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Teaching Sustainability through Traditional Sporting Games

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Abstract: Traditional sports games (TSGs), deeply rooted in local culture, serve as valuable resources for educating in sustainable development, aligning with guidelines set forth by international resolutions such as the Agenda 2030. This study investigated how ethnomotor variables in the educational use of TSGs with objects influenced emotional well-being and the acquisition of significant and contextualised physical and social sustainability learning involving various educational agents. The study adopted a qualitative and inductive approach centred on an ethnomotor intervention to promote sustainable learning within and beyond the educational setting. A total of 226 primary school students aged between 11 and 12 from seven primary education centres in the Canary Islands, Spain participated. Seven intervention sessions were conducted, including out-of-school activities involving family members and in-school activities with the collaboration of teaching staff and a specialised researcher. Various data collection instruments were employed (field notes, questionnaires, and interviews). A content analysis of qualitative data was conducted and subsequently transformed into quantitative data. For statistical analyses of these data, multidimensional frequency areas, crosstab (Pearson's chi-square), associated effect size (Cramer's V), and decision trees were utilised. This research discusses the relevance of TSGs as tools for promoting physically and socially sustainable learning. Furthermore, the role of various educational agents, including family members, teachers, and teacher-researchers, in developing these experiences is highlighted. The findings also highlight emotional well-being (psychosocial and socio-emotional affectivity) as a key aspect in the process of meaningful and contextualised sustainable learning.

Keywords: sustainable development; ethnomotricity; cultural heritage; Agenda 2030; quality education

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Citation: Luchoro-Parrilla, R.; Lavega-Burgués, P.; Pic, M. Teaching Sustainability through Traditional Sporting Games. *Sustainability* **2024**, *16*, 5510. https://doi.org/10.3390/su16135510

Academic Editors: Pedro Guilherme Rocha dos Reis and Gazi Mahabubul Alam

Received: 22 May 2024
Revised: 22 June 2024
Accepted: 26 June 2024
Published: 28 June 2024

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1. Introduction

1.1. Traditional Games, Resources to Educate Physical and Social Sustainability in a Contextualised Way

Traditional games (TGs) stand as extraordinary resources for fostering sustainable development goals in support of quality physical education [1–4]. TGs are motor practices deeply rooted in local culture [5], passed down following traditional customs and practices. In the Canary Islands, where this study was conducted, TGs involving objects represent a significant facet of traditional recreational culture. These TGs have fostered sustainability from a dual perspective, both environmental and physical or social [6].

Through TGs, children learn to maintain a respectful relationship with the physical environment. Prior to playing, TGs activate two processes linked to physical sustainability: (a) sourcing objects from the natural (e.g., stones, bones, branches, herbs, fruits, or reeds) or domestic environment (e.g., ropes, wheels, sacks, brooms, needles, shoes, or handkerchiefs), and (b) crafting those hand-made materials in an artisanal manner (for example, making stilts using rope and paint cans). Retrieving, recycling, and reusing are three key verbs in sustainable learning.

TGs trigger bodily techniques that educate players' subjectification [7]; through positive interaction with the material environment, young individuals undergo an affective bodily experience, enabling them to understand and construct their social and cultural identity. Through material subjectification, game objects acquire a cultural significance that contributes to individual formation. A spinning top, a marble, or a ball are not merely physical artefacts, but also carriers of meanings, signs, and messages about local culture [8].

Traditionally, these actions are performed with other individuals, family members (siblings, parents) or friends, activating the second dimension corresponding to socially sustainable learning [9,10]. Thanks to social interaction with others, each participant learns to identify the best places and materials for carrying out the artisanal construction process of game objects. In this interpersonal perspective, bodily techniques foster social subjectification, the process by which individuals internalise the signs and values inherent in interpersonal relationships in their society [8].

Interaction with others provides a safe social environment for individuals to subsequently personalise their game objects uniquely (with unique shapes, sizes, and colours). This aims to enrich the process of physical subjectification in an emotional approach.

Once the object is completed, it is customary to showcase the game object to the rest of the community, thus culminating the entire process and utilising it in a wide variety of motor situations shared with the rest of the class group. In this case, these actions have a direct relationship with social subjectification.

This journey through material culture leads individuals to share a sustainable relationship with the environment and themselves (environmental subjectification or sustainability) and to foster a sustainable relationship with others (social subjectification or social sustainability).

This inseparable pairing that accompanies the process of subjectification of sustainable learning makes it possible for individuals to acquire learning with a sense and meaning within the context of the local culture where they occur [2]. It involves contextualised sustainable learning [11].

1.2. Educating Sustainable Learning through an Ethnomotor Approach

The theory of motor action or motor praxeology coins the concept of ethnomotricity to refer to the "field and nature of motor practices, considered from the standpoint of their relationship with the culture and social environment in which they have developed" [12].

The contextualised study, i.e., from an ethnomotor perspective, of the effect of TGs on the education [13] of physical and social sustainability requires combining the concepts of the internal and external logic of TGs [12,14–17]. Each TG has an internal organisation pattern or identity card corresponding to a unique way of establishing internal relationships with other participants, with space, with time, and with objects. Players participating in any TGs must adapt their interventions to their internal logic. In the case of TGs involving objects, adaptation requires performing motor actions uniquely using objects when interacting with others (e.g., passing the ball to a teammate or hitting an opponent with a handkerchief), with space (e.g., moving an object across the squares of a hopscotch game), and with time (e.g., having three attempts to throw clubs at six pins, or flying a kite in the sky for as long as desired).

Each of the motor actions that activate the internal logic of a TG are contextualised in external conditions to the rules of that TG, i.e., a unique external logic. The internal logic (IL) corresponds to the sociocultural conditions in which TGs are carried out, referring to the students (according to age, gender, or social condition), to the areas or places where it is performed (specific installation or space in a locality or nature), to practice moments (time of year, week, and day, and the presence or absence of a festive calendar), and to the materials used (origin and method of elaboration of objects).

The ethnomotor vision intertwines the internal and external features of TGs, i.e., their internal logic with external logic, and the text with the context. This pairing is an essential requirement for educating physical and social sustainability.

The usual context of TGs is the street, the square, or the place where people coincide in their daily activities. Values and learning occur outside of school; these are contexts of non-formal or informal education. The master of TGs is the game itself, taking shape thanks to agents responsible for transmitting traditional knowledge (family members or friends).

From this perspective, the major challenge for any educator or researcher wishing to introduce TGs in school and use them coherently is to promote sustainable learning and education that is meaningful for students. How can the introduction of TGs in school or formal education be compatible with the fundamental knowledge that occurs outside and in non-formal or informal contexts?

This study addresses this challenge by investigating the impact exerted by an ethnomotor educational experience. The involvement of several educational agents is essential to this process.

1.3. Educational Agents to Promote Sustainable Learning: Multidimensional Approach

To ensure that the intervention is coherent, the UN guidelines [18,19] must be followed. The UN established 17 sustainable development objectives in its 2030 agenda. One of these objectives is promoting quality education.

From the ethnomotor perspective [20], all groups of people who actively participate in building sustainable learning are considered educational agents. In this study, we have selected four agents that intervene outside and inside the school:

(a) The students are the main participants and recipients of this educational process. Students actively intervene in the different phases.
(b) The familiars are people close to the student (grandparents, fathers, and mothers) who intervene as the main agents in actions outside the school. Familiars guide, advise, and transmit fundamental knowledge in the immediate environment (house, square, nature).
(c) The teachers. They are the official agents at schools, in charge of pedagogical actions with the students.
(d) The teacher-researcher. This agent, a specialist in the use of TGs with objects, introduces TGs in schools, advises teachers and students, and is responsible for using a variety of instruments and procedures to obtain data from the educational process, perform analysis, and generate scientific evidence.

1.4. Emotional Well-Being to Foster Sustainable Learning

In previous sections, two types of physical sustainability (referring to actions performed on objects or the physical environment) and social sustainability (corresponding to actions where interaction with others or the social environment is necessary) have been described. Motor praxeology also distinguishes two significant families of motor experiences: (a) psychomotricity, represented by psychomotor games, where individuals do not interact with other players (involving action in a physical or material environment); and (b) sociomotricity, constituted by sociomotor games where individuals interact with peers, opponents, or both (involving intervention in a social environment).

It seems reasonable to assume that participation in experiences related to psychomotricity, sociomotricity, and physical or social sustainability learning activates unique emotional states. Evidence shows that TSGs generate unique emotional well-being experiences, whether they are psychomotor or sociomotor games [1–3,6,21]. In all of these cases, it has been observed that when TSGs are employed, there is a predominance of intense positive and low negative emotions. In the educational context, these findings are crucial, as disciplines such as psychology or neuroscience indicate that when a learning process is associated with the experience of positive emotions, the outcome of that experience facilitates the acquisition of significant learning for students [22–26].

Following this approach, in this study, we distinguish two types of affective experiences based on the type of social relationship that originates:

Psychoemotional affectivity corresponds to experiences of emotional well-being or discomfort resulting from educational actions directed towards game objects (e.g., obtaining

an object, preparing it, elaborating it with unique nuances, or using it alone). States of psychoemotional well-being occur when the experience meets the actors' expectations. Conversely, the experience is one of psychoemotional discomfort when individuals deviate from the objectives they had set.

Socioemotional affectivity is associated with experiences of emotional well-being or discomfort arising from educational actions that require interaction with any educational agents involved (family members, other students, or the educator) when participating in the search, construction, or collective use of game objects.

This dual perspective of affectivity facilitates the interpretation of the effects of an educational program on the process of physical and social subjectification, through which students learn to attribute meanings of signs and messages to objects obtained from their domestic or local natural environment and to the interpersonal relationships they share [8].

1.5. Reflection in Action to Foster Meaningful Learning

Awareness of the learning process in which educational agents participate is a strategy that promotes the acquisition of contextualised physical and social sustainability learning. This strategy, involving both students and educational agents, invites them to reflect on their actions and delve into their educational value [27,28]. Additionally, by using game objects [29], experiences acquire significant affective content, enriching the reflection process from the action itself. "*The physical education teacher should allow students to discover the meaning of their motor experiences. Using reflection on action as a strategy is a possible path to continue exploring*" [30] (p. 174).

Various pedagogical tools, such as writing, journals, or field notes, make these resources mirrors, reflecting the internalisation of sustainable learning [2,31].

From an ethnomotor perspective, this reflective approach strengthens the understanding of educational objectives [32] and fosters a greater appreciation of educational contributions both within and outside the school.

Integrating procedures implemented inside and outside the school, with the collaboration of participating agents and using a methodology based on action reflection, fosters students' holistic development. This approach aims to cultivate an education dedicated to meaningful, contextualised, and well-being-oriented physical and social sustainability learning for students.

In light of the theoretical framework, this research set three objectives:

(a) Unveil the presence of comments corresponding to ethnomotor variables (referring to external logic, educational agents, and internal logic) in the elaboration of game materials conducted outside and inside educational centres in the Canary Islands.
(b) Examine the effects of emotional well-being and discomfort arising from ethnomotor actions carried out outside and inside educational centres in the Canary Islands.
(c) Identify the ethnomotor variables with the greatest predictive strength of the testimonies that originated the educational actions carried out outside and inside school centres in the Canary Islands.

2. Materials and Methods

2.1. Design

The design of this educational experience followed a qualitative approach [33,34] from an inductive and humanistic perspective [35–39]. Furthermore, it corresponded to an ethnomotor intervention aimed at developing sustainable learning outside and inside of schools, involving different educational agents (formal and informal).

The research employed a mixed methods approach, allowing for examining all the information from this educational intervention by combining qualitative and quantitative analysis. This approach involved different steps in the QUAL-QUAN-QUAL data transformation, illustrating how the "connecting" method was used [40–42]. This methodological framework ensured a comprehensive understanding by integrating diverse data sources and analytical techniques.

2.2. Participants

A total of 226 students (108 boys and 118 girls) aged between 11 and 12 years old, from seven primary education centres in the municipality of Telde, located in the Canary Islands (Spain), participated. Seven teachers from these institutions and a researcher who combined the roles of investigator and teacher for the student groups during the training were also involved. All of the participants provided feedback (comments) highlighting the positive impact of this experience on student education. The participants took part voluntarily. All ethical considerations required for the successful development of the research were met, respecting the Declaration of Helsinki of the World Medical Association [43], as well as obtaining approval (06/2019/CEICEGC) from the Clinical Research Ethics Committee of the Sports Administration of Catalonia, Generalitat de Catalunya (CEICEGC).

2.3. Procedure

Any educational experience that aims to use ethnomotor skills [44–46] should propose pedagogical actions as close as possible to the traditional context in which the fundamental knowledge of TSGs related to sustainability is forged [44–46]. The active methodology used in this study allowed students, educators, and families to have an active role in the actions carried out outside of school and inside the school. They all acted as educational agents whose complementary actions fostered sustainable and meaningful learning.

In this study, different ethnomotor actions were developed related to recreational activities practised in the Canary Islands with materials close to their immediate and domestic environment (stones, wood, leaves, buttons, and cans), with cultural and social areas identifying the context. The activities were close to educational centres (musical folklore, natural spaces, gastronomy, and work uses). This illustrates why it was important to have educational interventions that could occur both inside and outside of school.

The pedagogical experience was divided into different phases, during which the students were able discover game objects practised playfully in the Canary Islands and the materials used for their creation. The students were also able to experience and learn meaningfully, searching for the materials necessary to make a toy at school and home with the help of a family member. Later, recreational objects were created with those materials. Another interesting phase was the possibility of showing those made objects to their classmates and later demonstrating the importance of practising them by playing with the objects created outside and inside the educational centre.

Finally, the students were able to carry out reflective writing about the pedagogical experience they had. The students interacted with other agents, such as family members, teachers, and the researcher, to learn about the possibilities of creating and implementing an object made with materials from its closest environment. Below, each of the phases produced by the students during the seven sessions of this experience are explained in more detail.

(a) Outside the school, students and families were involved. They identified areas and searched for game objects, following the characteristics shown in other studies [44–47].
(b) Outside the school, with student and family intervention, the elaboration of game objects occurred, using different tools to personalize the objects (in terms of, for example, shape, size, and colours). This action was supported by previous studies that have employed the same strategy [48–51]. These actions fostered direct and profound interaction between students and their family environment, which was associated with states of emotional well-being among the participants [52–54]. Playful objects such as rag dolls, cars, aeroplanes, spinning tops, or skateboards were examples of the objects created by the students with the help of a family member.
(c) Inside the school, student intervention and a presentation to the educational community (students and teachers) of the objects made at home with their families
(d) Inside the school, students and a researcher-teacher intervened. The researcher-teacher, a specialist in the construction of game elements, helped the students elaborate on selected game objects. These objects were searched for at home and brought to the

educational centre. Materials such as buttons, ropes, plastic boats, cans, and fabrics were used to create stilts, tops, yo-yos, or cars.

(e) Inside the school, student intervention and a variety of TSGs using objects built by the students were carried out. All of these actions carried out outside and inside the school fostered a holistic understanding of the values and knowledge related to social and physical sustainability promoted by TSGs with objects [52–54].

(f) Given the limitations of this text, the study presented focused on analysing the elaboration phases of game objects outside the school (with family members) and inside the school (with teachers).

2.4. Instruments

This research utilised data collection instruments tailored to the characteristics of the participants. The students composed an essay, which included some drawings, and they also completed an emotion questionnaire adapted to their age. The teaching staff participated in semi-structured interviews, providing information on the teaching-learning process in this educational experience. The researcher acted as a participant observer, educator, and investigator, employing field notes and audio-visual recordings registered during the development of the educational activities. The students wrote about what they experienced in the educational intervention and commented on what stood out most about this experience.

2.5. Methodological Integrity

The methodology used for this educational intervention followed the considerations of qualitative research [55] and methodological integrity.

Data adequacy: Data were obtained from the comments of 226 students enrolled in primary education who carried out the educational intervention on using objects in TGs inside and outside the school through writings elaborated by the students in phase 7.

Conclusions based on evidence: The results corresponded to the comments obtained from interviews with teachers, students' writings, and field notes made in the educational intervention in seven schools in the municipality of Telde in the Canary Islands (Spain), and whose procedure was based on evidence obtained from previous scientific studies (publications and scientific articles, as well as doctoral theses). All this led to the discovery of the formative contribution of using sustainable materials and the interaction among students when participating in an innovative pedagogical experience both inside and outside the educational environment.

Data quality control: This study, which resulted in a doctoral thesis [2], was conducted by a researcher specialised in traditional children's games from the Canary Islands, the science of motor action, and motor praxeology. This allowed for a rigorous content analysis of the qualitative data obtained, which lasted for three years of research.

The present research was conducted by reducing, separating, and grouping the comments obtained from the students. The comments were analysed using Atlas Ti version 7 into units of meaning, which were subsequently analysed using comments referring to educational contexts outside or within the school.

2.6. Data Analysis

For the development of this data analysis, a mixed methods approach was employed [56–58], allowing for the examination of all the information from this educational intervention by combining qualitative and quantitative analysis. This method facilitated the reduction and organisation of the data collected through various instruments [51]. The qualitative content analysis of the data collected in this educational intervention (including field notes, teacher interviews, and students' written work) was performed using Atlas.ti V7 software. Simultaneously, a quantitative data analysis was conducted on various semantic units, achieving Cohen's correlation coefficients exceeding 0.8 for both inter-observer and intra-observer reliability. Various statistical tests were employed, such as multidimensional

frequency area analysis, crosstabs (Pearson's chi-square and Cramer's V for effect size), and paired sample tests, in SPSS v.25 [59]. The Pearson chi-square test was conducted to assess differences in the count of instances for each variable. The following criteria were used to estimate effect sizes: 0.10 = small effect, 0.30 = moderate effect, and 0.50 = large effect [60]. A classification and regression tree [61,62] was applied to determine the discriminative power of the study variables. Specifically, a CTR model was used, which had previously been used with motor and sporting games [63]. This multivariate technique divided nodes dichotomously to establish divisions as homogeneously as possible concerning the dependent variable (within and outside the school), allowing for adequate data modelling [64]. The following statistical specifications were applied: (i) the significance level was set at $p < 0.05$; (ii) to avoid overfitting, the pruning procedure was applied; (iii) the range of iterations was 100 for parent nodes and 50 instances for son nodes; (iv) the improvement measure could not be smaller than 0.001; (v) the impurity measure (Gini Impurity) tried to maximise within-node homogeneity; (vi) the tree had a maximum of five levels in order to reduce the misclassification risk; and (vii) cross-validation was used.

Seven sessions were conducted in each centre. Participants' comments were saved and categorised using Atlas.ti and Excel. The study analysed 18 variables related to ethnomotor intervention, both inside and outside the educational institution: (a) agents: students, family, researcher, and teaching staff; (b) internal logic: rules, motor interaction, material, space, and time; (c) external logic: students, material, time, and space; (d) phases: elaboration of objects outside the educational centre (F3) and elaboration of objects inside the educational centre (F5); and (e) effects: socio-emotional well-being and discomfort.

2.7. The Role of the Teacher-Researcher

The role played by the teacher-researcher was that of an instructor in the phase of object elaboration, following [65], with students assisted by the supervising teaching staff and physical education teachers. This fostered greater interaction between the students carrying out the activities and the teacher-researcher overseeing them, resulting in enhanced engagement between these agents, providing a holistic view of the educational intervention [37,66]. Additionally, the researcher acted as an observer of the objects created by the students with the assistance of a family member outside the educational institution.

2.8. Reliability and Validity Criteria

The research methodology adhered to Levitt's guidelines on the Reporting Standards for Journal Articles in Primary Qualitative, Qualitative Meta-Analytic, and Mixed Methods Research in Psychology [55]. This framework ensured methodological integrity throughout the study.

This research rigorously addressed the fulfilment of all reliability criteria [57], as it underwent review by an external researcher who approved all the criteria of content analysis. For this purpose, the Atlas.ti V7 software was utilised. Thus, the content of semantic units of significance, extracted from the comments obtained through data collection instruments, carried out by various agents, was analysed.

The content analysis underwent a meticulous four-month procedure conducted by two researchers. Two university doctorate students specialising in physical activity and sports sciences actively participated in this process. They were experts in motor praxeology and well-versed in prior studies on the content analysis of qualitative data in different playing scenarios. To enhance their analytical process, these researchers engaged in a comprehensive 40 h training programme on content analysis, aligning with the guidelines set forth by Anguera and Blanco [47].

The quality of the interpretative research was supported by the criteria of credibility and confirmability of the results through the triangulation of methods and researchers and external verification through the critical judgement of peers in the motor action research group (GIAM) [67,68].

3. Results

The different methodological strategies (mixed methods) employed for data analysis confirmed the positive effect of this ethnomotor experience on the development of meaningful and globally contextualized sustainable learning, with variables segmented between inside and outside the school setting. The effect size was shown to be small (V. Cramer = 0.097) ($p > 0.05$), as reported in the comments of the participants.

3.1. Creating Playful Objects Outside the Educational Setting: Physical and Social Sustainability Outside of the School

The educational actions carried out outside the school generated 623 comments (Figure 1) focused on fundamental interactions and components that participated in this educational intervention.

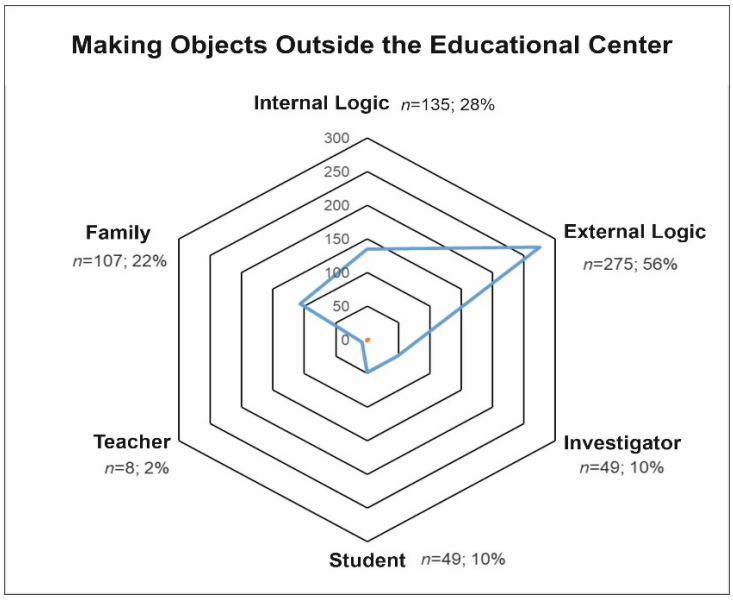


Figure 1. Comments resulting from the creation of play objects outside of the school.

The analysis of the testimonies narrated by the students, in the phase of creating objects outside the school with the help of a close relative (grandparents, parents), showed a high presence of comments referring to external logic (n = 275, 56%), i.e., aspects corresponding to the process of searching, obtaining, and personalizing these objects.

> "What I liked the most was when we made a toy at home with our parents. I made a telephone using two cups, a string, and some paints to make a dog face". (Student 3; comment 31)

> "My toy is called a 'zumbadera,' and I made it with my 67-year-old grandfather. At first, I did not know how to use it, but then I learned. I enjoyed the experience". (Student 18; comment 21)

In parallel, 205 narratives (32.9%) were identified, mentioning the participation of various educational agents (family members, teachers, researchers, and students), albeit in different proportions.

Firstly, comments describing the interaction of students with family members stood out (n = 107, 22%).

> "My father was the one who gave me the idea to make the bottlecap toy. The first step was to get the bottlecaps, and the second step was to add weight to the candle liquid. Then we had to wait for it to dry before putting on the football player stickers". (Student 53; comment 36)

> "I made a cart at home with my mother and grandfather. I felt very good because I screwed and unscrewed. I made it with wood, wheels, ropes, paint (...), the same materials my grandfather used to play with when he was little". (Student 58; comment 14)

Testimonies corresponding to the teacher-researcher were also collected to a lesser extent (n = 49, 10%), recalling some details explained on the first day in class and confirmed by their family members.

> "He told us that for the next day, we had to bring a traditional toy made by one of our family members when they were little". (Student 55; comment 114)

> "Then he told us to make a toy at home. I made an entertainment toy (...), we learned many things, and I really liked it". (Student 57; comment 57)

Likewise, comments were recorded about the protagonism of the students in the process carried out outside the school (n = 49, 10%). In contrast, testimonies regarding the teacher's role barely existed (n = 8, 2%).

> "I loved it; families were delighted, not only those who were here at the school in the joint game-making but also those who made individual games at home. Things came that I did not expect". (Teacher 2; comment 8)

> "I always tell the children, they ask me my age, and I tell them I am a child because otherwise, I cannot play. That is to say, by giving the children the basic notions, they start from previous knowledge but modify it because they also have another reality". (Teacher 4; comment 52)

The search and construction of play objects outside the school with family members were accompanied by their practical use of these materials in play situations involving family members and students. Hence, testimonies referring to the internal logic of these ludomotor situations were collected (n = 135, 28%).

> "It went from being a bottle, a few caps, and some sticks, to being a car with which we had fun racing. I was very happy to have had a time of many laughs". (Student 52; comment 33)

> "We used some wooden boards, not too thick, not too thin. We used a stapler and glue. When I tried it, it did not fly, but I do not mind because my uncle and I are improving it so it can fly". (Student 49; comment 49)

3.2. Creating Play Objects with Students within the Educational Setting: Physical and Social Sustainability in School

The creation of traditional play objects within the school resulted in 650 comments (Figure 2) related to external logic, formative agents, and internal logic, but the distribution was uneven compared to the testimonies collected in actions outside the school.

The largest group of comments highlighted aspects related to external logic (n = 302, 46%), which was a higher percentage than that found in actions outside the educational setting. The ethnomotor nature of this experience showed testimonies external to the school both in actions carried out within and outside the educational setting. Creating objects in school encouraged students to recognize play objects with their families, some of which they had not seen until that moment. This action invited them to personalize their play object according to colours, shapes, sizes, and other unique characteristics accompanying their play artefacts.

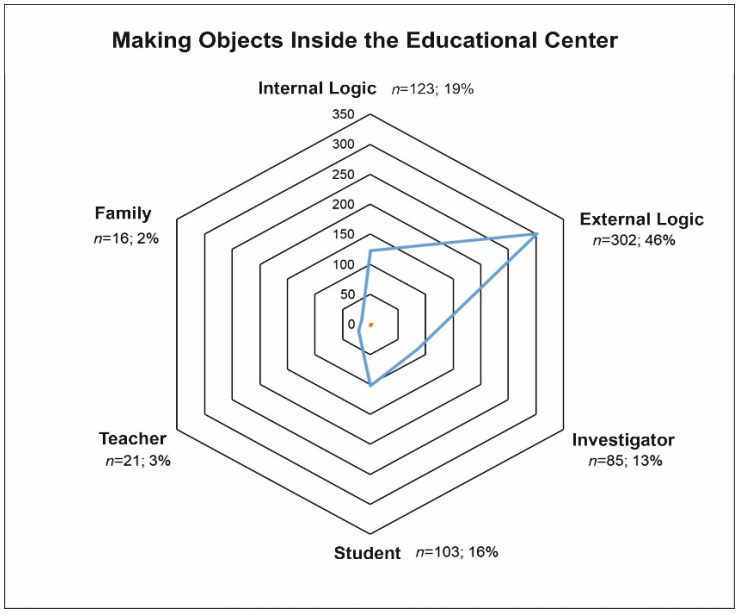


Figure 2. Comments resulting from creating play objects within the educational setting.

> "That was also very good because we do not control the student's and parent's work at home. Parents can let us call it, get excited, and do the work themselves, and the child helps, fetches things, and brings them. Although they may be present, they may not actively participate, and there is no other option in school. In school, you do it, or you do it". (Teacher 2; comment 19)

> "When we did it as a group, I had much fun because we all contributed something, and we even decorated it in our own way". (Student 28; comment 58)

The second-largest group of testimonies (n = 225, 34.6%) corresponded to the interaction or participation of different agents. One hundred and three comments (16%) evidenced the active participation of students in this process.

> "We also have to say that the first, second, and third-grade students from XXX class (the tutor of that class) visited us. It was striking to see the whole school involved in elaborating and decorating the kite. It was a big family. We even took the time from the religion teacher, and she got involved in making the kite and in the social and relational work of all the students in the school". (Researcher; field notes 3)

> "In the next class, we made some stilts and a wool ball with (Fictitious name) help. Some classmates did not bring materials to make them, but we lent them some materials". (Student 15; comment 150)

The researcher's intervention, a specialist in traditional games, in constructing these play objects was also crucial; hence, 13% of the comments (n = 85, 13%) were related to the researcher.

> "I felt very good and safe. I loved being with Lucho (researcher), doing workshops, and playing". (Document 53; Student comment 3)

> "I loved everything about the sock ball and kite we made. Thank you very much for coming to our school and for all the moments we laughed and had fun". (Student 07; comment 11)

Finally, other adult agents recorded few testimonies, as they did not have a decisive role in these formative actions (teacher: n = 21, 3%; family member: n = 16, 2%).

> "The Physical Education teacher came to our class to tell us that for the next day, we would have to bring two large empty cans and clothes that we do not use". (Student 32; comment 148)

> "I had a great time, and so did my classmates making the objects. The tutor also got very involved, which was a special, collaborative, and different experience for them. You truly feel they are learning and having fun simultaneously". (Student 13; comment 8)

When contrasting the results of the frequency areas during the creation activities of play objects, both within and outside the educational environment, a similarity in the highlighted variables in both phases of the process is evident.

3.3. Emotional Well-Being Inside and Outside the School Setting

The overall results, resulting from combining all ethnomotor comments from actions carried out inside and outside the school, confirmed that this experience mainly generated states of emotional well-being (p = 0.011) (M = 22.75, SD = 11.3) compared to distress (M = 8.75, SD = 5.56).

> "I also enjoyed crafting the ball as a group. I was surprised to see all the games and toys we could make with recycled materials during play sessions. In conclusion, I have learned that technology is unnecessary for play". (Student 11; comment 52)

> "That was also very good because, at home, we do not control the student's or the parent's work. Parents can let us call it, get carried away and do the work themselves, and the child only reaches out to me and brings me things. They may be present but not actively involved, and there is no other option at home. At school, you do it, or you do it". (Teacher 2; Comment 29)

When comparing where the actions took place, inside or outside the school, there was a tendency for a greater presence of comments within the school (n = 105) than outside the school (n = 79). No significant differences were observed ($p > 0.05$) between the registered comments of emotional well-being inside and outside the school and for comments of emotional distress. However, the trend showed more records of actions inside the school.

> "We are already here (school). On this day, we made stilts and balls. We had much fun. That same day, we were told that we would play with the toys made in class". (Student 28; comment 38)

> "I really liked the telephone my classmate built with two yoghurt cups". (Student 33; comment 119)

Finally, the number of comments originating from formative actions inside and outside the school, referring to different types of emotional well-being or distress, were studied (Figure 3). The results showed that both inside and outside the school, comments of well-being (psychoemotional and socioemotional) were higher ($p < 0.001$) than those of distress (psychoemotional and socioemotional). Although the frequency of emotional well-being versus distress was equal inside and outside the school ($p > 0.05$), trends were observed: (a) more comments of psychoemotional well-being inside the school (IN = 105 vs. OUT = 79); (b) more comments of psychoemotional distress inside the school (IN = 15 vs. OUT = 11); and (c) more comments of socioemotional distress inside the school (IN = 7 vs. OUT = 2).

> "When we made the ball in class, I was very surprised because I learned and did not know how to do it. I did it very carefully". (Student 33; comment 18)

> "I made a wool ball with the materials I brought from home. I was excited because I have never made a toy before". (Student 05; comment 62)

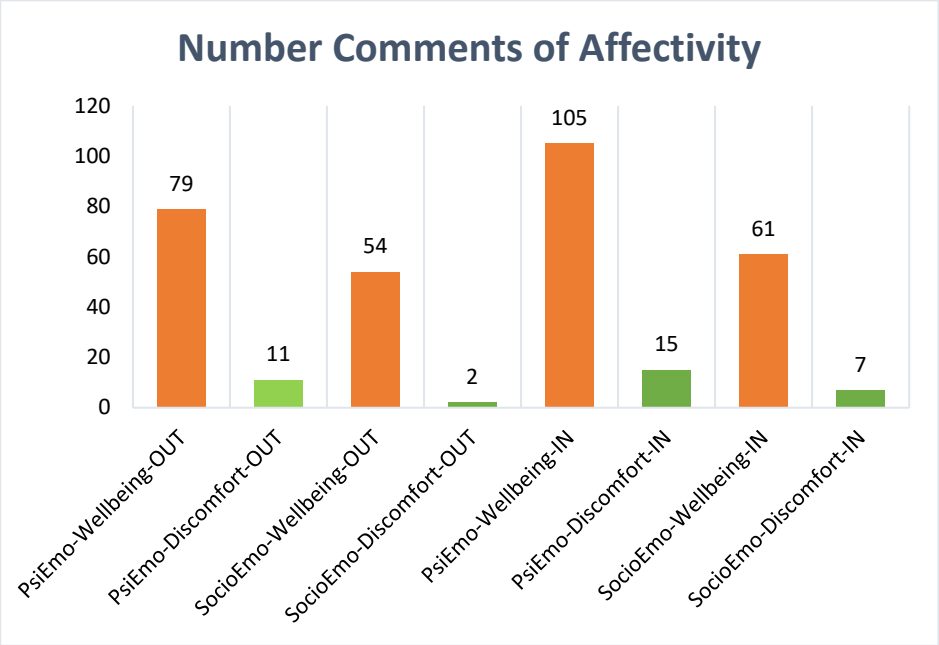


Figure 3. Emotional and relational well-being and discomfort inside and outside the school.

3.4. Classification Tree

The overall percentage correctly classified by the CRT (Figure 4) model was 81.8%. The first variable predicting the difference, like comments, corresponded to the students involved (external logic) (level 1: PT_LE) (improvement = 0.127). It was observed that when the records did not mention the students, the testimonies related to actions in the school increased their presence (node 1; n = 591; 88.5%). The distribution of proportions changed radically in the comments referring to the students (node 2). In this case, testimonies referring to actions performed outside the school exceeded, in double proportion (n = 194; 66.2%), those referring to actions in the school (n = 99; 33.8%).

At the second level of predictive strength (nodes 3, 4, 5, and 6), the following explanatory variable corresponded to the search for materials (improvement = 0.012). As expected, the presence of this variable (nodes 4 and 6) originated a greater number of comments on actions performed outside the school, especially when those testimonies also mentioned the family members involved in the process of sustainable learning (node 6: n = 95; 84.1%).

The experience of searching for objects with family members had a positive effect on the students' learning of physical and social sustainability, as evidenced by the presence of comments on these topics in the actions carried out at school without the presence of family members (n = 18; 15.9%).

Where the variable of material search did not exist, the most numerous comments were related to school actions (node 3) (improvement = 0.033). These comments also needed to consider the participation of educational agents (n = 547; 94.5%), indicating that students did not give the same prominence to the role of the teacher (formal educator agent) as to family members (informal educator agent).

At the third level of the tree (nodes 7 and 8), the variable with the most predictive strength was the elaboration of objects (improvement = 0.002). This variable only predicted the comments that did not imply the search for objects. In this case, testimonies mainly referred to actions carried out within the school (node 7: n = 258; 89.9%).

The fourth and final level of the tree (nodes 9 and 10) identified the last predictive variable as the procedure followed by educators (improvement = 0.002). This variable was associated with the material's variable elaboration. It was mainly present in actions within the school (node 9), where teachers used different didactic strategies (n = 172; 94.5%).

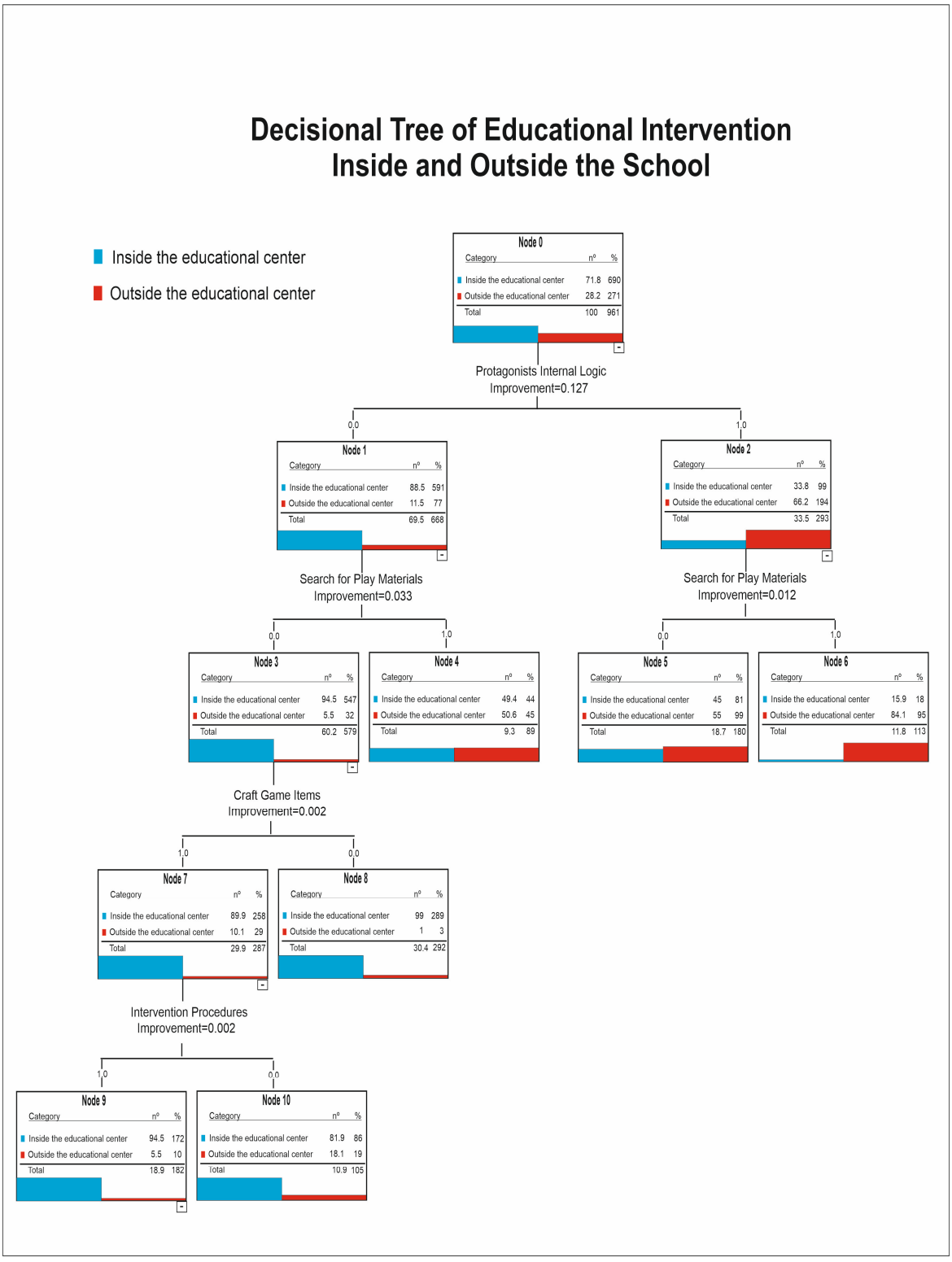


Figure 4. Decisional tree of educational intervention inside and outside the school.

Figure 5 presents the independent importance of variables in the model CRT. The variable Búsque_B had the highest importance score of 0.135, with a normalised importance of 100.0%. On the other hand, the PT_LE variable had an importance score of 0.127, with a normalised importance of 94.1%. These scores indicate that Búsque_B was the most influential variable in predicting inside/outside of the school, while Elabora_El was the least influential.

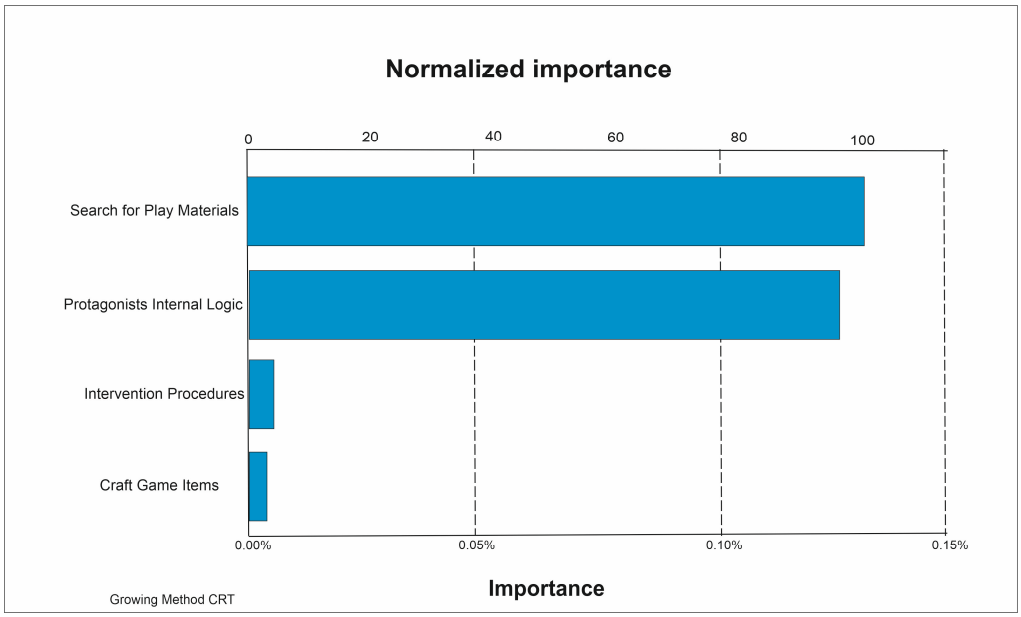


Figure 5. Normalized importance by model CTR variables.

4. Discussion

This study investigated the presence and predictive strength of ethnomotor variables in ludomotor actions with objects on physical and social sustainability education actions carried out through traditional games [69] with objects, both outside and inside schools in the Canary Islands. Likewise, the effects of this ethnomotor intervention on emotional well-being and distress were studied.

Numerous resolutions from state, regional, or international bodies, such as Agenda 2030, have established as priority objectives the development of sustainable learning and the relevant role of physical activity [18,70–72]. However, specific contributions addressing student-sustainable education through the performance of traditional games with various agents inside and outside the school environment are very scarce [2,46].

This study responds to this gap by providing scientific evidence of the effect of an original and innovative educational program aimed at fostering quality education oriented towards generating contextualized sustainable learning and psychosocial well-being.

4.1. Facilitating Sustainable Learning Contexts through Ethnomotricity: A Holistic Perspective

The findings of this study underscore the students' acquisition of fundamental knowledge regarding social and physical sustainability through the coherence of this ethnomotricity intervention unit. The integrated vision of ethnomotricity intervention demands consideration of the interaction and interdependence of the involved components: protagonists, spaces, and the use of objects provide meaning and trigger emotional well-being among students, thus fostering the appropriation of meaningful and purposeful learning.

Regarding the protagonists, the teachers, family members, and students constitute an indivisible whole, acting as active agents in the ethnomotricity formation of students.

> "When we used these wooden boards, not too thick or thin. We used a stapler and silicone [physical sustainability]. When I tried it, it did not fly, but I do not mind [physical well-being] because my uncle and I [family] are improving it so it can fly [social sustainability]". (Student 17; comment 49)

Regarding the spaces employed, it is essential to emphasize that each space utilized within and outside the school serves as a laboratory for learning. Thus, the study elevates the scenarios employed within the school (classroom, gymnasium, or pavilion) and those outside the school (home, domestic, and natural environment) to the classroom level. The social actions shared with family members, teachers, and other students, along with

actions performed individually in both internal and external spaces of the school, shape students' physical and social subjectivisation process, thus facilitating the acquisition of key competencies and skills for their formation as citizens.

> "My father and I [family] were the ones who came up with the idea of making the bottle cap toy. The first step was to get the bottle caps; the second step was to add weight with candle liquid [domestic objects]. Then we had to wait for it to dry to put on the football stickers [physical sustainability]". (Student 11; comment 36)

The ethnomotricity educational intervention provides coherence to the educational use of traditional games with objects from the Canary Islands. The phases comprising this experience have encouraged students to undertake actions outside the school (locating areas to obtain game materials and performing object elaboration, all with the guidance of family members) and inside the school (displaying objects, creating new materials, playing games with the constructed objects, and writing explanations about the experience, all with the guidance of educators). Thus, an attempt is made to reconcile the ethnomotricity nature of traditional sports games so that text and context, internal and external logic, teachers, students, and family members, as well as school and local environment and physical and social well-being, are intertwined as indispensable components of the process of subjectivisation of sustainable learning.

Thanks to the hierarchical segmentation technique or classification trees, the predictive strength of comments to identify actions performed within and outside the school has been identified. This statistical procedure identified three types of predictive variables: (a) the protagonists (agents: teachers, students, or family members), (b) the direct relationship with objects through two actions of object search and subsequent construction, and finally, (c) the "didactic" procedures employed by the teaching collective.

Numerous comments corresponded to testimonies that did not mention the protagonists involved in this educational process. This finding confirms the predictive strength of all subjectivisation or physical sustainability actions when comments mention the protagonists of this process; they mainly referred to actions carried out outside the school concerning family members.

The tree identifies the significant role of the variable of material search as an action specific to the external environment of the school. It also highlights the process of object elaboration as a predictive variable linked to didactic procedures. In this case, the majority of testimonies were recorded within the school, where there existed a wide variety of agents who shared their educational complicity (teachers, student classmates, and the teaching researcher specialist in TGs: (a) students experienced the phases of the activities and supported each other to carry them out. Their experiences and experiences strengthened the procedures for elaboration and implementation of the created objects; (b) the teaching staff supervised the development of the educational experience and fostered responsibility, creativity, and teamwork among students; and (c) the researcher-teacher supervised the activities of the educational intervention, energized the procedures for sustainable use of materials (physical sustainability), and energized the practical implementation of the objects created by the students, along with their classmates (social sustainability).

Simultaneously, the content analysis of comments, carried out in the phase of object elaboration both outside and inside the school, reflects this systemic view of all elements involved in the education of sustainable development learning. For example, the following testimony highlights this variety of components of ethnomotricity nature.

> "I made a cart at home [space outside the school] with my mother and my grandfather [family] [social sustainability]. I felt very good [positive emotion] because I screwed and unscrewed [psychosocial well-being related to the object]. I made it with wood, wheels, ropes, paint (...), [natural and domestic objects] with which my grandfather used to play when he was little [social subjectivisation, referring to social meanings of family members]". (Student 09; comment 14)

The findings of this section confirm the consistency of the fundamentals of motor praxeology about the development of the concept of ethnomotricity and its application from a socio-cultural and educational perspective [12,15,73–76]. The findings confirm that this experience has also supported the education of Sustainable Development Goal (SDG) 3, "Good Health and Well-being". This goal is directly related to emotional well-being, as it advocates for ensuring a healthy life and promoting well-being for people of all ages [18,70–72].

As observed in other studies, the educational potential aroused by the internal logic of the game (in this case, the use of play objects) and its relationship with local culture (in this case, through family members and educational agents at school) is confirmed [77,78]. Traditional games are a resource of utmost interest for promoting interpersonal relationships linked to the development of social sustainability [54].

4.2. Emotional Well-Being Inside and Outside School: Key Role of Sustainability

In the 1960s, Parlebas posited that affectivity was the linchpin of motor behaviours. Sixty years later, scientific advancements confirmed how sensory experiences shape the brain. Indeed, [79], in his work "Descartes' Error", asserts that understanding movement will lead to understanding emotion. In this study, comprehending emotions unveils the educational force of ethnomotricity educational experiences conducted through traditional games with objects.

The data obtained shed light on the impact of ethnomotricity intervention on emotional well-being.

The first finding confirms that all educational actions collectively fostered emotional well-being. Students mainly experienced positive emotions in ethnomotricity actions carried out inside and outside school. This finding aligns with previous research [4,54,80].

Secondly, it has been observed that there were no differences in the well-being generated by actions within the educational centre, focused on teachers and students, compared to those originating outside the school, led by family members. By turning external spaces and family members into educational agents, the experience allowed the restitution of the nature of non-formal learning that traditional games typically activate in everyday life environments. Young students experienced intense emotional well-being guided skilfully by family members, grandparents, or parents. In actions such as recognizing places to obtain game objects, elaborating playful objects and their conditioning, narratives referring to their relatives' anecdotes, stories, and experiences accompanied them. Students endowed the process of social subjectivisation with meaning and significance, thanks to the socio-emotional well-being that emerged from the interpersonal relationships they shared with their family members. Objects came to life, acquiring social meaning and significance through that relational affectivity that allowed for a better understanding of the signs and values of their local ludomotor culture [8,81].

Actions carried out within the school generated trends of more intense emotions than those outside the school. A greater number of educational agents (classmates, teachers, and the specialist teacher-researcher in TSG) favoured the process of sustainable development learning with great emotional intensity.

The third finding concerns the dual orientation of emotional well-being. The educational actions that activate greater well-being invite students to maintain an affective connection with objects (psychosocial well-being). Among the possible well-being actions, we highlighted the option of touching various objects with diverse shapes, textures, and colours, personalizing play materials with unique characteristics and testing them in ludomotor situations in front of other teachers. Thus, the physical nature of bodily techniques allowed students to recognize game objects as physical and inert artefacts and as elements bearing meanings and signs of local ludic-affective culture [8,12]. The social construction of emotions derived from the affective relationship with objects activated intense states of psychosocial well-being in students, giving meaning and sense to learning linked to physical sustainability. The number of comments showed a slightly higher trend

in testimonies recorded within the school than those originating outside the school. One possible interpretation relates to the wide variety of agents, strategies, and procedures used in formal education compared to non-formal scenarios.

> "After finishing the toy activity at home, we had a workshop in practical class to make a kite, a fabric ball, and some wooden toys. My classmates and I made the kite and did not enjoy it very much. What we liked the most was playing with it". (Student 29; comment 39)

The number of comments related to socio-emotional well-being [4] was also somewhat higher for actions carried out within the school compared to those occurring in external spaces with family members. Like psychosocial well-being, this superiority can be interpreted according to the variety of agents, strategies, and procedures used within educational centres.

This trend was also reproduced in comments directed at psychosocial and socio-emotional discomfort. A greater number of testimonies of negative emotions related to the relationship with objects were identified than those linked to interaction with others. Again, materials capture the educational force of sustainable development learning. By carrying out construction actions, displaying them to others, and using them amid a wide variety of agents, each person tests their bodily techniques [82]. In case of failure, the effects of discomfort are somewhat higher in school (due to a greater number of agents) than in the family environment, where there is a maximum affective security relationship with family members [83].

> "During previous sessions, each student explained the toy they made with their family to the group. Some students need help communicating in front of the group, not just in small groups. This activity boosted self-esteem, increased confidence in group settings, and received recognition from peers for the toy they made and their oral presentation and communication with their family". (Teacher 4; Comment 10)

> "Some of us noticed that the relationship with the grandfather or some family member was positive. With others, we observed an immense negative emotional burden. When the girl dropped the doll with disdain as if it did not matter". (Teacher 3; Comments 5 and 17)

These findings confirm that the experience has also supported the education of Sustainable Development Goal (SDG) 3, "Good Health and Well-being". This goal is directly related to emotional well-being, as it advocates for ensuring a healthy life and promoting well-being for people of all ages [18,70–72].

4.3. In Pursuit of Educational Effectiveness: Towards Optimization of Interaction among Educational Agents

Analyses conducted in seven primary education centres in the Canary Islands (Spain) have revealed the interdependent relationship of the various components (variables) involved in the different phases of ethnomotricity education.

The findings emphasize the actors' relevance, both within and outside the school environment. Furthermore, they highlight the activities of searching for and creating playful objects carried out by students with the collaboration of close family members outside of school and the activities of elaboration and application of these objects within the educational centre. "*The interactions of cultural life contribute to the generation of social cohesion, a sense of belonging, and a framework of social coexistence, all central elements in promoting a model of sustainable development*" [84].

Based on an ethnomotricity approach, this study reveals the dynamics that arise when students participate in educational activities of traditional games [5]. It has been possible to explore how these interactions unfold with various actors both within and outside the school environment and in formal and informal education contexts. All of this has contributed to educating the participants on social sustainability.

The meaningful learning that originates in students [85,86] manifests when a family member, such as a grandparent or parent, teaches the student about the search for and acquisition of materials and the transformation of these into playful objects outside the school environment. The observation of high participation and comments in the decision-making process evidences the relevance of this approach in non-formal contexts of primary education. Procedures in these comments reinforce teaching from an ethnomotricity perspective [10,12,87,88], considering the cultural and particular aspects that influence the sustainable pedagogical experience between the family member and the student.

The involvement of diverse actors in a sustainable education experience has had a positive impact on four Sustainable Development Goals (SDGs) [18,70]:

SDG 4: Quality Education: Inclusive and equitable quality education is strengthened when learners, teachers, and families collaborate. Using locally constructed playthings not only enriches learning but also makes education more accessible and relevant to learners, connecting them to their cultural and natural environment.

SDG 11: Sustainable Cities and Communities: Promoting the use of local and sustainable materials in educational activities helps students to appreciate and conserve their cultural and natural heritage. This practice can instil a sense of responsibility and pride in the community, fostering more sustainable cities and communities.

SDG 12: Responsible Production and Consumption: Students are educated about the importance of sustainability and responsible consumption by using recycled and local materials to create play items. This can lead to greater awareness and more sustainable practices in their daily lives.

SDG 15: Life on Land: Integrating elements of the immediate environment into educational activities can foster a deeper connection with nature, promoting the conservation of local ecosystems and biodiversity. This is essential for sustainable development and the preservation of biodiversity.

5. Conclusions

This study has explored an educational process of an ethnomotricity nature carried out through traditional games with objects and its impact on education for physical and social sustainability, as well as on the emotional well-being of students. It has emphasized the educational contribution of this intervention as a response to the scarcity of specific contributions addressing sustainable education through traditional games with various actors, both within and outside the school environment.

The results reveal that the students internalized fundamental social and physical sustainability knowledge through the coherent ethnomotricity intervention unit. This holistic vision requires considering the interaction and interdependence of the components involved, from the protagonists to the spaces and objects used, generating experiences of emotional well-being that favour the appropriation of meaningful and purposeful learning. It has been evidenced that actions inside and outside the school function as laboratories for sustainable development learning, where interaction with family members, teachers, and peers shapes students' physical and social subjectivisation processes. The coherence in the educational use of traditional games with objects has allowed for the reconciliation of its ethnomotricity nature, generating contextualized learning and fostering the formation of students as citizens of the 21st century.

Statistical analysis has identified the predictive strength of comments in identifying actions inside and outside the school, highlighting the importance students place in their relation with objects and the didactic procedures employed. Additionally, it has been noted that all educational actions, as a whole, favoured the emotional well-being of students, mainly through positive emotions. Interaction with objects has proven to be a key factor in activating psychosocial and socioemotional well-being inside and outside the school. However, there is a tendency towards more intense emotions within the school environment due to the greater diversity of agents and educational strategies in this context. Finally, the importance of optimizing the interaction between educational agents within and outside the

school environment to promote meaningful and sustainable learning has been highlighted. Collaboration between students, family members, and teachers has been fundamental to the success of this intervention, highlighting the relevance of considering the cultural and particular aspects that influence sustainable pedagogical experience.

Although this study has yielded promising results, future research needs to address some limitations. It is necessary to consider the generalization of findings, as the study was conducted in the specific context of the Canary Islands. Furthermore, the study needed to adequately address the issues of validity and reliability, which should be a focus of future investigations. Additionally, research with a control group could be conducted to strengthen the attribution of effects observed exclusively by an ethnomotricity intervention. For future research, longitudinal studies evaluating the long-term impact of these interventions on sustainable development and the emotional well-being of students are suggested. Furthermore, it would be beneficial to explore the implementation of this approach in different cultural and geographical contexts to better understand its effectiveness and adaptability to the education of students' physical and social subjectivisation.

In summary, this research provides scientific evidence of a significant contribution to the advancement of the Sustainable Development Goals in accordance with the 2030 Agenda [18,70].

Author Contributions: Conceptualization, P.L.-B. and R.L.-P.; methodology, P.L.-B., M.P. and R.L.-P.; software, M.P. formal analysis, M.P.; investigation, P.L.-B., M.P. and R.L.-P.; resources, data curation, M.P.; writing: original draft preparation, P.L.-B. and R.L.-P.; writing: review and editing, P.L.-B., M.P. and R.L.-P.; visualization, P.L.-B., M.P. and R.L.-P.; supervision, P.L.-B., M.P.; project administration, P.L.-B.; funding acquisition, P.L.-B. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the National Institute of Physical Education of Catalonia (INEFC).

Institutional Review Board Statement: The study was reviewed and approved by the Ethics Committee for Clinical Research of the Catalan Sports Council [06/2019/CEICEGG].

Informed Consent Statement: Written informed consent has been obtained from the patients to publish this paper.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Acknowledgments: This work was supported by the Institut Nacional d'Educació Física de Catalunya (INEFC) of the Generalitat de Catalunya (Catalonia, Spain).

Conflicts of Interest: The authors declare that this educational intervention and research was conducted in the absence of any commercial or financial relationships that could give rise to the interpretation of a possible conflict of interest.

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