



Physical Education in the pedagogical innovation projects in Catalonia for the academic year 2021-2022

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Abstract

The interest of the educational community in constantly improving teaching practices has led to the creation of pedagogical innovation projects in different educational fields. Unfortunately, the involvement of Physical Education (PE) in these new projects is unknown. In this study, the involvement of PE in the innovation projects of the 2021-2022 academic year was determined on the basis of a questionnaire and interviews with six experts in educational innovation and PE. The validation of the questionnaire was done following the Delphi method, with subsequent piloting and an expert panel, using Cronbach's alpha coefficient to determine its reliability. 232 PE specialists responded to the questionnaire thanks to the internal dissemination carried out by the Association of Physical Activity and Sport Professionals of Catalonia (COPLEFC). A considerable number of cross-curricular projects linked to PE were highlighted (62% of schools had at least one), although in 44.3% of these the field was of high importance in involvement. A significant correlation was detected ($p < .001$) between the number of projects in which PE was involved in the school and the weight of involvement within the projects, which was higher in schools with more projects. Among the conclusions, it is stressed that the scarce promotion in the school, the priorities of the Department of Education that are not linked to PE, and the creation of networks and spaces within the working day for the generation of new PE projects may be the causes and conditions for increasing the presence of PE in innovation projects.

Keywords: innovation, Physical Education, projects.

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Two alpinists climbing a snowy mountain in the Arctic under the northern lights.
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Introduction

The emergence of new problems and needs in the education community has called for going beyond pragmatism in order to develop more complex and innovation-based responses (Palamarchuk et al., 2020). One of the areas where more innovation has been demanded is Physical Education (PE), with the aim of abandoning the traditional mechanistic and uncritical vision (Gil Gómez & Maravé Vivas, 2018) focused on the purpose of enjoyment (Pastor et al., 2016). For this reason, a PE has been pursued aimed at the comprehensive development of students and addressing the emotional, intellectual, social, and physical dimensions (Gil Gómez & Maravé Vivas, 2018), all based on more meaningful physical activity practices (Prat et al., 2019). However, there is a divergent view that has called for reconsidering the need for innovation in PE, taking into account the unique and exclusive characteristics of the area that differentiate it from the rest (Pérez & Hortigüela, 2020). In this sense, it is claimed that innovation in the area should focus mainly on generating an improvement in educational quality (Pérez & Hortigüela, 2020; Sein-Echaluce et al., 2016).

Innovation in the area of PE has focused, among others, on the creation of educational innovation projects (Cañabate et al., 2019). According to Order ENS/303/2015 of the Department of Education, projects are a modality of pedagogical innovation consisting of articulated actions where the objectives of improvement derived from the educational needs detected are specified and which generate long-term changes based on previous research. In the area of PE, the forms that these projects have taken have been varied and have addressed different fields of innovation, from didactic proposals that combined martial arts and dance to develop social and civic competency (Moneo et al., 2017) to the creation of sports simulation games that sought to improve specific psychological abilities (Arribas-Galarraga et al., 2017). Some projects have focused on combining models, such as personal and social responsibility (TPSR) and gamification in PE, demonstrating a positive impact on student motivation, autonomy, and responsibility (Valero-Valenzuela et al., 2020). Although the focus of the projects is not always on improving student competencies, to the extent that the TPSR model has been used to improve teachers' own competencies (Camerino et al., 2019).

The impact on competencies that were not specific to the area of PE stands out among the above proposals. In this line, PE can become an ideal context for developing their specific competencies, as well as those of other areas, all based on the creation of cross-curricular projects (Fuentes, 2019). The latest contributions in the field of

neuroscience suggest a close relationship between motor skills and other non-motor learning (Tomprowski & Qazi, 2020; Van der Fels et al., 2015), and that cross-curricular learning, which requires the involvement of more areas of the brain, becomes more effective and resilient over time (Bueno-Torrens & Forés-Miravalles, 2021).

In the absence of updated and contrasted data on the current situation of the area of PE in relation to educational innovation, the aim of the study was to determine the presence of PE in the pedagogical innovation projects carried out during the 2021-2022 academic year in Catalonia. The specific objectives were:

1. To determine the distribution of innovation projects according to the type of involvement of the area of PE.
2. To identify the conditions that favour the existence of innovation projects linked to the area of PE.
3. To identify the expectations of specialist PE teachers regarding the future of the area's presence in educational innovation projects.

Method

The study emerged at the initiative of the Official Association of Physical Activity and Sport Professionals of Catalonia (COPLEFC). A mixed methodology was followed and, for this reason, the procedure was divided into two phases. Firstly, a quantitative search was carried out in schools in Catalonia using a questionnaire specifically designed and validated to be applied to PE teachers. Subsequently, qualitative research was carried out by means of semi-structured interviews with representatives of selected schools with a proven level of expertise in the field of PE and educational innovation. In the following, each search will be divided into two phases and the methodological design will be made explicit.

Phase 1 - Questionnaires to schools on the role of PE in school innovation

Participants

A total of 232 PE specialists working in 232 different public, charter or private schools, covering primary, ESO (Mandatory Secondary School), baccalaureate and/or intermediate and higher vocational training levels, took part in this study. Participants were informed in advance about the purpose of the research and responded to the questionnaire that was distributed via social media and COPLEFC's weekly internal newsletter. All ethical

standards and guidelines in educational research and in the field of sport and exercise sciences were followed (BERA, 2018; Govil, 2013), as well as the criteria of the Declaration of Helsinki and the codes of research integrity at the University of Barcelona (University of Barcelona, 2020).

Procedure

A questionnaire was designed covering three dimensions: 1) the presence of PE in innovation projects, 2) the assessment of the involvement of PE in projects in which the area was involved, and 3) the role of educational agents with respect to the involvement of PE in innovation. A total of 13 questions (identification questions 1 to 3; questions 4, 6, 9 of dimension 1; questions 5, 7, 8, 10 of dimension 2; questions 11 to 13 of dimension 3) made up the questionnaire.

Validation of the resource

To ensure the validity of the questionnaire, a Delphi method was used (De Villiers et al., 2005) following a process similar to Monguillot et al. (2022):

- The people responsible for the research, 3 PE teachers with experience in school PE, generated the first version of the questionnaire (12 questions).
- Subsequently, based on a piloting phase, changes in the structure and wording of questions 8 and 10 were proposed and question 13 was created.
- 2 experts in qualitative methodology and with experience in PE determined the degree of understanding and appropriateness of the 12 initial questions on the basis of a 0-1 rating. An 83.3% agreement was obtained and the wording of questions 5 and 10 was modified.
- A panel of expert PE teachers from both primary and secondary schools was set up to check the coherence and relevance of the questions on a scale of 1 to 4. The mean rating of the questions was 3.36 ± 0.2 out of 4 and the mean rating of the questionnaire was 3.69 ± 0.3 out of 4. The wording of question 4 was changed as the lowest average score was 3 out of 4.
- Finally, Cronbach's alpha coefficient was calculated for the non-identifying and central questions of the study (questions 5, 7 to 13) to assess their appropriateness. A value of .751 was obtained and was considered acceptable as it was superior to alpha .700.

Analysis of results

Once Cronbach's alpha coefficient was determined, the descriptive statistics (mean and standard deviation), the frequencies of each variable, and the bivariate correlations of the variables were calculated (from Pearson for symmetrical quantitative variables and Spearman for ordered quantitative variables). Cross tables were then constructed between two variables for those that had shown significant correlations. Finally, a factorial dimension reduction was performed on the basis of a rotated component matrix to obtain new dimensions by combining variables and the frequencies of the new dimensions were calculated. The level of statistical significance was set at $p < .05$ for the correlations. All analyses were performed using the SPSS 27.0 software.

Phase 2 - Interviews with experts in educational innovation and PE

Six individual interviews were conducted with experts in PE during the year 2022. The selection of the people was intentional because of their link to innovation in the area of PE. The people included had more than 8 years of experience in teaching in PE and were in active employment. It was ensured that 3 people had experience in secondary and post-compulsory education and 3 people in primary education. Four people were PhDs and taught at universities in the field of PE. One person from the Department of Education with expertise in innovation in the area of PE, two people in charge of coordinating innovation in schools, and the headmistress of a secondary school were involved. The resource used to collect information was the semi-structured interview. The five interview dimensions (and their categories) were validated by consulting three experts in qualitative research in PE. The procedure began with the agreement of the respondents and the subsequent setting of a date and place for the interview. Once the procedures had been explained and the doubts of the respondents had been resolved, the interviews were carried out. All conversations were recorded with a tape recorder with the consent of the respondents.

Analysis of results

Based on the research of Lobo-de-Diego et al. (2020), the content of the extracted information was analysed and identified, reduced and grouped on the basis of inductive categorisation (table 1) to establish relationships between the categories on the basis of networks. The analyses were carried out with Atlas.ti version 22.

Table 1
Dimensions and categories for data analysis

Dimension of analysis	Category
Actions to boost the creation of projects linked to the area	Timetable and presence of PE in the school
	Teacher training for innovation in PE
	Specialist networks
	Networking between the specialist and the rest of the teaching staff
	Role of movement in the school and promotion of the school
	Spaces for the creation of projects
Types of innovation in PE	Innovation in evaluation
	Innovation on the content area
	Methodological innovation
	Cross-curricularity and relationship with other areas
Agents involved	Role of the Department of Education and priorities
	Engagement and willingness of the PE specialist
	Role of the management team
	The specialist in the management team
	Role of non-specialist teachers

Table 2
Relationship between the number of cross-curricular projects in which PE is involved and the importance attributed to the area in these projects.

No. of projects in which PE is involved at school	Percentage of schools where the weight of PE in the cross-curricular innovation projects is:		
	Low or non-existent	Neutral	High
1	26.2	32.2	41.6
2	18.9	24.5	56.6
3	13.9	43.5	42.6
4 or more	7.4	63.9	28.7

Results

The questionnaire to the PE specialists

A total of 232 PE specialists responded to the questionnaire (166 teachers from public schools; 63 from charter schools; 7 from private schools). No significant relationships were found between the responses and origin by type of school. Of the 232 schools surveyed, 90.5% of the schools ($n = 210$) had an active innovation project.

The presence of PE in school innovation

62% of schools had an active cross-curricular educational innovation project in which the area of PE was jointly

involved with other areas. Of these schools, 13.4% reported having three or more active cross-curricular projects linked to PE (see Table 3).

Beyond involvement in the project, the specialists were asked what weight and importance was given to PE in the cross-curricular innovation project. A significant correlation ($r_s = .222$; $p = .011$) was found between the number of projects in which PE was involved in the school and its weight of involvement within the projects. In schools where there were fewer cross-curricular projects involving PE, the importance of the area in the projects was lower than in schools where PE was involved in more projects (see Table 2). In 44.3% of cross-curricular projects, PE had a prominent involvement weight.

Table 3

Relationship between the number of cross-cutting projects in which PE is involved and specific projects in the area of PE.

Number of projects	Cross-curricular projects in which PE is involved		Specific PE projects	
	Frequency	Valid percentage	Frequency	Valid percentage
Unknown	11	5.2	9	4.3
No project	69	32.9	109	51.9
One project	65	31.0	56	26.7
Two projects	37	17.6	20	9.5
Three projects	14	6.7	5	2.4
Four or more projects	14	6.7	11	5.2
Total	210	100.0	210	100.0

Table 4

Frequency and percentage of the school's promotion and specialist engagement to create innovation projects linked to the area of PE.

	Promotion in the school		Specialist engagement	
	Frequency	Valid percentage	Frequency	Valid percentage
It is non-existent	51	22.0	23	9.9
It is insufficient	42	18.1	37	15.9
It is neutral	70	30.2	68	29.3
It is high	60	25.9	73	31.5
It is the maximum	9	3.9	31	13.4
Total	232	100.0	232	100.0

In addition to cross-curricular innovation projects, the specialist was asked about the number of specific projects in the area of PE. It should be noted that more than half (51.9%) of the schools had no project unique to the area, while 17.1% of centres had more than one.

A significant correlation was found between the number of innovation projects carried out by schools and the number of projects in which PE was involved, either cross-curricularly or specifically. The majority of projects linked to the area of PE (48.5%) were created in schools with four or more educational innovation projects ($r_p = .474$); $p < .001$).

Aspects that condition the engagement of PE in educational innovation projects

The role of both the school and the teachers' own engagement in the creation of new projects involving the area of PE was discussed with the PE specialists (see Table 4). Next, the relationship between school support and specialist

engagement was analysed and a significant correlation between the two variables was found ($r_s = .537$; $p < .001$). In schools where the promotion of PE-related projects was the lowest, 54.5% of specialists were not sufficiently involved in the creation of these projects. On the other hand, in schools where promotion was at a maximum, 100% of specialists were highly involved.

In relation to the assessment of the projects, the PE specialists were asked about their relevance, usefulness, and educational quality. 77.2% of the respondents gave a positive rating of the projects in which PE was involved and a significant correlation was found between the rating and the number of projects linked to PE that the school had ($r_s = .183$; $p = .019$). In relation to the assessment of PE teachers, a new category was created on the basis of a rotated component matrix linked to the perceived success of the innovation process in the school in relation to PE. The results showed that 81.9% of specialists believed that the success of the innovation process linked to the area of PE was high.

Future scenarios for the presence of the PE in innovation projects

A new dimension was created from a rotated component matrix to calculate what PE involvement is claimed in the school innovation process, based on the current and future demands made by the specialist. It was noted that 91.2% of specialists demanded a high presence of PE in the innovation of the school of the future. In relation to the desired weight, a statistically significant correlation was found between the current weight of PE in the interdisciplinary innovation projects and the weight claimed by PE teachers for the future ($r_s = .263$; $p = .002$). In schools where the weight of PE in innovation projects was non-existent, 65.2% of specialists called for a more important or crucial weight of the area in these projects, while in schools where the weight of PE in the projects was high or the maximum, 100% of teachers argued that it should be kept high or increased as much as possible in the future.

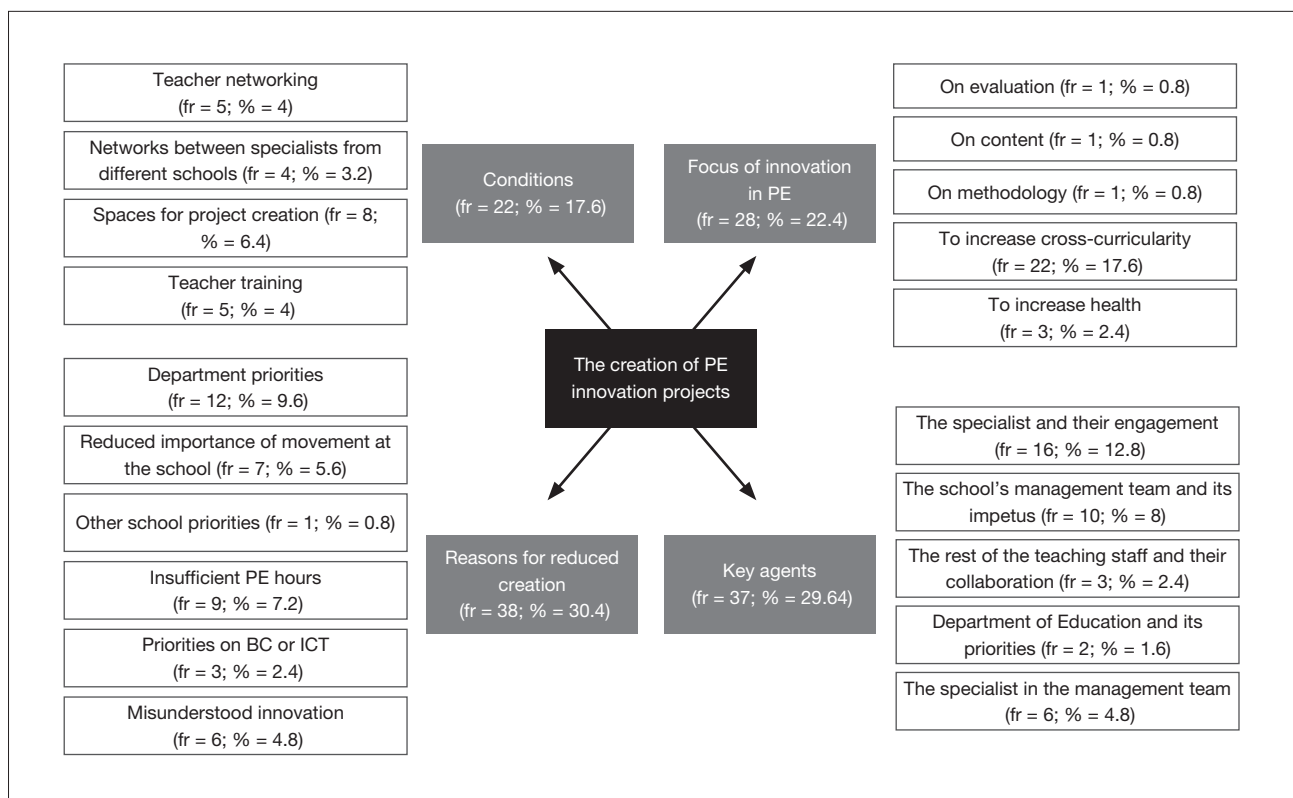
Interviews with Physical Education experts

The analysis of the interviews using Atlas.ti generated a total of 19 codes, which were grouped into 4 different families (see Figure 1). The four families of codes were collected in all interviews. The family that appeared most frequently were the reasons for not creating more innovation projects linked to the area (fr = 38; % = 30.4), among which the

following stood out: a) priorities of the Department of Education—unlinked to PE—(fr = 12; % = 9.6), and b) the hours of PE—which were considered insufficient according to all respondents—(fr = 9; % = 7.2). In fact, the third most frequently mentioned word in all interviews was “hours”, after “project” and “Physical Education”. The greatest agreement among the respondents was the importance of the engagement and willingness of the PE specialists to create new projects (fr = 16; % = 12.8), as well as the high level of creation of cross-curricular projects linked to PE (fr = 22; % = 17.6).

With regard to the conditions favouring the creation of innovative projects with the involvement of PE, the creation of training spaces for innovation (fr = 5; % = 4), the existence of networks between specialists to share ideas (fr = 4; % = 3.2) and the creation of spaces within the working day for the design of innovation projects between specialists or between the specialist and teaching staff from other areas and schools (fr = 4; % = 3.2) were highlighted as indispensable. In this sense, the importance of the management team a) facilitating the occurrence of the conditions mentioned above, and b) promoting the creation of projects related to the area was stressed (fr = 10; % = 8). Respondents agreed that the presence of PE specialists in management teams facilitated the emergence of all these aspects (fr = 6; % = 4.8). Finally, most of the innovations linked to PE focused on involvement in cross-curricular projects.

Figure 1
Conceptual network of the codes and families extracted from the interviews.



Discussion

This study analysed the presence of PE in pedagogical innovation projects, identified the conditions that favour the creation of projects linked to the area, and highlighted the expectations of specialist PE teachers in relation to innovation of the field in the future.

Regarding the presence of PE in cross-curricular projects

The results of the study emphasised the involvement of PE in cross-curricular innovation projects. Experts highlighted the current trend to incorporate PE in cross-curricular innovation projects and, according to teachers, 62% of schools had innovation projects that included more than one interrelated curricular area (Fuentes, 2019) in which PE was involved. This result contrasted with those related to specific PE projects, where 43.8% of schools have at least one project. Similarly, and according to the experts interviewed in the study, the innovations being made in the area of PE focused on its inclusion in cross-curricular projects. One possible explanation is that PE has its own characteristics that generate an ideal framework for developing cross-curricular competencies such as social and citizenship skills (Moneo et al., 2017), emotional skills (Gil-Gómez & Maravé-Vivas, 2018), other curricular areas (Hraste et al., 2018; Norris et al., 2015), autonomy and responsibility (Valero-Valenzuela et al., 2020), and cognitive skills (Dalziell et al., 2019) that promote synergies with the rest of the areas in order to facilitate the comprehensive development of students (Pastor et al., 2016) based on the conscious improvement of their corporeality (Buscà, 2005). As highlighted by the experts, the construction of joint networks between teachers of various specialisations and roles in the school, all based on the creation of systematic spaces with time for the design and evaluation of projects, can enhance this synergy and favour the implementation of cross-curricular projects.

Beyond assessing the presence of the area of PE in school projects, our interest focuses on the extent to which it does so. In this respect, in less than half of the cross-curricular projects (44.3%) PE played a prominent role. In fact, a significant correlation was found between schools with fewer PE projects, where the importance of the area within the projects was also lower, and schools with more PE projects, where PE played a more important role. Experts suggest that the priorities of the school are a key aspect in determining not only the inclusion of PE in cross-curricular projects, but also its importance

and quality within them. As the interviews showed, misunderstood innovation can directly affect the area of PE (Pérez & Hortigüela, 2020), in the sense that its involvement is reduced to the performance of physical activity as a resource for learning other content, ignoring the specific content of the area (Pastor et al., 2016).

Concerning the creation of specific projects in the area of PE

This research provided evidence on the engagement of the PE specialist in the creation of specific innovation projects and in innovation and improvement processes in the area (Pastor et al., 2016). In fact, only 26% of specialists stated that they had little engagement in setting up projects. However, more than half of the schools (55.7%) did not have any specific innovation project in the area of PE. Among other explanatory factors, only 29.8% of schools encouraged the creation of specific projects. In this sense, a significant correlation between the support of the school and the involvement of the specialist in the creation of projects was highlighted, so that when the former reached values close to the maximum, 100% of specialists stated that they were engaged in innovation in the area of PE.

The results showed, with a significant correlation, that schools with 4 or more innovation projects also had an innovative proposal in the area of PE. In the educational contexts where more innovations are developed, common characteristics are observed, such as the constant concern for educational quality and the proposal of educational policies and actions to improve the area (Barraza, 2005) as well as the support of educational agents towards the specialist in the introduction of new initiatives (Gil López et al., 2018). Beyond the willingness of each school to innovate, the interviews stressed the importance of the management team facilitating the conditions for promoting the creation of projects linked to the area and overcoming the demands and priorities of the Department of Education, which are totally unrelated to PE. The creation of networks between specialists to share ideas, as well as the creation of spaces within the working day for the design of projects (Van Waes et al., 2018), communities of practice (Jarrett & Harvey, 2014), or the increase of hours available for the implementation of projects in the area, were indispensable conditions upon which experts agreed. A condition that was also highlighted was teacher training for innovation. The results of empirical research demonstrate an insufficient level of innovation skills on the part of PE professionals (Palamarchuk et al., 2020).

Regarding the future of the area and its role in educational innovation

One of the remarkable results of the research was the claim for a more active role of the area of PE in innovation projects in schools (91.2% of specialists). This seems logical if one takes into account that the assessment of the projects was positive in 77.2% of the cases, but that more than half of the schools (55.7%) did not have any active projects linked to the area or that the importance attributed to PE in the overall projects is low or non-existent (21.4%). In fact, the results highlight a correlation between the teachers' assessment of innovation in the field and the number of PE projects available at the school. In this sense, the teachers' assessment was more positive in the schools that carried out more projects linked to PE.

Similarly, a relationship is found between the role of PE in the school's projects and the specialist's claim for the future, although fewer specialists (65.2%) claim more innovation when they are in schools where PE is not involved in innovative projects. On the other hand, in schools where PE is involved, and with a high or maximum weight, all the specialists agreed in calling for more involvement in the future. This result, coinciding with the interviews, placed the specialist at the centre of the process of change and innovation in the area. Further empowerment of the specialist to foster innovation linked to PE is based on strong institutional support, either from the Department of Education or from the school itself. Experts agreed that the Department does not foresee or carry out actions to promote the improvement of the area based on innovation. From the results of the present study, the key role of the school was also emphasised, although only 29.8% were highly supportive of the creation of innovation projects.

Conclusion

In relation to the first objective of the study, there is evidence of an elevated and superior involvement of PE in cross-curricular projects compared to that of area-specific projects. Despite the specialists' general satisfaction with this, a high number of schools are noted in which PE is only marginally involved in cross-curricular projects, or where there are no innovation projects linked to the area. In this sense, and in response to the second objective, a series of conditions are proposed that need to be met in order to promote the creation of projects linked to the field, including the role and support of the school, the engagement of the PE specialist, and the creation of spaces within the working day and networks for collaboration between teachers. With regard to the third objective, there was a majority of agreement among PE specialists in calling for higher and better-quality involvement of the area in educational innovation projects in the coming years.

Given the characteristics of this study, we consider it important to highlight its limitations. Firstly, the number of specialists who responded to the questionnaire is not significant for the population of Catalan PE teachers. Secondly, the panel of experts has been limited in terms of the number of people and variety of backgrounds. In the future, the latter limitations should be addressed by including more specialists and a wider and more varied panel of experts. Future research should also analyse how the latest innovation projects in PE are developed within the framework of the new curriculum. Derived from the results of the present study with regard to cross-curricularity and the changes that the new curriculum has brought about in this respect, it will be necessary to include educational agents from different fields, beyond specialists in PE.

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