Pedagogical resources
AQUATIC ACTIVITIES

LEARNING TO SWIM BY PLAYING: A MULTIDIMENSIONAL FOCUS OF AQUATIC COMPETENCE

Juan Antonio Moreno Murcia & Rita Fonseca Pinto

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LEARNING TO SWIM BY PLAYING: A MULTIDIMENSIONAL FOCUS OF AQUATIC COMPETENCE

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Play is a natural and effective way to learn in the water. Through well-designed games, children develop skills, safety and confidence, while enjoying themselves and actively engaging in their aquatic learning.

Introduction

The aquatic environment offers children a unique opportunity for comprehensive learning for physical, cognitive, social and emotional development in childhood. Thus, teaching in the aquatic environment goes beyond mere technical instruction in swimming, incorporating a multidimensional approach aimed at the comprehensive development of the student, using play as a pedagogical tool.

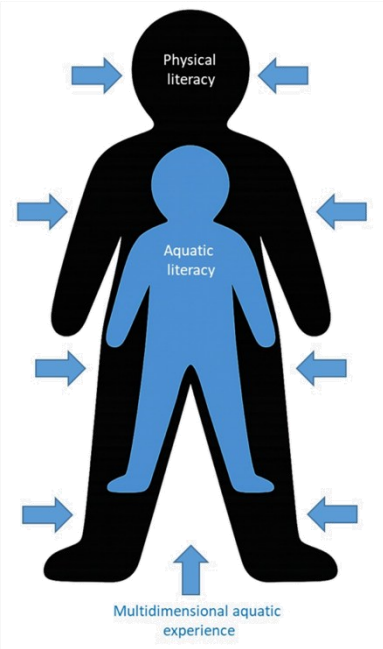
According to Fonseca-Pinto and Moreno-Murcia (2023), the development of proficient aquatic skills encompasses three dimensions: aquatic literacy, drowning prevention and environmental education, which correspond to the areas of know-how (various practical skills), knowledge and know-how/being (attitudes and values). In this way, "learning to swim, from a multidimensional perspective, is conceived as a social necessity" linked to the comprehensive development of students, safety in aquatic environments, and connection with their diversity (real and artificial).

However, designing effective aquatic games requires intentional consideration of a variety of pedagogical aspects. Water teaching cannot be left to chance; rather, it is the professional's responsibility to plan activities with pedagogical, social and human meaning, tailored to the characteristics, rhythms and interests of the learners. This document analyses the fundamental pillars for the design of games in the aquatic environment, following the multidimensional approach proposed by Fonseca-Pinto and Moreno-Murcia (2023) and based on the Comprehensive Aquatic Method.

Comprehensive benefits: empirical and multidimensional evidence

The basis for water play as a teaching method is particularly supported by the concepts of aquatic literacy, competence and safety, all of which are integrated into the Physical Literacy framework (Haga et al., 2025), Figure 1. This approach encompasses the joint development of technical, cognitive and affective skills necessary for safe, efficient and meaningful development in aquatic environments (de Martelaer, 2023). In short, it is about *learning for the whole and from the whole*, understanding that the dimensions cannot be separated.

Figure 1. Aquatic literacy as an integral part of physical literacy.



What do we mean by this? **That playing in the aquatic environment is not only about physical activity or learning specific techniques**, but also **symbolically representing** experiences related to the environment: fauna, flora, the diversity of aquatic spaces or their physical characteristics, as well as **social bonds** (the self with others) and the emotional world. This global experience promotes the integrated development of three areas of knowledge:

- **Know-how**: motor, technical and practical skills.
- **Knowledge**: understanding of the environment, conceptual knowledge and decision-making.
- **Knowing how to be and behave**: values, attitudes, emotional regulation and socialisation

Contemporary pedagogical approaches, especially non-linear models, advocate for **task variability and problem-solving as the cornerstones of the learning process** (Invernizzi et al., 2021). Several studies show that playful methods generate greater motivation, active participation and confidence in the water among learners, having a positive impact on the acquisition of motor skills compared to methodologies that do not use them (Mekkaoui et al.,

2022; Peterson et al., 2024). Recent literature also highlights that the integration of play can facilitate incidental (unintentional) learning mechanisms and the transfer of skills to real-life situations, especially those associated with drowning prevention (American Red Cross, 2022; Ortiz et al., 2025; Swim England, 2019).

From a **motor skills** perspective, studies with infants who participated in play-based programmes showed substantial improvements in floating, propulsion and safe movement. One example is the work of Arhesa and Badriah (2021), where 46% of participants achieved higher skill levels after an eight-week play programme, demonstrating the effectiveness of this approach over repetitive instruction.

From a **cognitive and scientific** perspective, water play facilitates the understanding of physical principles such as buoyancy, flow and density. De Martelaer (2023) argues that structured games and exploration activities, such as sinking and floating experiments, are particularly effective in the acquisition of scientific knowledge at an early age.

On a **socio-emotional level**, the playful dimension promotes enjoyment, intrinsic motivation and social interaction, factors that are essential for long-term adherence to aquatic activities. Mekkaoui et al. (2022) highlight that using games promotes self-esteem and cooperation, aspects that have repeatedly been identified as key to the comprehensive development of the individual.

For its part, the 10-week AquOTic controlled trial (Peterson et al., 2024) showed that structured, play-based programmes aimed at neurodiverse children significantly increased their aquatic skills, as reflected in higher scores on the WOTA (Water Orientation Test Alyn). These results suggest that play acts as a powerful facilitator of inclusion, allowing the adaptation of proposals to different levels of execution.

Also, studies on **drowning prevention** indicate that 12 to 18 playful lessons in infants increase self-rescue capacity, respiratory control, and appropriate reactions in case of accidental falls into water (American Red Cross, 2022). The playful approach, which assumes play as an intentional strategy, allows real situations to be simulated in a safe (physically and emotionally), respectful and supervised environment.

Objectives of aquatic play

As indicated in Moreno-Murcia (2023), the objective of the game is to involve the learner as the protagonist of their own learning. The guided game style, where the teacher guides but allows the student to make decisions, promotes both motivation and learning effectiveness. Therefore, **any recreational-educational programme in the water must be based on clear objectives that promote the development of students' aquatic skills**. Fonseca-Pinto and Moreno-Murcia (2023) emphasise that the essential purpose of aquatic activities is to promote comprehensive development through the acquisition of fundamental and cross-cutting aquatic skills, including motor literacy in the water, practical skills and knowledge, safety and environmental awareness. This implies that the approach must be based on the aim of providing significant value to the learner, and when designing games, the teacher must ask themselves: *why teach, what to teach, and how to teach?*

The objectives should include:

- **Mastery of basic skills for autonomy and aquatic mobility.** For example, games focused on entering and exiting the water (where to enter and where to exit), floating and buoyancy (knowing how to stop because I want to, because I need to rest, to orient myself in the environment), breathing (different plans, distances, orientation, body position, etc.) and propulsion (ventral, dorsal, lateral, mixing motor patterns), which are the technical basis for moving autonomously in the water. These skills can be introduced in a playful way (such as "playing starfish" to float, "imitating a crab" to observe the environment or dive and move underwater, picking up a shell to work on breathing and aquatic orientation).
- **Water safety and awareness.** Incorporate drowning prevention objectives, both preventive and reactive, such as entering the water depending on the context (deep, shallow, unknown or known area, where and how to get out, whether it is a swimming pool or natural area, etc.), games with unconventional materials that represent real contexts or situations (jellyfish, waves, ropes, etc.), or simple peer rescue simulations without entering the water, or practising with clothes on.
- **Environmental education and respect for the aquatic environment.** From an early age, with young children, awareness-raising objectives can be established, such as where water is found, what types of water exist, how to take care of it (not waste it) or learning about the basic flora and fauna of aquatic environments (Álvarez & Vega, 2009; Cheng & Monroe, 2012). Furthermore, by increasing environmental literacy, with the potential to bring children closer to nature and increase their knowledge of the aquatic environment, it may be possible to contribute to the prevention of drowning (Favara & Moreno, 2020; Salazar et al., 2020).

Beyond the specific objectives of the aquatic environment, games should be aligned with the general goals of the developmental stage, promoting the development of cross-cutting skills such as balance, agility, strength and coordination, as well as autonomy, cooperation and enjoyment of physical activity. A key objective of this approach is to promote a positive, competent and lasting relationship with the aquatic environment, encouraging healthy lifestyle habits and preventing people from giving up sport. In short, each game should be designed with a clear **educational purpose**, defining the value it aims to contribute in connection with real situations (why and how it is useful) and the skill that responds to that need.

Play as a teaching tool in the aquatic environment

Far from being a simple pastime or a reward for good behaviour, play is an essential teaching tool at any age. Integrating play into learning to swim is part of an active, learner-centred educational approach, where knowledge emerges from experience, exploration and fun, rather than from purely passive instruction. Using games to teach in the water creates situations in which the learner progresses almost without realising it, as their attention is focused on a playful objective (solving a problem, overcoming an imaginary challenge, having fun or achieving a goal within the game) rather than on the technical execution itself. However, during this process, the child practises and effectively assimilates the desired skills, while incorporating symbolic strategies associated with the game (figures, songs, stories, imaginative slogans), which facilitates their transfer to other aquatic contexts.

Even in the early stages, when families actively participate in the process, these symbols and metaphors are transferred to everyday life: expressions such as “the starfish” or using a small “checklist” before entering the water (“Where am I? Where am I going?”) are naturally integrated into family routines when they frequent aquatic environments. This spontaneous use of playful references shows the educational power of play and is a clear example of how

the experience of being in the water becomes meaningful, useful and transferable knowledge.

Fonseca-Pinto and Moreno-Murcia (2023) frame this idea within cognitive-constructivist learning theories, where the student actively participates in their learning, and the teacher acts as a facilitator. Numerous studies support the effectiveness of play in teaching aquatic skills: using playful methods, creating a more favourable learning environment, increasing exploration, socialisation and diversity of experiences. The aim is not only to develop technical skills that build progressive autonomy in the environment, such as floating, breathing, underwater movement, etc., but also to create a positive connection with water.

For play to fulfil its educational function, it must be carefully designed. It is not about playing for the sake of playing: each game must have a clear educational purpose (connecting with the objectives set). The aquatic educator must be creative in turning technical exercises into engaging games. For example, instead of repeatedly asking them to practise the front crawl kick while holding onto the edge of the pool, you can play “the speedboat”: each child grabs a kickboard and kicks, competing to reach a goal or trying to generate waves to knock down a floating toy. Similarly, to practise breathing rhythms and underwater orientation, an underwater treasure hunt game can be proposed. Almost any content (breathing, propulsion, turns, etc.) can be gamified, i.e. inserted into a playful situation with rules, challenges and narrative.

Motivation and play: the role of fun in aquatic learning

Motivation is an essential driver of learning and play acts as a natural catalyst for that motivation. In the aquatic environment, getting children motivated is particularly important, as they will be willing to overcome any initial fear or discomfort they may have about water, persevere in learning new skills, and incorporate aquatic activities into their active lifestyles. Therefore, game design must adhere to motivational principles, creating fun, challenging, and meaningful experiences for students.

A useful theoretical basis for understanding motivation in educational contexts is Self-Determination Theory (Deci & Ryan, 1987), which posits that motivation increases when three basic psychological needs are met: autonomy, competence, and relatedness. Applying this to aquatic games, we can infer that children will be more motivated if:

- They have a certain degree of autonomy in the game (for example, choosing which game to play first, deciding how to solve a challenge, or whether the task can be performed with or without physical assistance or help from the teacher).
- They perceive that they can progress and feel competent: this is achieved by setting achievable goals and providing positive feedback. A well-designed game allows each child to experience small successes (such as managing to submerge their head to pass through a hoop and pick up an object, catch a floating ball, or stop the action when it moves away) that reinforce their sense of achievement.
- They interact and feel part of a group: the social dimension of the game (healthy competition, cooperation, laughing together) satisfies the need for connection and makes

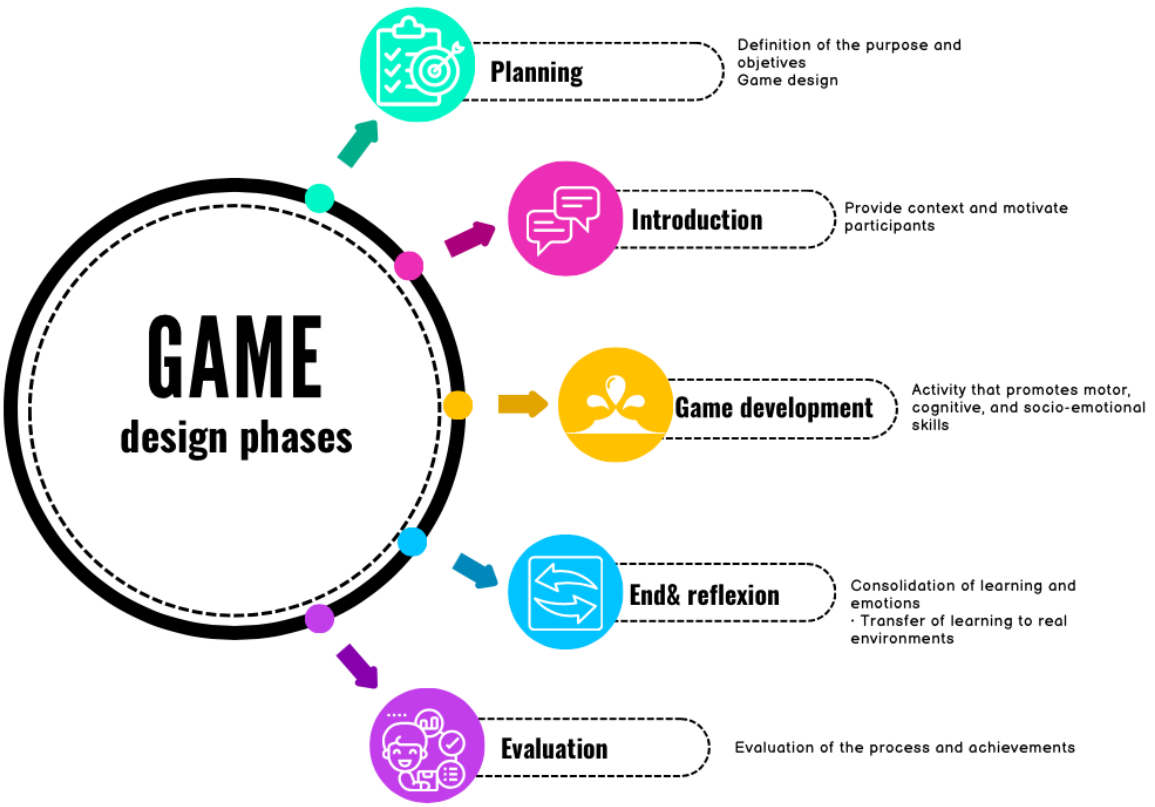
the activity more attractive.

- We have already highlighted (Fonseca-Pinto and Moreno-Murcia, 2023) the importance of intrinsic motivation in aquatic programmes, to the point of incorporating it as a key element in methodologies such as Comprehensive Aquatic Method (Moreno-Murcia, 2026). This cognitive-constructivist approach to teaching swimming seeks to actively engage students and help them find personal enjoyment in aquatic activities, so that they want to continue practising even after the course has ended or as they grow older. In this sense, **learning to swim from this perspective is not at the service of a specific modality, but rather of the relationship with the aquatic environment in its entirety and diversity**.

Phases for designing aquatic games

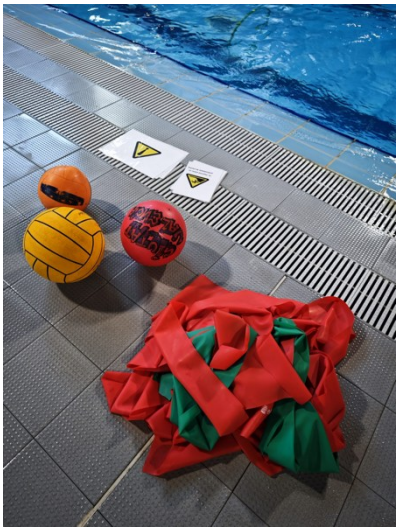
The phases for implementing games in teaching, especially under an approach such as the multidimensional model of aquatic competence by Fonseca-Pinto and Moreno-Murcia (2023), allow for structuring a playful experience with pedagogical intent. These phases (Figure 2) include planning, where objectives are defined and the game is designed; introduction, where participants are contextualised and motivated; game development, which activates motor, cognitive and socio-emotional areas intending to build competence; and the end and reflection, consolidating learning and emotions, reflection as a moment to evaluate the process and achievements in the different dimensions with connection to the concept of transfer to other environments. This sequence ensures that the game is a comprehensive and meaningful educational tool.

Figure 2. Game design phases.



1. Planning. In this initial phase, the teacher is aware of the purpose of the game in line with the educational objectives and designs the proposal. Logically, the context and the group must have been analysed. Under the multidimensional model of aquatic competence, this involves considering not only motor skills (such as floating, moving or underwater swimming), but also cognitive components (such as the conceptualisation of skills and decision-making in the aquatic environment), affective components (such as managing fear or confidence) and axiological components (such as respect for the aquatic environment and others). The teacher must select a game that integrates all or some of these areas of knowledge, considering the dimensions of the model. In other words, they must establish the pedagogical intention (objective, purpose). For example, a game called "Rescue in the Ocean" can be planned, where children must move around to "rescue" symbolic objects representing endangered marine animals, promoting movement, emotional control, cooperation and environmental awareness, using laminated posters with information about animals and where they live on the planet.

2. Introduction. In this phase, the type of game is presented to the group, the rules are explained clearly, and an atmosphere of motivation and safety is created. There should be a clear final challenge (*motivating and appropriate to the level*). It is also essential to contextualise the game with an engaging narrative and to ensure that everyone understands the purpose, as well as that the teacher is present and available to support the activity (respect for learning rhythms and levels). In the example of "Rescue in the Ocean," the teacher can tell a short story in which the children are guardians of the sea who must save animals trapped by pollution. This introduces the cognitive component (problem to be solved) and the axiological component (ecological values) while motivating participants to get emotionally involved.



3. Game development. During the game, participants are literally immersed in the action. This is where the variables of internal logic (space, time, material, participants, rules, roles, final challenge) are continuously adjusted. This phase is essential for activating the motor dimension of aquatic competence (floating, moving, changing direction or position, submerging, coordinating movements, observing the environment) and, at the same time, putting into practice context interpretation, problem solving and cooperation. The teacher must actively observe and provide help if any participant needs support, but without interrupting the flow of the game. In "Rescue in the Ocean," children must swim to certain points, collect the "animals" (floating or submerged objects), and bring them to a safe area, all as a team. This fosters the socio-affective dimension by requiring teamwork and respect for turns, as well as the cognitive dimension by requiring strategies to decide the order of rescue or how to move efficiently. **Games should be inclusive**. This can be achieved in several ways. For example, if there are children with different levels of aquatic skills in a group, the game can be structured into stations or roles so that everyone contributes: a less experienced child can

be the “land helper” who secures a guide rope and supports their peers in returning safely, while the more advanced children swim to retrieve the animals or clean the water of objects, rotating roles. Additional support (life jackets, boards, tube floats) can also be provided for those who need it, without detracting from the fun of the activity. The key is to adjust the difficulty: games should have an optimal level of challenge for everyone, avoiding both over-demanding (which causes anxiety) and boredom for the more skilled. Likewise, inclusion involves recognising and valuing individual differences. A respectful approach (Fonseca-Pinto et al., 2024) promotes the recognition of diversity in learning, adapting to the different needs and rhythms of each child. This is in line with international guidelines: no child should be excluded from aquatic education because of their functional condition, previous experience or socio-economic background. In the specific design of games, this can translate into: **offering alternatives within the same game** (for example, in an aquatic “treasure hunt”, some children can dive to look for objects at the bottom with goggles, while others can look for them while floating with support on the surface); **setting personalised goals**, that is, if the game involves covering a distance, allow each child to go “as far as they feel safe,” celebrating individual achievements rather than competitive comparison; **encouraging cooperation over individual competition**, as many cooperative games (e.g., transporting floating objects from one place to another together, group relay races) help children of different abilities to work as a team and support each other.

4. End and reflection. Once the game is over, a moment is devoted to group reflection. This phase allows for consolidation of learning, promotes metacognition, and activates the affective and axiological dimensions of the model. The teacher can guide a conversation with questions such as: “How did you feel in the water?”, “What did you do to help your team?”, “What did you learn about caring for the sea?” This type of dialogue allows participants to verbalise their learning and emotions, reinforce positive attitudes towards the aquatic environment, and develop awareness of their actions. In addition, they can be invited to identify which physical skills they used and how they could improve. The aim is to apply what has been learned through play in real or similar contexts. Within the framework of the multidimensional model, students should be able to transfer their skills and attitudes to everyday use of the aquatic environment (swimming pools, beaches, rivers), demonstrating safer, more responsible and conscious behaviour. To promote this transfer, the teacher can propose complementary activities, such as a guided visit to an ecological centre. In this way, aquatic competence is consolidated as an integral skill, not limited to the physical, but extended to judgement, attitude and behaviour.

5. Evaluation. In this phase, the teacher analyses the results of the process, both individually and as a group. In the multidimensional approach, assessment is not limited to motor skills but also considers whether the children have gained confidence in the water, whether they have a better understanding of the risks of the aquatic environment, whether they collaborated with their peers and whether they showed responsible attitudes. The evaluation can be informal (direct observation) or more structured (rubrics, anecdotal records, self-evaluation). In the case of the game "Rescue in the Ocean," the teacher can assess whether the student improved their autonomy in movement, communicated with the group, showed initiative, and understood the importance of caring for water. Feedback is part of the ongoing information that the educator must provide to the participant throughout the process.

Educational recommendations

The educational recommendations for designing aquatic games should be understood as a backbone that guides educational activities in the water from a multidimensional approach that respects the rhythms and characteristics of each child. First, it is essential to place **water safety** as a cross-cutting principle that guides any recreational proposal. The World Health Organisation recognises that teaching swimming, accompanied by prevention practices, is an essential strategy for reducing the risk of drowning in children and young people. This means that all games must be planned in a safe environment, with a depth appropriate for the height

of the participants, stable materials and flotation aids where necessary, as well as constant supervision by the educator. The dynamics of the game itself can also become an opportunity to teach safe behaviours naturally, integrating actions such as controlled entry and exit from the water, breath control or the simulation of safe rescues using floating aids. When presented within a playful narrative, these behaviours take on meaning for children, who incorporate them not as impositions, but as a necessary part of the story they are experiencing, and which makes sense to their personal system.

Along with safety, another key aspect of the teaching process is the **variety and progression of the games**. In the early stages of learning, activities should focus on familiarisation with the aquatic environment, free exploration and the development of basic sensations such as buoyancy, water pressure and body awareness. As children gain confidence, activities can evolve towards more complex challenges that integrate movement, brief immersions, breath control, spatial orientation and motor cooperation. Progression should be carefully adjusted so that each child can advance from their own level of competence, avoiding both the frustration of excessive challenge and the disinterest generated by an activity that is too simple. This way of staggering experiences not only promotes the acquisition of aquatic skills, but also strengthens autonomy, decision-making and personal confidence.

In addition, the design of aquatic games must intentionally incorporate an **inclusive perspective**, ensuring that all students, regardless of their previous experience, specific needs or level of competence, can actively participate. Inclusion is not limited to adapting the material or proposing more accessible variants but involves a deep understanding of the diversity of the group and the different ways of learning. Offering differentiated roles, allowing different ways of performing the same task, or providing specific assistance without detracting from the game are strategies that allow all participants to experience success. This approach to games not only promotes educational equity, but also reinforces values of cooperation, mutual respect, and acceptance of difference, which are central elements of knowing how to be and interact in the aquatic environment.

Another essential factor is the use of **narratives and symbolic elements** as a resource to enrich the motor experience. In the aquatic environment, stories, imaginary characters and fantastic missions act as motivational stimuli that encourage the student's emotional and cognitive involvement. Through stories such as rescuing trapped marine animals, cleaning up a polluted ocean or exploring an unknown reef, technical content takes on a concrete and appealing meaning. This symbolic dimension allows ecological, social and emotional values to be worked on, while physical skills are developed almost imperceptibly. When conceived in this way, play becomes a global experience that associates motor skills with imagination, knowledge and emotion.

Closely related to the above, the pedagogical process must also address **motivational principles**, understood as fundamental drivers of aquatic learning. From Self-Determination Theory, we know that intrinsic motivation increases when children feel competent, autonomous and socially connected. Aquatic games are particularly effective in this regard

because they allow children to make decisions, explore their own solutions, work as a team and experience constant progress through small achievements. When a child can choose how to move, what strategy to use to save an object or what role to play within a team, their sense of autonomy is reinforced and their involvement increases. Similarly, the group interaction generated in games fosters connection between peers, a key element in ensuring that the aquatic experience is enjoyed and engaged with.

All these recommendations must be integrated under the premise that **each game must have a clear pedagogical intention**, consistent with the general and specific objectives of aquatic learning. It is not about playing for the sake of playing, but rather about designing situations where play acts to develop motor, cognitive, affective, social and environmental skills. In this way, the educational proposal remains deliberate and meaningful, and play becomes a true vehicle for comprehensive training. Well-planned play allows children not only to improve their autonomy in the water, but also to build a positive, conscious and safe relationship with the aquatic environment, with a potential impact that can last a lifetime.

Table 1. Essential elements in the design of aquatic games.

Essential element	Foundation	How is it expressed in game design
1. Clear pedagogical intent	Teachers must plan with defined objectives: motor, cognitive, affective, and axiological skills (game planning).	Determine which skill, value, or behaviour you want to develop: floating, breathing, cooperation, environmental care, safety, etc.
2. Analysis of the content and the group	The design must be adapted to the characteristics, rhythms and interests of the learners and to the specific context of the aquatic environment.	Adapt materials, water depth, roles, distances and level of difficulty to the actual group.
3. Integration of aquatic competence dimensions	The game should include motor skills, decision-making, emotional management and values (triple function of the multidimensional model).	Include motor actions, decisions, emotional control and responsible behaviour in the water in each proposal.
4. Narrative and educational significance	The use of stories, symbols or missions allows children to connect emotionally with the activity.	A motivating introduction that contextualises the game with a story (guardians of the sea, rescue, ocean exploration, etc.).
5. Adjusting the internal logic of the game	Manipulate space, time, materials, participants, rules and roles in a coherent manner.	Vary depths, routes, number of objects, types of movement, and roles (rescuer, explorer, shore support, etc.).
6. Integrated water	The WHO (2014) emphasises	Controlled entry and exit, breath

safety	the importance of drowning prevention and safe practices.	control, safe rescue without entering the water, supervision, and appropriate equipment.
7. Real inclusion and full participation	Adapt for children with different levels, previous experiences or neurodiversity.	Support (board, life jacket), alternative roles, differentiated variants and personalised goals are offered.
8. Progression and variability	Non-linear models and cited evidence (Invernizzi, Mekkaoui, Arhesa, etc.) recommend varying tasks and progressively increasing complexity.	Move from familiarisation → basic skills → cooperative challenges → contextualised and simulated situations.
9. Cooperation and socio-affective dimension	The document highlights the importance of teamwork, taking turns, social bonding and emotional regulation.	Team games, shared missions, cooperative relays, agreements between participants, peer support.
10. Reflective closure and metacognition	The closure phase involves verbalising learning, emotions and attitudes, reinforcing values and awareness.	Ask questions such as: "How did you feel?", "What did you learn?", "What would you do differently?". Link the experience to real life.
11. Continuous and formative assessment	Assessment should consider motor progress, confidence, safe behaviours, cooperation, and responsible attitudes.	Observation, self-assessment, anecdotal records, adjustments along the way, evaluation of the process, not just the result.

Conclusion

Teaching through play in the aquatic environment is a highly valuable pedagogical strategy, supported by scientific evidence and an educational approach focused on the comprehensive development of the student. By incorporating play as the main tool in aquatic instruction, not only is the acquisition of essential motor skills promoted, but also cognitive, affective and social development, intending to acquire and develop aquatic competence. If, in addition, the multidimensional model is considered, play becomes a teaching vehicle capable of promoting water safety, inclusion, environmental awareness and intrinsic motivation from an early age.

The playful nature of water activities strengthens children's positive relationship with water, which increases their enjoyment, participation and long-term adherence to physical activity. To achieve these results, it is essential that educators intentionally plan each game, with clear objectives, inclusive adaptations and a well-structured teaching sequence. They must take care in how they communicate and interact with the group, as well as with each child, respecting their pace and diversity. In this way, the pool ceases to be just a recreational space and becomes a meaningful, safe and transformative learning environment.

In short, teaching through play in the aquatic environment is not only effective but necessary for a modern, inclusive education focused on well-being and aquatic competence with lifelong effects.

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