 5.584 | 0.018 | 0.145 |
| 10. Health-related knowledge | 13 | 8.3 | 6 | 5.6 | 0.737 | 0.391 | 0.053 |
| 11. Self-awareness | 28 | 17.9 | 7 | 6.4 | 7.437 | 0.006 | 0.168 |
| 12. Personal competence | 2 | 1.3 | 1 | 0.9 | 0.076 | 0.782 | 0.017 |
| 13. Attitudes/enjoy | 2 | 1.3 | 2 | 1.8 | 0.132 | 0.716 | 0.022 |

4. Discussion

The main aim of this pilot study was to explore the thought processes of the students of the degree in Physical Activity and Sports Sciences Degree course with regard to what being a physically literate pupil means. Evaluating the opinions of students at the beginning of their training and the influence this thinking can have on their personality and teaching development will enable us to understand the behaviour and professional know-how that the future generation of physical education teachers will put into practice. On the other hand, it will also allow us to analyse whether the data collection instrument shows the reliability and validity necessary to tackle the study subject posed.

After analysing the results, it was seen that the responses more highly valued by the students overall generally are those that consider a physically literate pupil to be one who maintains a healthy lifestyle and who possesses overall motor competence and self-awareness. These results coincide with what is described in the first book on physical literacy [13] that is, that physically literate pupils are those who have the motivation, confidence, physical competence and the knowledge and understanding to maintain physical activity throughout their lives.

A total of four essential and interconnected elements exist within physical literacy: motivation and confidence (affective), physical competence (physical), knowledge and understanding (cognitive) and engagement in physical activities for life (behavioural) [13].

Engagement in physical activities for life is the most widespread response among the opinions revealed by the sample. This response has a higher rate of support from the students finishing their Physical Activity and Sports Sciences Degree course than those just beginning. From this data it can be deduced that the initial education would seem to influence the reinforcement of the thinking that an active lifestyle is one of the most important characteristics to instil in future physical education students. This is because, when they finish their studies, the percentage of students who consider that the main characteristic of a physically literate student is that of maintaining an active lifestyle increases. Besides the influence organisational socialisation [6,25] might have had on students, other factors that might also have contributed to this change should not be ignored. The time period of 4 years between beginning the degree course and finishing it could have influenced thought processes, as could experiences in the teaching field resulting from teaching practice. Students' thought processes at the beginning of their training have been moulded by a range of factors, in which early teacher training experiences could play an important role. This data coincides with other studies [26] defining physical literacy as the ability to engage in an active lifestyle. Additionally, coinciding with this opinion, other authors [27] consider a physically literate person to be

one who possesses the knowledge, skills and attitudes necessary to lead a healthy lifestyle, as well as helping others to acquire these skills. In other publications, it is stated that the main aim of physical education is to develop physically literate individuals, providing them with the knowledge, skills and confidence to enjoy a healthy, active life [15].

The second element of physical literacy to which students from the sample attach more importance is physical competence (physical). In various studies [18] it is considered physical competence to be the individual ability to develop movement skills and patterns, and the capacity to experience a variety of movement intensities and durations.

In physical literacy, the mastery of the fundamental motor skills that allow children to move confidently and with control in a wide range of physical activities is considered as something of overriding importance [28]. Similarly [27] is considered physical literacy to be the ability to move with competence and confidence in a wide range of physical activities in a variety of environments that benefit individuals' health and well-being. This is in accordance, therefore, with the results obtained from the students' thinking, considering physical competence to be one of the most important elements that a physically literate student should master.

Physical competence is also considered important in the original idea [1,13] where it is pointed out that a physically literate individual moves with poise, economy and confidence in a wide range of physically challenging situations. Apart from recognising the importance of physical competence, it can also be emphasised that this line of attributes can never solely constitute physical literacy [13]. However, a large part of the sample recognises physical competence as the main element of physical literacy.

The third element of physical literacy (affective) is defined as the enthusiasm for, enjoyment of and self-assurance in adopting physical activity as an integral part of life and confidence in one's own skills [18].

The results of this study show that the first-year students are the ones who consider that self-awareness is a characteristic of a physically literate student to a greater extent than the fourth-year students. This line of thinking is also more deeply rooted among the students from the University of Vigo. From these results, it can be deduced that the affective element is scarcely dealt with in the universities, as after studying their degree courses the students barely consider the fact that a physically literate pupils should possess self-awareness. However, other authors [14], consider that physically literate individuals make healthy and active decisions throughout their lives that are beneficial to and respectful of oneself, others and the environment. Similarly, Whitehead [1,13] believes that physically literate individuals have a well-established sense of self as embodied in the world. This, along with an articulate interaction with the environment, engenders positive self-esteem and self-confidence.

With respect to the fourth element of physical literacy, only a small percentage of the sample were of the opinion that knowledge is one of its relevant characteristics. No significant difference in thinking is found among the group, as the percentage of the sample that believes that physically literate pupils should possess knowledge barely reaches ten. However, other authors [28,29] indicate that physical literacy includes elements of knowledge, understanding, thought, communication and application, also believing physically literate pupils to be those capable of perceiving different environmental aspects, anticipating movement needs, responding rapidly and appropriately with intelligence and imagination [29].

In the other hand, some authors [18] link knowledge and understanding to the capacity to identify the essential qualities that influence movement.

Physical literacy is more than the simple knowledge of fundamental motor skills; rather, it is also the ability to perform movements and know why they are performed in different contexts. Physically literate individuals are constantly developing the motivation and ability to understand, communicate, apply and analyse different forms of movement [28].

5. Conclusions

The first conclusion this study has enabled us to reach is that we have obtained a valid and reliable instrument for analysing the thinking and conceptions of students doing the Physical Activity and Sports Sciences Degree course.

With respect to the analysis of the students' thought processes, it can be concluded that their university studies reinforce the importance for future teachers of maintaining healthy lifestyle habits throughout their lives. Their university studies also lead them to move away from the idea that sports knowledge is important, and that self-awareness and general motor competence are more important.

The differences between the two universities are latent in various aspects of students' thinking. On the one hand, the students from the University of A Coruña tend to attach more importance to sports-related knowledge while the students from the University of Vigo consider health-related knowledge to be more important. However, students from both universities consider healthy lifestyle habits and motor competence to be the main characteristics of physically literate pupils.

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