

# *Outdoor Sport-based activities and Educational Sustainability: Learning Processes, Social Relationships, and Psychophysical Well-Being*

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## *Abstract*

Outdoor sport-based activities can promote sustainable education and active learning in primary schools, supporting motor and cognitive development, participation, and well-being. However, evidence is limited on the role of low-specialization, adaptable outdoor activities in learning, relationships, and perceived well-being. This study examined a year-long outdoor intervention based on bocce in a natural school setting in Southern Italy. Participants were 20 children aged 9-10, including two with intellectual disabilities. Data were collected through structured and semi-structured observations (1-3 checklist, teacher notes) and repeated student questionnaires. Changes across baseline, midpoint, and follow-up were analyzed in learning processes, inclusion, socio-relational benefits, and well-being/motivation. Results showed progressive improvements in all dimensions, with early gains in learning and motivation, stable high inclusion, and gradual socio-relational growth. Bocce appears feasible, sustainable, and inclusive. Further studies with larger samples and comparative designs are needed.

*Keywords:* Outdoor Education; Inclusive Education; Sport and Physical activity.

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## **Introduction**

Outdoor education is now recognized as a pedagogical approach capable of enhancing learning through direct experience and interaction with the external environment (Abdullah et al., 2018). In this perspective, the open space is not just an alternative place to the classroom. It becomes an

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educational context that stimulates curiosity, attention and involvement (Becker et al., 2017). Learning, in fact, is consolidated even when students observe, experiment and deal with real situations, often less predictable than in formal contexts. This type of experience can support the integrated development of physical, cognitive, social and emotional skills, making educational processes more complete and meaningful (Quibell et al., 2017).

The outdoor environment requires adaptation, quick decisions and the ability to orient oneself in space. Students are confronted with concrete variables, such as distances, obstacles, surfaces and action times. In this way, learning becomes situated, i.e. linked to the context in which it takes place. Body and mind work together. Relationships also play a central role, because many activities take place in groups and involve discussion, cooperation and management of social dynamics. This approach allows you to develop deeper skills, because they are not limited to theory but are built in experience (Remmen, & Iversen, 2023).

In this context, outdoor sport-based activities are placed, understood as structured motor activities inspired by sports disciplines, carried out in outdoor contexts and oriented towards educational and inclusive purposes, rather than competitive objectives (Susanto et al., 2024). In primary school, these activities represent a concrete resource (Newman et al., 2012). They allow you to integrate movement, learning and participation. It's not just about "playing sports". It is a matter of living an educational experience in which the motor gesture also becomes an opportunity for relationships, behavior regulation and the construction of shared meanings (Helleman et al., 2023).

When outdoor sports activity is proposed intentionally, the benefits are not limited to the development of basic skills such as balance, coordination and spatial-temporal perception. An improvement in social skills may also emerge. Students learn to respect rules and turns, to collaborate and to manage confrontation with others. In these contexts, participation tends to increase because the environment is less rigid and more stimulating than in closed space. This can foster a more inclusive and motivating educational climate, in which each student finds a role and a possibility of expression (Armour, & Sandford, 2013).

A further important element concerns psychophysical well-being. Outdoor experiences can reduce tension and stress, supporting a more positive mood and a greater willingness to learn (Deschamps et al., 2022). Well-being is not a marginal aspect, but a factor that influences attention, motivation and the quality of interactions. For this reason, the emotional and relational dimension must be considered an integral part of educational

processes, especially in primary school, where the sense of security and belonging directly affects involvement (Mosca et al., 2024).

Outdoor sport-based activities can also be read as tools consistent with educational sustainability. Educating in a sustainable way means building contexts that promote accessibility, participation and inclusion. It also means enhancing the environment and the territory as educational resources (Walshe et al., 2023). The outdoor experience, in this sense, is not just about “taking lessons outside”. It concerns the idea of school as a living, open space capable of connecting learning, relationships and responsibilities. Outdoor motor activities of a sporting nature can strengthen this vision, because they promote cooperative practices and a sense of belonging, transforming the experience into an opportunity for individual and collective growth (Kiviranta et al., 2024).

In light of these considerations, the present study analyzes a sport-based outdoor activity in primary school based on the game of Bocce. The choice of Bocce derives from the characteristics of discipline, as it is able to promote discipline, flexibility and adaptability. It does not require complex technical skills, but stimulates precision, coordination and control of gesture (Toohill, & Entwistle, 1999). At the same time, it requires planning and reading the situation, because every launch involves a decision. Bocce also fosters ongoing peer interactions. Children observe, discuss, wait for their turn and share strategies. This makes the experience particularly suitable for supporting participation and social relationships (Erol et al., 2024).

Inclusion is also a central aspect. The game of Bocce allows concrete adaptations, both in the rules and in the methods of execution. This allows for more equal participation, even in the presence of specific educational needs or motor difficulties (Andajani et al., 2023). The group, in these conditions, is not just a set of individuals playing, but becomes a context in which cooperation, mutual respect and recognition of differences are experienced. In this sense, Bocce can represent an effective example of outdoor motor activity of a sporting nature aimed at building well-being and sociality, as well as the development of skills.

Despite the growing interest in outdoor education and experiential learning, the literature still shows limited attention to the specific effects of outdoor sport-based activities in primary school, especially in relation to the quality of social relationships and perceived psychophysical well-being. In addition, the contributions of activities with low technical specialization but high organizational flexibility, such as bocce, in educational paths oriented towards participation and inclusion are still little explored. Starting from this gap, the present study aims to analyze the educational potential of an outdoor sport-based activity in primary school, considering the game of bocce as a

case study. In particular, the learning processes activated by the experience (both on a motor and strategic level), the level of inclusion and participation of the class group, the socio-relational benefits that emerged in the dynamics between peers and the wellbeing and motivation perceived by the students during the course will be evaluated.

## **Methods**

### *Study design*

The study was conducted through an observational longitudinal design, implemented in a school context in southern Italy. The project was integrated into the normal activities of the primary school and aimed to explore the educational potential of outdoor sport-based activities, in relation to learning processes, the quality of social relationships and the psychophysical wellbeing perceived by the pupils.

The course developed over an entire school year, with two meetings a week lasting about 60 minutes each. The activities took place mainly in an outdoor environment, using both the outdoor spaces of the school and, at sometimes, an outdoor bowling alley. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Prior to the start of the project, parents/legal guardians received clear information on the purposes and methods of operation and provided written informed consent to participate.

### *Participants*

20 pupils (aged between 9 and 10) belonging to a primary school class located in Southern Italy participated in the study. The class group was heterogeneous in terms of individual characteristics, levels of ability and methods of participation in school activities. Within the sample there were also two pupils with intellectual disabilities, inserted in the classroom context with the support of the support teacher.

Pupils who met the following criteria were included in the study: belonging to the class involved in the project; age between 9 and 10 years; participation in normal school activities; possibility of carrying out motor activities in an outdoor environment in safe conditions, also with any didactic adaptations or educational supports. Pupils with disabilities were also included, as the aim of the study was to observe participation and relational

dynamics in an authentically inclusive context. Pupils who, during the period of the intervention, had medical conditions or temporary limitations such as to prevent participation in outdoor activities in a safe way (e.g. injuries or specific indications of unfitness) were excluded. Cases of prolonged absence that did not allow continuous participation in the phases envisaged by the project were also excluded.

### *Procedures*

The study procedures have been developed to ensure a realistic and sustainable implementation in the school context, without interrupting the classroom routine. The activities were carried out in an outdoor environment, during moments dedicated to the motor and educational proposals provided for in the program. The class participated as a natural group, avoiding artificial subdivisions and maintaining an authentic context.

The intervention was conducted through a collaboration between three key figures: the curriculum teacher, the support teacher and an instructor from the Italian Bocce Federation. This organization has made it possible to integrate educational skills and technical-sports skills, keeping the activity accessible and consistent with the needs of the class group. The presence of the support teacher also favored the continuous participation of pupils with intellectual disabilities, especially in moments of greater complexity.

During the course of the activities, particular attention was paid to safety, space management and clarity of deliveries. Proposals were presented with simple indications, often accompanied by practical demonstrations, to facilitate understanding and reduce the risk of exclusion. When necessary, adaptations were introduced in the throwing distance, the duration of the tasks or the mode of execution, keeping the educational objective of the experience unchanged.

The procedures provided for a gradual progression, with a controlled increase in difficulty and with recurring moments of feedback. After each session, a few minutes were left for a brief collective restitution, useful for bringing out strategies, difficulties and ways of collaborating. This moment, simple but constant, helped the children to give meaning to the experience and to recognize the value of group work.

### *Sport-based intervention*

The intervention was designed as a path of outdoor sport-based activities based on the game of bowls, selected for its simplicity, its flexibility and the possibility of involving all pupils in an active way. The activities were built

to progressively develop motor and cognitive skills, but also social skills related to participation, cooperation and respect for rules. The work was organised in three phases: an initial phase, an intermediate phase and a consolidation phase. This scan allowed the children to acquire skills gradually. It also allowed us to observe how participation, social interactions and cooperation skills changed over time.

### *Phase 1 – Startup and familiarization: getting to know the game and the space*

In this first phase, the main goal was to make the children feel “comfortable” with the activity. A lot of work has been done on discovery and mutual listening.

The exercise plan included:

1. Exploration of the material: grip of the ball, posture, balance and control of the gesture, with guided free trials.
2. Short-range precision throws: Throws towards a large target area, with attention to direction and not force.
3. Simplified paths: Throws with small constraints (e.g. “from behind a line” or “with a firm step”) to strengthen coordination.
4. Rotation and basic rules: mini-games with short times, to introduce respect for the turn, waiting and error management.

At this stage, the children began to understand that play is not just about throwing. It also matters how you are in the group. What matters is the way you speak and listen.

### *Phase 2 – Development and increasing complexity: strategies and cooperation*

In the intermediate phase, the activity has become more challenging. The children began to reason before acting and learned to confront each other in a more intentional way.

The exercise plan included:

1. Medium-distance throws with a specific objective: to bring the ball closer to the cue ball with greater precision, working on trajectory and intensity.
2. Problem solving tasks: small game situations in which the group had to choose the strategy (“is it better to approach or move the opponent?”).
3. Pair play: two children per team with alternating roles, so as to stimulate collaboration and shared decision-making.
4. Progressive constraints: for example, changing the launch point, introducing natural obstacles or demarcating play areas to increase the need for control.

Pupils with disabilities also participated fully, thanks to simple but effective adaptations, such as shorter distances, longer times or support in understanding the assignments. In the classroom this makes the difference. And his teammates perceive it immediately.

### *Phase 3 – Consolidation and transfer: new contexts and autonomy*

The last phase was designed to consolidate what has been learned and verify the ability to adapt to a more structured environment. The activities also took place in an outdoor bowling alley, offering a different context than school spaces.

The exercise plan included:

1. Simplified matches with comprehensive rules: with defined times, scoring and team rotation.
2. Co-op challenges: Group goals (e.g., achieving a number of “useful” launches without focusing only on the final result).
3. Role rotation: children called upon to manage small organizational tasks (scoring, recalling the turn, checking the lines).
4. Moments of final reflection: short guided discussion on what worked, what was difficult and how the group collaborated.

In this phase, the relational dimension emerged more clearly. Some children showed more autonomy. Others needed support. In both cases, the game functioned as a real educational space, in which participation and well-being could be observed in a concrete way.

## **Measures**

To ensure a systematic survey consistent with the objectives of the study, data collection was conducted through structured and semi-structured observation tools, selected to be sustainable in the school context and understandable for children. The focus was not only on participation and inclusive dynamics, but also on the learning processes activated by outdoor sport-based activities, as well as motivation, perceived well-being and the quality of peer relationships.

The measures made it possible to monitor four main dimensions: learning processes (detected through the observational rubric), inclusion (real participation and quality of integration in the group), socio-relational benefits (cooperation, functional communication, respect for turns and shared rules) and well-being/motivation (enthusiasm, persistence and

subjective perception of experience), in line with the principles of inclusive education and learning in outdoor context (Kelly et al., 2022).

The observations were collected during the sessions and used to describe the trend of the variables over time, while maintaining attention to individual differences and group dynamics. The information from the rubric, check-list and diary were read in an integrated way, so as to obtain a more complete understanding of the processes activated by outdoor sport-based activities, while the questionnaires provided useful support to interpret the experience from the students' point of view.

### *Observational Learning Rubric*

Learning was detected through a qualitative observational rubric, compiled by the adults involved in the activities (curriculum teacher, support teacher and federal instructor). The rubric has been constructed to document, in a descriptive and non-numerical way, the progressive changes in the skills developed during the game of bowls. Each dimension was evaluated through three interpretative levels (Emerging, Developing, Consolidated), based on observable evidence shared among observers. In particular, the column considered: the understanding of rules and instructions (e.g. ability to respect turns and procedures without continuous reminders), motor control of the gesture (stability, intentionality of the throw, force adjustment), the use of game strategies (conscious choice of the action, planning, adaptation after a mistake) and autonomy in the task (ability to act with increasing independence and to keep attention on the goal). This tool made it possible to describe learning as a process, observing how children gradually moved from a more spontaneous execution to a more conscious and regulated behavior.

### *Observational behavioral checklist*

Alongside the learning rubric, an observational check-list, compiled by the adults involved in the project, was used to monitor behavioral and relational aspects that emerged during the sessions. The check-list was organized into observable indicators related to: peer cooperation (mutual support, spontaneous help, shared strategies), participation and involvement (attention to the task, initiative, continuity in the activity), respect for rules and shifts (waiting for one's turn, compliance with deliveries, self-control) and inclusive dynamics (integration into the group, absence of exclusion, participation of pupils with disabilities). To make the observational process

clearer and more consistent, the indicators were accompanied by essential descriptors that helped to uniformly recognize relevant behaviors.

### *Teacher's Observational Diary*

An observational diary compiled by the teacher was also used, aimed at collecting significant episodes and situations that emerged during the activities that required a more narrative description. The diary made it possible to record moments of spontaneous collaboration, relational difficulties, peer inclusion strategies, emotional reactions and changes in the way the children approached play. This qualitative material was particularly useful for interpreting the observational data, because it returned the “how” and “why” of some dynamics that are not always visible through more structured instruments.

### *Questionnaire for pupils*

To integrate the observation of adults with the point of view of children, a short questionnaire with simple and age-appropriate language was administered. The tool detected the subjective perception of the experience in terms of fun and motivation, perception of participation, perception of inclusion in the group and willingness to repeat the activity. The questionnaire was administered at three times of the school year: at the beginning (T0), at the middle of the course (T1) and at the end (T2), so as to capture any changes in the perception of the experience over time.

## **Statistical analysis**

The data were analyzed with a descriptive and inferential approach, with the aim of exploring the trend of the observed variables over time and verifying any changes between the three moments of detection (T0, T1, T2). In a first phase, descriptive statistics were calculated, reporting frequencies and percentages of the observed levels (1-3) and, when appropriate, averages of the scores to summarize the trend of the different dimensions considered. This choice was appropriate to the nature of the data, mainly ordinal, and to the small number of the sample. Given the repeated measures structure, the Friedman test was used to evaluate the differences between the three time-points in the variables detected through checklists and questionnaires. When the overall analysis was significant, post-hoc pairwise comparisons (T0 vs T1, T1 vs T2, T0 vs T2) were performed by Wilcoxon paired sample tests,

applying a correction for multiple comparisons (Bonferroni) in order to reduce the risk of type I error. For each comparison, the size of the effect was also estimated, calculating the  $r$  index ( $r = Z/\sqrt{N}$ ), so as to interpret the observed changes not only in terms of statistical significance but also in terms of practical relevance. In relation to the dimensions most related to participation and inclusion, a specific descriptive analysis was also conducted for pupils with disabilities, useful for observing the evolution of the levels of involvement and integration in the group; Given the small number of this subgroup, these results have been interpreted with caution and presented mainly as a descriptive support. The qualitative information collected through observational diary was used to integrate and contextualize the quantitative results, through a thematic reading oriented to the identification of recurring episodes related to cooperation, inclusive dynamics, play strategies and emotional well-being. The integration between observational data and pupils' perceptions allowed a more complete reading of the educational experience, avoiding interpretations based on a single indicator. The level of statistical significance was set at  $p < .05$  and analyses were conducted using SPSS statistical software (version 30.0 (2024) - International Business Machines Corporation, Armonk, New York (USA)).

## Results

The four dimensions were assessed at three time points (T0 = initiation, T1 = intermediate, T2 = consolidation). Scores generally increased over time. By the final phase, higher ratings were more frequent, and lower ratings were already less common at T1. Differences across the three measurements were tested with the Friedman test. Where needed, pairwise comparisons were explored through Wilcoxon tests, applying a Bonferroni correction.

Learning processes showed a significant change across time. The strongest shift appeared early, between T0 and T1, while the consolidation phase mainly reflected stability rather than further growth. Pairwise results were most evident when baseline was used as the reference. Inclusion displayed the same overall structure: a significant time effect, clearer improvements compared with T0, and smaller changes between T1 and T2. For well-being and motivation, the pattern was again consistent, with a significant increase already visible at T1 and then maintained through consolidation. Socio-relational benefits moved upward as well, but the change did not reach statistical significance, and pairwise comparisons did not identify reliable differences. This suggests a slower and less stable development of peer dynamics within the class group. Full statistical details are reported in Table 1.

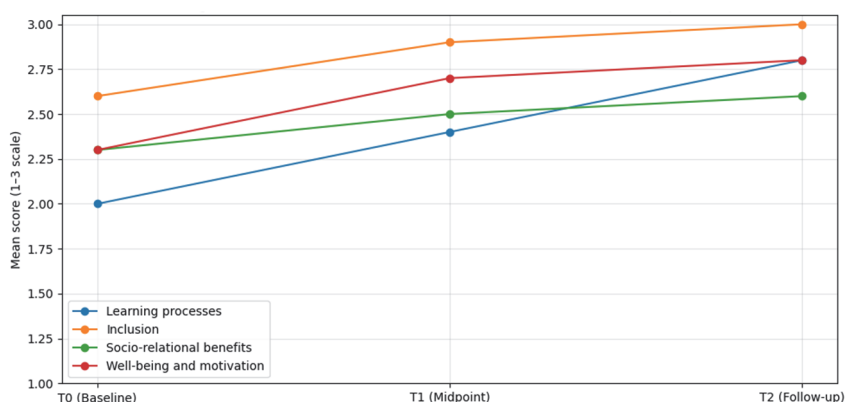
Table 1 shows significant differences between the three survey points for learning processes, inclusion and well-being/motivation, showing a progressive improvement along the way, with more marked effects between T0 and T2. Post-hoc comparisons indicate that the most consistent changes are concentrated mainly in the first half of the intervention (T0–T1), with a subsequent stabilization. The socio-relational benefits show a positive trend, but do not reach statistical significance, suggesting a more gradual evolution of relational dynamics in the class group.

*Table 1 - Nonparametric test results for repeated measurements*

Variable	Friedman $\chi^2(2)$	p	Post-hoc Wilcoxon T0 vs T1 (Z; p; r)	Post-hoc Wilcoxon T1 vs T2 (Z; p; r)	Post-hoc Wilcoxon T0 vs T2 (Z; p; r)
Learning processes	13.84	.001	- 2.78; .005; .44	- 1.92; .055; .30	- 3.32; .001; .53
Inclusion	10.26	.006	- 2.45; .014; .39	- 1.21; .226; .19	- 2.89; .004; .46
Socio-relational benefits	5.44	.066	- 1.62; .105; .26	- 0.88; .378; .14	- 1.84; .066; .29
Wellbeing and motivation	9.71	.008	- 2.58; .010; .41	- 1.34; .180; .21	- 2.94; .003; .47

Note. T0 = beginning; T1 = intermediate phase; T2 = consolidation. Post-hoc comparisons are reported as Z; p; r, with  $r = Z/\sqrt{N}$ . P-values can be interpreted with Bonferroni's correction for multiple comparisons (corrected  $\alpha = .05/3 = .017$ ).

After examining the overall data, Fig. 1 summarizes the trend of the four dimensions observed in the three moments of the course (T0 = beginning, T1 = intermediate phase, T2 = consolidation), highlighting how the average levels have changed during the school year.



*Fig. 1 - Trend of the average scores of the variables observed in the three moments of survey*

Fig. 1 shows that all four dimensions improve over time: learning processes, inclusion, socio-relational benefits, and well-being/motivation. Learning processes change the most. From the first to the third measurement point the increase is steady, which is consistent with a gradual consolidation of the skills required by the task and a better handling of the game rules. Inclusion starts high and stays high. By the last phase it is essentially stable at the upper level, confirming that the activity is accessible and that small, heterogeneous groups worked well in practice. Socio-relational benefits follow a different pace. They improve, but more slowly, suggesting that cooperative dynamics and peer interaction quality may need longer exposure before they become fully established. Well-being and motivation rise earlier, already at midpoint, and remain high at follow-up. This indicates positive emotional involvement and participation that becomes more consistent across time. Taken together, the figure supports the idea that integrating outdoor bocce-based activities into the school routine can create a meaningful educational experience, with benefits for learning, inclusion, participation, and relationships among peers.

## Discussions

The aim of the present study was to explore the effects of outdoor sport-based activities, based on the game of bowls, in primary school, observing in particular how this experience could affect the learning processes, inclusion, socio-relational benefits and well-being/motivation of pupils over an entire school year. The intent was not only to describe a motor activity in an outdoor environment, but to understand its educational potential as a sustainable practice that can be replicated in the school context.

The results indicate a positive and progressive trend in all dimensions considered. The most evident improvement concerns the learning processes, which increase steadily from T0 to T2. This suggests that, over time, children have not only “played better”, but have developed a greater ability to read the situation, respect constraints and rules, and adapt their behavior in a more conscious way. It is a change that appears gradual, but clear. The outdoor environment, with its variables and its small unforeseen events, seems to have favored situated learning, closer to reality and less tied to rigid schemes (Dean, & Gallifa, 2025). In this sense, the game of bocce has proved to be a useful context for training attention, precision, planning and self-control, without transforming the activity into a technical performance for its own sake.

Inclusion also shows a particularly interesting trend. Initial levels are already high and tend to plateau towards the top in the final stage. This suggests that the experience did not "create" inclusion out of thin air, but functioned as an educational space capable of maintaining and strengthening it over time (Di Palma et al., 2025; Natalini, 2025). This is an important aspect, especially because the class group included pupils with intellectual disabilities. In this context, bocce seems to offer a concrete advantage in terms of understandable rules, modular motor engagement and adaptability of the practice that allows simple adjustments without altering the meaning of the game (Montesano et al., 2013). Participation, therefore, does not depend on performance, but on the possibility of being there, of having a turn, of contributing and of being recognized by the group (Pan, & Davis, 2015; Aidar et al., 2022).

The socio-relational benefits increase, but at a slower pace. This is a plausible outcome as social skills do not always grow linearly and often take time to stabilize. Collaborating, managing a conflict, waiting for the turn or accepting the mistake are not skills that are consolidated in a few weeks. They require repetition and trust (Степанюк et al., 2023). In this study, the progressive growth of the higher levels suggests that the group has learned to "stay in the game" in a more mature way, with increasingly functional and cooperative interactions. It is possible that the simple structure of bowls, based on shifts, observation and respect for shared rules, has created the conditions to exercise these skills in a natural way, without forcing.

Another important result concerns well-being and motivation, which increase markedly already in the intermediate phase and then remain at high levels until consolidation. This trend seems to indicate an early effect of the experience, probably linked to the fact that outdoor activity breaks the routine, makes learning more dynamic and allows children to move in a less constrained space than the classroom (Latino et al., 2023). In addition, the playful dimension of the game of bowls may have supported motivation without generating pressure. The children were able to experiment, make mistakes and try again. And this, in primary school, is often a decisive factor in maintaining positive involvement (Köroğlu, 2025).

Read together, the results support the idea that sport-based activities in an outdoor context, if well structured and integrated into teaching, can represent an effective and sustainable educational model. It is not just a matter of "moving" outdoors. The point is that movement becomes an educational language that allows you to learn through experience, to build shared rules and to recognize the group as a resource. In this sense, the choice of an activity with a low technical specialization such as bocce appears consistent with the objective of ensuring accessibility and continuity, preventing the

complexity of the sporting gesture from becoming a barrier to participation (Baan et al., 2023).

Of course, the study has some limitations that must be considered carefully. The sample is small and the absence of a control group does not allow the changes observed to be causally attributed exclusively to the intervention. In addition, the measurements used are based on ordinal scales and observations conducted in a real context, with an inevitable component of interpretation. However, the continuity of the path throughout the school year and the integration between structured tools and descriptive observations represent a strength, because they allow us to grasp changes not as isolated events, but as educational processes that are consolidated over time.

In the future, future research could expand the sample, include a comparison between classes or between different types of outdoor sport-based activities, and use more sensitive tools to detect even more precisely the evolution of social skills and learning. Deepening individual differences, for example related to gender, initial levels of competence, specific educational needs or related to body image (Latino et al., 2019), could also offer useful indications to further personalize the intervention. Despite these aspects, the results obtained suggest that the game of bocce, proposed in a continuous and inclusive way, can represent a concrete resource to promote learning, participation and well-being in primary school, while strengthening the quality of peer relationships.

## **Conclusion**

This study explored the educational potential of outdoor sport-based activities in primary school, using the game of bocce as a structured and inclusive experience developed over an entire school year. The aim was to understand if and how this proposal could support learning processes, participation, the quality of social relationships and the perceived well-being of pupils. The descriptive results show a progressive improvement in all dimensions observed, with a particularly evident increase in learning processes and well-being/motivation, already in the intermediate phase and then consolidated in the final phase. Inclusion has remained at high levels from the beginning and has reached a full stabilization in consolidation, confirming the consistency of the activity with an accessible and participatory approach. The socio-relational benefits, while showing a more gradual evolution, nevertheless highlight a strengthening of cooperative dynamics and peer interactions over time. Overall, experience suggests that

activities with low technical specialization and high organizational flexibility, such as bocce, can represent a sustainable and replicable model for integrating motor learning, relational dimension and well-being in outdoor contexts. Further studies with larger samples, comparative designs and more sensitive assessment tools remain necessary, but the results obtained offer useful indications to enhance outdoor educational practices capable of combining movement, inclusion and quality of the school experience.

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