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Consistency between two Tests of Assessment of Motor Talent in Physical Education

Concordancia entre dos pruebas de evaluación del talento motor en Educación Física

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Abstract

The detection of talent in sport has been a topic of interest in numerous research studies. However, this has not been the case in the area of Physical Education (PE). The purpose of this study was to test the degree of concordance between two recent tests aimed at talent detection in PE: an Athletic Skills Track (AST) and the PE Talent Identification Scale. A total of 205 students (54.76% boys and 45.4% girls) of Primary Education (M_{edad} = 8.37 years; SD_{edad} = 1.79) participated in the study. The pupils with the best results in the athletic skills test were also considered by the teachers to be talented in PE. Therefore, the results found here indicate that there is a relationship between the two instruments for identifying talented students in PE. Future studies should further explore enrichment programmes for such students detected as talented in PE.

Key words: Giftedness; diversity; Primary Education; detection; screening.

Resumen

La detección del talento en el deporte ha sido un tema de interés en numerosas investigaciones. Sin embargo, en el área de Educación Física (EF) no ha sido así. El propósito de este estudio fue comprobar el grado de concordancia entre dos recientes pruebas destinadas a la detección del talento en EF: una pista de habilidades atléticas (Athletic Skills Track, AST) y la Escala de identificación del Talento en EF. Un total de 205 alumnos/as (54.76% niños y 45.4% niñas) de Educación Primaria (M_{edad} = 8.37 años; DT_{edad} = 1.79) participaron en el estudio. El alumnado

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con mejores resultados en la prueba de habilidades atléticas también fue considerado por el profesorado como talentosos/as en EF. Por tanto, los resultados aquí hallados indican que existe relación entre ambos instrumentos para identificar alumnado con talento en EF. Los estudios futuros deberán profundizar en los programas de enriquecimiento para dicho alumnado detectado como talentoso en EF.

Palabras clave: Superdotación; diversidad; Educación Primaria; detección; screening

Introduction and objectives

Traditionally, talent detection in sport has been a topic of special interest. However, selecting and developing talented athletes is not a simple task, as the development process of an athlete can be influenced by physical, psychological, cognitive and sociological factors, all of which are interconnected (Fernández-Río and Méndez-Giménez, 2012). These influences also take place within the educational sphere, when we talk about the development process of students with high intellectual abilities and also, specifically, within the area of Physical Education (PE). Within this area, moreover, it has been concluded that teachers have little knowledge of how to carry out processes of identification and development of motor talent in their classes, which is practically non-existent (Prieto-Ayuso et al., 2022a).

In 2006, Richard Bailey and David Morley established the only talent development model known to date (Bailey and Morley, 2006). The aim was to make explicit theory about the nature, content and character of the process of talent development in EF, built on accumulated evidence, intuition or knowledge derived from theory (Keeves, 1988). Figure 1 reflects this model.

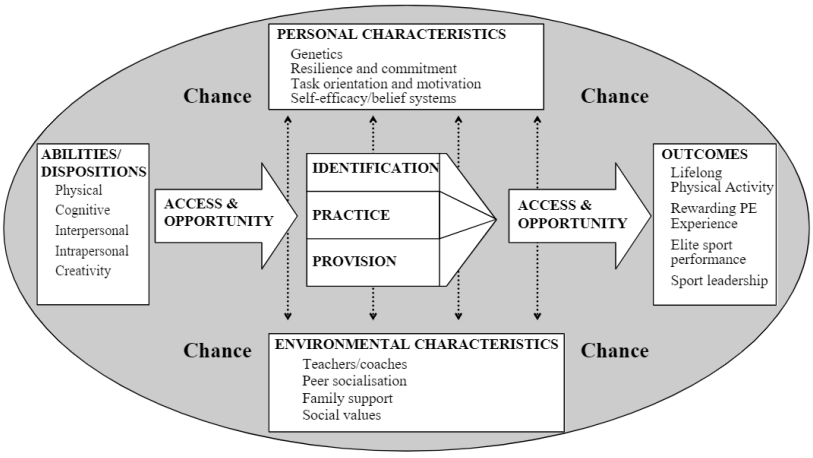

Figure 1. Model of talent development in FE (Bailey and Morley, 2006)

With this model, an attempt was made to clarify which are the fixed and other relatively changing variables that are associated with the process of identifying and

developing talent in PE. According to the authors of the model, there are five skills or capacities that must be developed in students in order to build talent, such as the following:

- Psychomotor or physical ability, to be developed through movement and performance of skills.
- Interpersonal skills, which manifest themselves in social contexts and are the basis for leadership, teamwork and related concepts.
- Intrapersonal skills are an individual's capacity for self-control, self-efficacy and emotional intelligence.
- Cognitive ability, shown in tactical environments, as well as through knowledge and understanding of concepts in EF.
- Creative ability, expressed when learners respond to challenges with fluency, originality, and sensitivity to problems.

Furthermore, within the model, the process of learning construction is a structured process, most likely to take place within formal settings such as schools. It is also influenced by both personal characteristics and environmental characteristics (Xiang et al., 2022), so access and opportunities to certain learning environments will significantly influence the development of talent in FE.

This development process is composed of identification, practice and provision, which can be carried out in the school context (Faber et al., 2022). In order to carry out an identification within a specific area, a targeted provision is required to address the needs of this area, as is the case of PE (Contreras-Jordán and Prieto-Ayuso, 2022). Practice represents a condition of talent realisation, which will be realised through hard work and effort, although genetics is one of the key aspects influenced. The combination of all the above factors will favour a number of positive outcomes including lifelong physical activity, reward through different sport experiences, elite sport or sport leadership (Bailey and Morley, 2006).

However, as the authors of the model themselves stated two decades ago, there are no absolute methods to carry out this identification process, due to the large number of factors that influence these processes, such as personal factors, environment, genetics or experience, among others (Morley and Bailey, 2002).

Focusing on the process of talent detection and identification, we must first clarify the difference between the two concepts, as they are often used interchangeably, erroneously (Prieto-Ayuso et al., 2022a). According to these authors, detection refers to a general process aimed at finding out who may have potential in EF, while identification is a specific process by which it is recognised, with a series of criteria, in which particular ability has potential.

At present, it seems that the most common method for teacher identification of motor talent is still the assessment of the student's basic physical abilities, which is widely criticised in the literature as it does not reflect the multidimensionality referred to as a talented student (Gray et al., 2010).

In the last five years, there have been several studies that have focused on a more comprehensive assessment of students with motor talent in PE. For example, Faber et al. (2017) conducted an intervention programme through table tennis in PE, assessing perceptual-motor skills. A year later, Krombholz (2018), in the field of Early Childhood Education (ECE), conducted an exploratory study in preschool age for the detection of motor talents. This author assessed the development of physical characteristics, skills and cognitive performance. A battery of motor tests was carried out and then classified into high performance, average performance and low performance. In the same year, but for Primary Education (PE) students, Platovet et al. (2018) developed a tool to objectively assess motor performance, meeting the individual developmental needs of children. The aim was to create a combination of tests covering the different aspects of fundamental movement skills (locomotion, balance and control objects). One year later, Prieto-Ayuso et al. (2019) determined in their study that potentially talented students can be identified in invasion sports, as long as their percentage of effectiveness is higher than 80% in terms of decision-making and technical execution. Unmarking was the most decisive technical-tactical element when discriminating talented and non-talented students in invasive sports in PE.

But if above the rest we must differentiate two instruments designed and validated for the assessment of motor talent in PE, they are the following (Contreras-Jordán and Prieto-Ayuso, 2022): *Scale for Identification of Sport Potential* (SISP) (Platvoet et al., 2015) and *Athletic Skills Track* (AST) (Hoeboer et al., 2017). The SISP instrument was developed based on the skills of Bailey and Morley's (2006) model of talent development in EF. It is a pencil-and-paper questionnaire based on six abilities that characterise talent development, such as motor ability, intellectual ability, interpersonal ability, sport learning ability, work attitude ability and creative ability. The questionnaire was originally composed of 66 items, which after several tests were reduced to 27. Currently, the questionnaire is translated and validated in Spanish, called *Escala de Identificación del Talento en Educación Física (EITEF)*, by Prieto-Ayuso et al. (2022b). On the other hand, the AST assesses children's fundamental skills, including crawling, jumping, throwing, kicking, somersaulting and moving. The main objective of this circuit is to complete it in the shortest possible time. It is an instrument that can be evaluated quickly and at low cost in the context of PE, but its reliability, its discriminative capacity and its validity in terms of different ages should be further evaluated.

Therefore, the general objective of the study was to check the degree of concordance between two tests designed to detect talented students in PE, namely the EITEF and the AST. This general objective was specified in two specific objectives, as follows:

1. To test whether students who performed better on the AST achieved higher teacher scores on the EITEF.
2. Determine the performance in AST of students whose teachers have perceived them as gifted in EF.

Method

Study design

Following the works of Montero and León (2007) and Ato et al. (2013), it is possible to frame this study in a quantitative empirical research design. Within empirical research, it can be classified as an observational and inferential descriptive strategy, since, on the one hand, it has sought to describe events as they happen, without any manipulation of variables or comparison of groups, and on the other hand, it has sought to infer the results obtained here to the population under study. Furthermore, it is a correlational and cross-sectional study, as it aims to determine the degree of relationship between two variables carried out at a specific time.

Population and Sample

The study was carried out in a public pre-school and primary school in the province of Cuenca, in a rural setting. The initial sample consisted of 209 participants, of whom 4 dropped out of the study due to non-attendance at the school on the days of data collection. Therefore, the final sample consisted of a total of 205 participants (54.37% boys and 45.63% girls) belonging to the primary school stage, aged between 6 and 12 years (M = 8.37; SD = 1.79). Segmenting the sample by academic year, 22.33% belonged to the first year, 12.14% to the second year, 17.96% to the third year, 18.93% to the fourth year, 15.54% to the fifth year, and finally 13.10% to the sixth year. Two PE teachers, both with more than 10 years of teaching experience, also participated.

Instruments

The instruments used were the *Escala de Identificación del Talento en Educación Física (Prieto-Ayuso et al., 2022b)* and an athletic skills test that assesses basic fundamental skills, called *Athletic Skills Tracks* (Hoeboer et al., 2017). The EITEF consists of 25 items grouped into six main skills: sport learning ability, work attitude ability, interpersonal ability, intellectual ability, creative ability and motor ability. Each item was scored by the PE teacher between 1 and 5, the legend being as follows: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Finally, a total sum of the evaluated items is made, with a maximum score of 125 points (Platvoet et al., 2015).

The AST consists of a total of 10 tests that have to be performed in the shortest possible time: (1) crocodile tracking, (2) bunny hopping, (3) mobile jumping, (4) throwing and catching a ball, (5) kicking and stopping a ball, (6) rolling forward, (7) rolling backwards, (8) running backwards, (9) climbing and (10) jumping (Hoeboer et al., 2017). Figure 2 shows the layout in the gymnasium of the athletic skills circuit and figure 3 an example of how it was performed in the school.

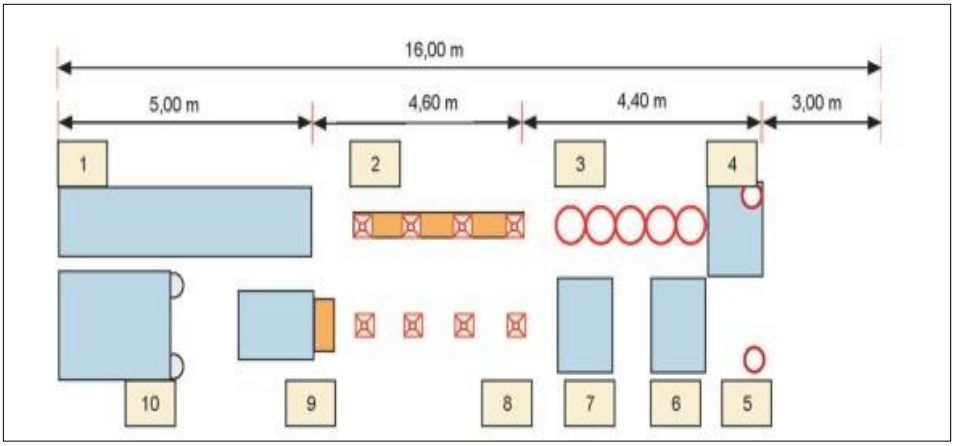

Figure 2. Athletic Skill Track (Hoeboer et al., 2017)

Figure 3. Implementation of AST in schools

Collection procedure

First, the project was sent to the ethics committee of the University of Castilla-La Mancha for evaluation. The study was approved under registration number CEIS-609597-F1Z7. Once the study was approved by the ethics committee, the educational centre and

the parents of the participating students were informed. Once the teachers accepted the proposal, it was the parents/guardians of the students who had to sign an informed consent form explaining the objectives, participants, possible results and benefits derived from the study.

Once informed consent had been obtained from the parents or guardians of the participating pupils, the intervention was carried out. To this end, each teacher was given the EITEF, which they had to complete with each of their students. Prior to this, a training session was held with the participating teachers on the instrument. In order to carry out the AST, familiarisation was carried out the previous days with some of the tests that formed part of the athletic skills circuit, especially those of greater difficulty or those that had not yet been worked on in the teachers' programmes, such as the forward somersault, backward somersault or climbing.

The practical intervention was carried out in the school gymnasium. Two PE sessions were used with students from 1st to 3rd grade to carry out the test, while only one session was needed with students from 4th to 6th grade. All of them, in addition to familiarising themselves with some of the tests on the previous days, also tried the full circuit beforehand.

Data analysis

The data were entered and analysed with the SPSS v.24 statistical software. Descriptive statistics (means and standard deviations) were calculated from the scores obtained in the EITEF and the AST test. In addition, an inferential analysis was performed using one-factor ANOVA for group comparison and correlational analysis (Pearson) in order to determine the degree of agreement between the two tests. The degree of significance of the results was established when $p<.05$. A Pearson correlational analysis was also performed to determine the relationships between the two tests. In order to analyse the scores obtained on the identification scale, the results obtained by the students were classified into the following ranges:

-Range 1: 101-125
-Range 2: 76-100
-Range 3: 51-75
-Range 4: 26-50
-Range 5: 0-25

The 20 best scores on the AST test were selected to determine the achievement level of potentially gifted students in PE. This number was selected according to Gagné's (2004) definition of high ability students, which places the percentage of students with AACC at 10% of their peers.

Results

The results derived from the data analysis are presented below. Firstly, those data resulting from the descriptive analysis and, subsequently, the results obtained from the inferential analysis. Table 1 shows the basic descriptive data obtained in the EITEF scale and the AST test.

Table 1.

Descriptive results (mean ± standard deviation) on the identification scale and the athletic skills test.

Course	EITEF			AST(s)		
	Children	Girls	Total	Children	Girls	Total
1º	89.92±14.15	89±10.76	89.5±12.59	54.4±8.53	59.48±8.24	56.72±8.69
2º	99.84±14.31	91.17±12.45	95.68±13.89	50.46±8.54	55.17±9.13	52.72±8.97
3º	99.06±16.03	89.35±19.45	93.81±18.38	42.06±5.89	48.35±6.91	45.46±7.12
4º	95.90±19.17	79.22±23.96	88.21±22.83	36.62±4.89	42.17±4.84	39.18±5.56
5º	99.05±20.84	82.75±15.11	92.94±20.29	34.8±7.52	41.5±4.98	37.31±7.37
6º	104.07±15.25	85.62±28.38	95.19±24.01	34.14±6.15	38.92±4.80	36.44±5.96
Total average	97.11±17.19	86.27±19.15	92.06±18.88	42.49±10.70	48.34±10.10	45.22±10.80

s = seconds

As can be seen in Table 1, Year 2 of Primary 2 obtained the best results in the EITEF (95.68). On the other hand, Primary 4 obtained the worst results (88.21). As for the results in the AST test, the best results were obtained by Primary 6 (36.44s) and on the opposite side with the worst results was Primary 1 (56.72s). More specifically, taking into account the classification by year and gender, boys in 6th grade obtained the best results in the EITEF (104.07). On the other hand, girls in Primary 5 obtained the worst results (82.75). Regarding the results in the AST test, the best results were obtained by the boys in Primary 6 (34.14s), while the worst results were obtained by the girls in Primary 1 (59.48s). Overall, boys performed better than girls in both the EITEF and the AST test.

Subsequently, in order to find out the mean obtained on the EITEF scale in each of the five ranges, the basic descriptive data were carried out. Figure 4 shows the results obtained.

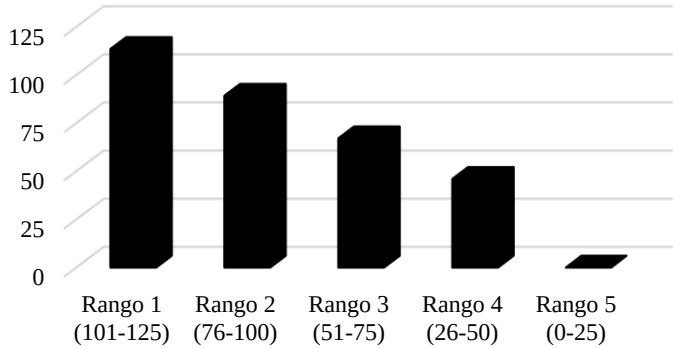

Figure 4. Median EITEF score in each of the ranks

The mean of those participants within range 1 was 113.50±6.74. For those in rank 2, the mean was 89.20±6.69. The mean of the participants in rank 3 was 67.11±7.83. For participants within range 4, the mean was 46.00±2.94. There were no participants in rank 5. On the other hand, of the 205 participating students, 32.19% (66 participants) were in rank 1, 47.31% (97 participants) in rank 2, 18.53% (38 participants) in rank 3, 1.95% (4 participants) in rank 4, and no students in rank 5.

Below (table 2), we present the results that respond to specific objective 1, which was to check whether the students who obtained better results in the basic fundamental skills test obtained higher scores from the teacher in the EITEF. As can be seen in Table 2, those pupils who obtained better results in the AST were those who belonged to rank 1 on the EITEF scale. On the other hand, those belonging to ranks two, three and four obtained lower results.

Table 2.

Descriptive results on the identification scale and the athletic skills test.

EITEF Rank	AST (seconds)
1	37.00±7.20
2	49.67±10.73
3	47.76±8.40
4	48.75±8.42

To conclude the descriptive results, and in order to respond to the specific objective number two, which refers to determining the performance in the basic fundamental skills of those students whose teachers have perceived them as talented in PE (belonging to rank 1), the results of the AST test were segmented according to the academic year. Table 3 shows the corresponding results. It can be seen that the best scores were obtained by pupils (boys and girls) in the 5th year of Primary School. In general, they obtained an average of 31.17s, while more specifically, also separating into categories of boys and girls, the children in the 5th year of Primary School obtained the best scores in the AST test with

an average of 29s. On the other hand, the worst scores were obtained by the 1st year of Primary School with an overall average of 48.25s. More specifically, it is the girls in Primary 1 who have obtained the worst results with an average of 50.67s.

Table 3.

Segmented results by grade of the AST test of students within the first range in the EITEF (mean ± standard deviation).

Course	AST		
	Children	**Girls**	**Total**
1º	46.8±2.39 *n* = 5	50.67±9.07 *n* = 3	48.25±5.55 *n* = 8
2º	43.67±4.93 *n* = 6	42±0 *n* = 1	43.43±4.54 *n* = 7
3º	37.88±3.76 *n* = 8	40.75±3.30 *n* = 4	38.83±3.74 *n* = 12
4º	34.18±2.60 *n* = 11	35±7 *n* = 3	34.36±3.59 *n* = 14
5º	29±3.33 *n* = 10	42±2.83 *n* = 2	31.17±5.95 *n* = 12
6º	31.57±6.13 *n* = 7	35±2.10 *n* = 6	33.15±4.88 *n* = 13

n = total number of participants

Table 4 below shows the results obtained after the statistical analysis to determine the differences between the AST results in each range of the EITEF. The results show the existence of significant differences ($p < .001$) between the results obtained in the athletic ability test according to the five ranges established in the EITEF. These descriptive scores (mean and standard deviation) can be found in table 2 above.

Table 4.

One-factor ANOVA between athletic ability test scores in each range of the EITEF.

	Sum of squares	**gl**	**Root mean square**	**F**	**Sig.**
Between groups	6676.060	3	2225.353	25.920	< .001
Within groups	17257.062	201	85.856		
Total	23933.122	204			

Sig = p value

Finally, to conclude the inferential analysis, Pearson correlations were established to determine the relationships between the two tests. Table 5 shows that the results obtained show significant correlations between both tests ($p < .000$), in each of the dimensions of

the scale, as well as in the total score. The degree of correlation presents low (.200 - .390) and moderate (.400 - .690) indices, ranging from .305 to .432 in this work. Furthermore, the association between both variables is negative, indicating that the higher the EITEF score, the lower the score (in seconds) obtained in the AST.

Table 5.

Pearson's correlation between AST and EITEF scores.

EITEF	AST	
	Corr.	**Sig.**
Sport learning capacity	-.466**	.000
Ability to work attitude	-.424**	.000
Interpersonal skills	-.305**	.000
Intellectual capacity	-.328**	.000
Creative capacity	-.410**	.000
Motor capacity	-.400**	.000
Total EITEF	-.432**	.000

Corr. = degree of correlation; *Sig.* = p value

Discussion

The aim of this study was to check the degree of concordance between two tests designed to detect students with motor talent in PE, namely the EITEF and the AST. Both tests were administered by the PE teacher, since the skills assessed in both tests are developed within this context, and therefore it is appropriate to use the figure of the teacher for this assessment and not an external agent (Tinning et al., 1993), such as a researcher who is not involved in the normal development of the classes. Furthermore, according to Kirk and Gorely (2000), PE classes are a suitable context for observing students' talent in a multidimensional way, i.e., taking into account not only the physical, but also the creative, social and cognitive domains, so that the combination of an observation scale, together with the performance of an athletic skills test, has brought us closer to determining who can be considered as potentially talented in PE classes.

According to the study by Hoeboer et al. (2017), the results obtained after administering the AST test to a total of 463 children were similar. Thus, the results of this study are consistent with those previously found by these authors, who also found that the performance in this test among the different age groups was high. In general, the boys completed the test in a shorter time than the girls.

The first objective was to check whether the students who obtained the best results in the AST obtained higher scores by the teacher as potentially talented. The results obtained in this work indicated that, taking into account the students who obtained the best results in the AST, 90% obtained the best scores by the teacher in the EITEF. These results indicate the concordance between the two assessment tests, which is reinforced by the data extracted from the correlations (Table 5) where it can be seen that the relationship between the two tests is significant. These results shed more light on the field of high abilities in the

school context in general, and in PE in particular. Previously, Prieto-Ayuso et al. (2019) determined which were the observation criteria for PE teachers when detecting talented students in invasion games. The results found here provide teachers with more tools to carry out such detection in a holistic and comprehensive manner (Kirk and Gorely, 2000). An example of the importance of carrying out these processes of motor talent detection is the study by Krombholz (2018), whose objective was to develop an intervention programme for IE students detected as talented through a series of physical tests, skills and cognitive performance. Adequate detection at an early age will lead to the correct planning and intervention of the student with motor talent in his or her specific discipline. In this sense, various scales focused on sports, such as, for example, the scale focused on young handball players in the context of 5th and 6th grade PE, designed and validated by Artiles and Castellano (2019) is an example of this. Or the work of Faber et al. (2017) in which they focused their perceptual-motor skills programme on the detection of talented students in table tennis. On the other hand, the explanation for the 10% of students who obtained a higher score in the basic fundamental skills test, but who did not obtain a higher score from the teachers, may be due to the fact that these students did not achieve a high score in the EITEF in some of the variables assessed by the teachers, such as those related to leadership or creativity, these being determining factors in high abilities (Renzulli and Gaesser, 2015).

The second objective was to determine the performance in the AST of those students whose teachers had previously perceived them as potentially talented in PE. An average of the results was obtained, divided by year, taking into account the time students took to take the AST test, and the results showed that boys performed better than girls. According to the study by Hoeboer et al. (2017), the results obtained after taking the AST test with a total of 463 children were similar. Thus, the results of this study are consistent with the previous findings of these authors, who also found that the AST performance among the different age groups was high. Similar to this study, the findings of Krombholz (2018) in IE showed that students identified as motor talented had better results in improving motor competence after the intervention programme than those who were not detected at the beginning of the programme. Therefore, the AST should be adjusted using different tracks taking into account the different abilities according to the age group. In general, the boys completed the test in a shorter time than the time needed to complete the test by the girls.

Finally, it is worth mentioning that, despite the strengths of the work carried out, it also has some limitations. The first limitation was that the study was carried out in a single school, and that the study did not take into account students who were involved in out-of-school physical activity, which may have provided an advantage in the AST. The second limitation of the study stems from the lack of data from the authors who designed the AST. Their article does not include data such as the diameter of the ball for the manipulations, or the length of the jump to be performed. The last limitation in carrying out the AST test is that only time was taken into account as an indicator of the students' motor skills, so there is no knowledge of the relationship between the time taken to complete the AST test and the quality of the movement performed.

Finally, and linked to the last idea in the previous paragraph, it is recommended that for future studies or research on students considered to be talented in PE, the technique and the ability to perform these skills according to age group should be evaluated in greater depth. Another aspect that is considered important for future studies is to

determine from what time in the AST test and score in the EITEF we can consider a child as talented in PE. Likewise, it would be interesting for future studies that once the pupils have been detected as gifted in PE, an action programme should be drawn up to be developed with those pupils in PE.

Conclusions

Once the work has been carried out, the following conclusions are drawn from it. Firstly, in relation to the general objective of this study, it is possible to conclude that there is agreement between both instruments for assessing talent in PE. The results obtained have shown the degree of agreement that these instruments present when assessing the same reality, such as talented students in PE. Therefore, both instruments can be used separately or together, depending on the objectives and the teachers' time to carry out this process in their classes. In this sense, the second conclusion drawn from the study is the adequate ability of teachers to identify talented students in PE, since the scores obtained in the EITEF (subjective instrument filled in by teachers) coincided with the results obtained in the AST test. Thus, the process of detection should not be exclusively derived from the sports field carried out by the coaches of the sports specialities, but it has also been shown that the PE teachers themselves can carry out a good detection within the educational field.

In short, as a general conclusion, it is possible to conclude that both instruments are suitable for the identification of talent in PE, and that there is concordance between the two tools; therefore, it will be up to the teacher to choose one instrument or the other according to his/her needs in the school context.

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