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Towards a Globalised Vision of Aquatic Competence

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Abstract

Human interaction with the aquatic environment has always taken different forms to meet the needs of pleasure, survival, therapy or performance. The diversity of existing aquatic spaces presents itself as a challenge, due to their variety, dynamism, unpredictability and unrepeatable conditions. These factors potentiate an infinite number of possibilities for human response in interaction with the aquatic environment, with aquatic competence being the one that will be able to sustain all types of interaction. Thus, the aim of the proposal has been to present a new approach to the contextualisation of aquatic competence. After a literature review on the concept of aquatic competence, a three dimensional model is presented: aquatic literacy, drowning prevention and environmental education. Recognising the human being as a bio-psycho-social being, a holistic model is developed, where the dimensions are based on three types of know-how (to be, to know and to do). In turn, these knowledges are influenced by the socio-cultural environment, the aquatic environment, the self and by others. Considering its breadth and the focus on the human being, this ecological model should not be a privilege, but a condition of aquatic programmes. Therefore, the acquisition of aquatic competence is presented as a civic necessity.

Keywords: aquatic skills, aquatic literacy, aquatic competence, water competence, drowning prevention, environmental education, ecological perspective, swimming.

Introduction

Human interaction with the aquatic environment has always taken different forms in order to respond to the needs of pleasure, survival, therapy, or performance. The conceptions that have arisen from it are many, as human beings are not born with the instinctive ability to know how to swim, but they are capable of adapting and developing behaviours that allow them to enjoy this environment (Moreno-Murcia, 2021). Even so, the taste for the aquatic environment and the possibility of accessing it is not universal, as there are different aquatic cultures and realities in the world. Moreover, some people feel satisfaction and others refuse to enter the water. Along the way, some overcome their anxieties and others are inhibited, making this relationship with the aquatic environment very personal and diverse (Megy, 2000).

This subjectivity in the interaction with the aquatic environment brings richness to the need to meet the demands of the context (e.g., motor competence, adaptability, self-regulation of behaviour) and to the role of the aquatic educator (Guignard et al., 2020). It becomes, therefore, a seductive mystery to the teaching-learning process, because of the diversity and unpredictability of the possible responses that everyone can adopt (i.e., environmental and temporal factors).

Expressions such as "I know how to swim," "I grew up in this river, I know it," and "I was a swimmer," can be considered examples of what it means to know how to swim. Does this self-perception mean that we are able to deal with the diversity and specificity of each aquatic scenario? Will the formal processes build permanent and unalterable skills, to such an extent that it can be said that this person knows how to swim? In order to get a possible answer to these questions, we present this contextualisation, which can lead to the question: can I swim or, alternatively, is the aquatic environment swimmable for me?

Knowing How to Swim or Being Competent in the Water: What Does It Mean to Know How to Swim?

Recently, Moreno-Murcia & Ruiz (2022) highlighted the importance for children of being competent in the water and learning to swim. They presented a model that transcended the standardising and exclusively achievement-oriented view of specialised technique, extending to a more integrative perspective to culturally identify being competent in the water.

From the contributions of Langendorfer & Bruya (1995) to the present contributions of Ortiz et al. (2022), the concept of aquatic (water) competence has maintained three elements that are transversal: the awareness of the dynamics and diversity of the aquatic environment, the personalisation of human characteristics (physical, temperament, cognitive, socio-emotional), and the infinite possibilities that can be considered of interactions between the self and the environment. Because we are talking about a dynamic environment and human decision making, the degree of unpredictability grows exponentially, making this a complex, multifactorial, open and dynamic issue.

Moran (2006a) has played an important role in the inclusion of the ecological perspective in aquatic education and his main focus has been on drowning prevention, showing some evidence of the importance of the link with the environment. In 2013, the same author presented the definition of water (aquatic) competence, associated with the sum of all personal aquatic skills that help prevent drowning, as well as the association of aquatic safety knowledge, attitudes and behaviours that facilitate safety in, on, and around the water (Moran, 2013). More recently, Moreno-Murcia & Ruiz (2019) presented aquatic competence as an integral part of motor competence, in which its development goes beyond drowning prevention. Considering the human being in a holistic way in different contexts, there is a very powerful potential impact on training and personal development (cognitive, motor, social and emotional) when learning in the aquatic environment is included and valued, as it is necessary to go beyond know-how. In this contemporary educational perspective, we are aware of the infinite possibilities and the multidimensionality of aquatic competence. This involves not only the capacity to move in the water (functional behaviour) but also the capability to observe and interpret situations

that require a performance with varying degrees of competence (cognitive and emotional), seeking to help the learner to be more able to adjust behaviours, attitudes, knowledge, and emotions to the specific situation (with or without material, alone or in company) as well as to be able to develop the ability to initiate relationships with others in the water (Moreno-Murcia & Ruiz, 2019).

Therefore, the notion that aquatic competence is something more than the mastery and efficiency of a repertoire of skills must be considered fundamental to avoid drowning and/or to dominate the environment. Aquatic competence should refer to the set of knowledge, procedures, attitudes, and behaviours that people need to solve problems or enjoy themselves in different aquatic environments (Moreno-Murcia & Ruiz, 2022) with their different gambits. Aquatic competence would be the basis that supports all types of interaction within the aquatic environment.

So, knowing how to swim (being competent in aquatic environments) is not an ability that is permanently and unalterably possessed (Langendorfer, 2011). Rather, the concept of knowing how to swim would be associated with the dynamics of the systems, which gives rise to transitory behaviour, regulated by the characteristics of the aquatic scenario, the socio-cultural environment, individual characteristics, and interaction with others. These findings, among others (Guignard et al., 2020), highlight the importance of knowledge in general, the capability to read the environment, of emotional and behavioural regulation during interactions, evolving from a perspective of "I know how to swim" towards a concept of "the environment is swimmable for me."

"The Aquatic Context Is Swimmable for Me:" A Personalised and Nonlinear Perspective
The diversity of existing aquatic environments is presented as a dynamic, unpredictable, variable and, specifically, when they are natural spaces (e.g., sea, rivers, lakes) their conditions are unrepeatable. Therefore, the possibilities of responses during human interactions with the aquatic environment are infinite. Evidence exists that incidents in children occur when they have to make decisions while playing (Morrongiello et al., 2007) and according to the ecological perspective, children with certain characteristics will perceive certain "affordances" (invitations to act) of the environment, adopting unpredictable, variable and different behaviours from adults (Gibson, 1979).

These advances on the most important knowledge in different dynamics in, outside, and around aquatic spaces and on the behaviours of children, young people and adults, invite us to assume a concept that goes beyond know-how. This new approach highlights the importance of knowing, of knowing how to think/reflect/observe and get involved, as well as self-awareness, of feeling (how do I feel in this situation? What is activated - fear vs. excitement - in me when a risk occurs?) In this sense, none of the areas of knowledge is a substitute

for any other, nor is it independent of the context, and all of these interactions need to be considered in the teaching-learning process.

Claiming that we know how to swim because we are able to perform a set of motor behaviours at a given time and in a given context does not presuppose a universal condition or a unique explanation of the process that occurs during human interaction with the aquatic environment (Langendorfer, 2011). Knowing how to float in the swimming pool, where sometimes you are even asked to give your peers space and time to experience it calmly, is not the same as being able to do it in the sea (i.e., salt water) with waves or cold water or in direct sunlight, or in the river (i.e., fresh water) and in movement (i.e., with currents). Being in the water with a swimming suit or clothing on is not the same as falling into the water from a boat with a life jacket on or falling in with clothes on and trying to make movements to keep yourself safe. Surfing is not the same as a sailing lesson or playing water polo, but in all of these activities and/or situations, without exception, a set of essential and common domains are needed, concretised in the family of competences, the aquatic competence.

According to Newell's model (1986), the characteristics of behaviour in a given situation arise from the constraints of the context, the task and the person, and the response opportunities underlie the possibilities/opportunities for action that are obtained from what the task to be performed presents (based on the degree of motor, cognitive and socio-affective mastery at that time and condition) (Langendorfer, 2011). This is an ecological, non-linear perspective, in which more answers can be found to the understanding of behaviour according to the specificity of the population. Ecological dynamics, through the principles of non-linear pedagogy, promotes the design of representative tasks in which learners can acquire the fundamental aquatic skills they need to transfer them to other environments (e.g., sea, rivers, lakes). In this sense, teaching competency should not be seen as the only main objective in drowning prevention models, but rather as a complement to situations designed to help learners feel comfortable in a variety of aquatic environments.

Therefore, knowing how to swim is not something that can be possessed, but to be able to meet the conditions necessary for that context to be "swimmable for me" in a given situation, which requires a revision of the content that integrates the concept (Langendorfer, 2011). What does the human being need to develop in order to meet the demands of the context?

Contextualisation of Aquatic Competence

As previously indicated about aquatic competence, we are talking about a concept that goes beyond know-how, which highlights knowing how to observe, self-awareness to know how to decide, self-esteem in the relationship with others and respect for the characteristics and needs of others. In this sense, evidence indicates that metacognitive skills (cognitive process) help to solve

problems effectively (Gourgey, 2010). This cognitive action allows human beings to be aware of their thoughts and feelings, better understanding what is right and wrong and developing the ability to transfer knowledge (e.g. what kind of swimming to do in a wave zone or what to observe when arriving at an aquatic space in a recreational or surfing ambit) (Chatzipantelli, 2014).

In this constant perception-action, internal and external variables and interaction with the environment are very present, such as the level of personal ability, expectations and beliefs, previous experiences, the specificities of the aquatic environment, others, and so on, which in combination, allow us to first perceive at a neural level (involuntarily and non-consciously) and interpret (consciously and voluntarily) the aquatic context as something safe or dangerous. The information we process through these signals tells us what we can trust and what we cannot trust. We interpret who or what may be a danger to us, adopting one position or another in response. The polyvagal theory describes this response process of the autonomic nervous system (without the involvement of the thinking parts of our brain), which is responsible for ensuring our safety (Porges, 2009). According to this theory, it would be this neuroception that makes us involuntarily experience the world through people and the environment, not judging whether it is good or bad, but simply acting to manage risk and seek our safety (Dana, 2018; Porges, 2009).

This reading of the environment is captured and managed by the autonomic nervous system (sympathetic and parasympathetic) which, involuntarily, responds to the question "Is this safe? For example, a child, when approaching water, neuro-perceives it as a safe environment by activation of the ventral parasympathetic nervous system, and decides to play in a shallow, controlled pool, presenting an attitude of calm, availability and connection with others, enjoying the moment. But when it unexpectedly moves into the deep end, its system neuro-perceives it as a threat to its integrity, at which point the sympathetic system is activated and it enters a fight or flight mode, mobilising resources to act and protect itself, seeking to return to the surface. If its fight does not work, then the response may evolve into immobilisation (dorsal parasympathetic nervous system response) (Figure 1). Neuroception is something that occurs permanently, where previous experiences and self-awareness are essential.

Figure 1

Hierarchy of unconscious integrated responses to danger signals in the aquatic environment
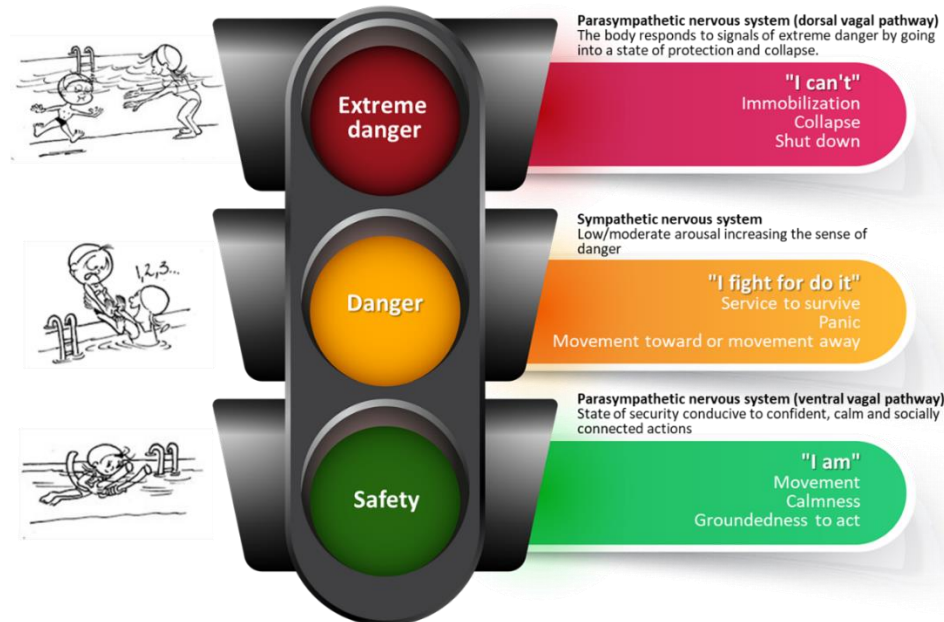
For this reason, the interpretation of swimming knowledge cannot be limited to the mastery of swimming techniques or the acquisition of fundamental skills. We thus propose a triple function of aquatic competence: *to be* (socio-affective area), *to know* (cognitive area) and *to do* (motor area), with and in the aquatic environment, independently of its ambit or context, where each of these areas is interdependently related (i.e., one depends on the other) and manifests itself in an incorporated way in the others with an infinite variety of possibilities (Figure 2).

The beauty and challenge of this approach is precisely the variability of realities that can be combined. For example, a young man approaches the seashore to go into the sea and uses his knowledge to observe the place (e.g., colour of the flag, surveillance, swell, wind direction, bathing area). He decides to move forward considering the information he gathers from the context supported by what he perceives himself as a personal competence and what he intends to do as a task. In this decision-making process, the three areas (i.e., cognitive-conceptual, motor, and socio-affective) are always present. The dynamics of the aquatic environment and our human condition keep the autonomic nervous system always alert to safeguard our safety. Another young person exposed to the same aquatic scenario may decide not to enter the water. Her cognitive, motor, socio-affective, cultural biography and her autonomic nervous system may give her different referents that led her to that choice, allowing different people in similar contexts to make different decisions. The meaning we intend to give is that of a spectrum through which a greater or lesser

participation of one of the areas or dimensions is manifested, being totally impossible to isolate or segment them.

Considering the human being as a bio-psycho-social being (biological, psychological and social dimension), this vision allows us to develop aquatic competence by addressing three major dimensions: aquatic literacy, drowning prevention and environmental education. It is still necessary to recognise the importance of the self, of others, of the characteristics of the aquatic environment and of the socio-cultural involvement in the practice. All these elements make up the subjective aquatic competence developed through personal aquatic biographical construction. The degree of mastery of aquatic competence is like a fingerprint, it is personal.

Figure 2
Multidimensional conceptualization of aquatic competence
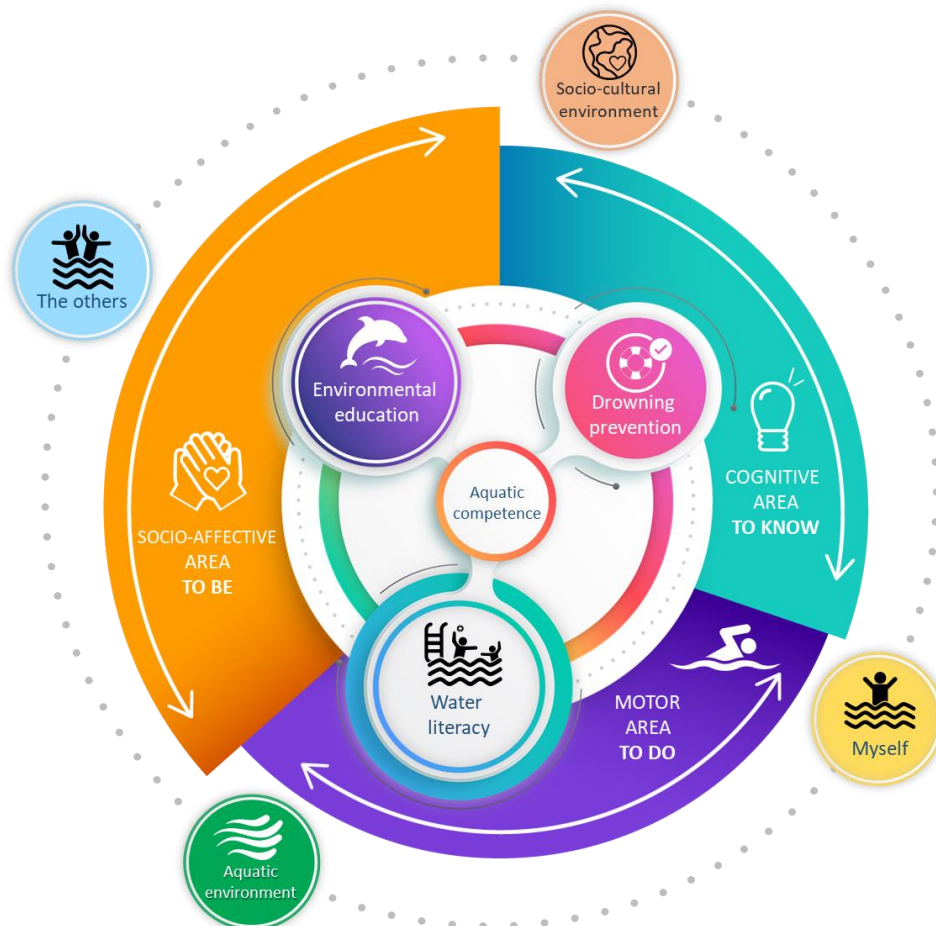
Aquatic Literacy
This dimension considers perceived competence (i.e., what I believe I know to do) and actual competence (i.e., what I really know to do) according to the demands of the moment (i.e., individual, environment, and task characteristics).

All these intrinsic (i.e., the self, personal characteristics, and aquatic biography) and extrinsic (i.e., the physical, socio-cultural environment, and its condition in interaction with the self) will be present during decision making, in the cognitive (perceived vulnerability vs. potential for danger) and emotional (risk taking vs. risk avoidance) reactions, which will be integrated together at the moment of acting during the motor task (Morrongiello & Matheis, 2007).

As the aquatic environment is a place of choice for physical activity practices with various objectives, such as recreation, education, sport, and/or therapy, both in artificial (swimming pool) and natural (sea, river, lagoons, etc.) contexts, it requires a capacity for adaptation (transfer of skills) and self-regulation of behaviours. These needs are justified by the specific risk involved in the practice (Button et al., 2017, 2020; Guignard et al., 2020; Ortiz et al., 2021; Stallman et al., 2017).

Learning to know how to do (Figure 3) requires the acquisition of competences (Stallman et al., 2017), as they have a preventive (self-assessment, attitudinal) and protective effect on the practitioner, which also includes competences that enable the identification of a rescue need and being rescued (Button et al., 2017, 2020; Drowning Prevention Auckland, 2020; Guignard et al., 2020; Karatrantou et al., 2019; Kjendlie et al., 2013; Moran, 2014, 2015; Moran et al., 2012; Moreno-Murcia et al, 2020; Moreno-Murcia & Ruiz, 2019; Morrongiello et al., 2004, 2007, 2010; Ortiz et al., 2021; Peden et al., 2017; Varveri et al., 2016; Willcox-Pidgeon et al., 2020).

This vision requires exposing the learner to a variety of practices (different materials, environments, practice dynamics, possibilities, etc.), focused on the learner, respecting his or her needs and rhythms. But also, the socio-cultural context in which the learner is immersed must not be forgotten, as learning to act in the diversity of the aquatic environment will be required. These practices can have a strong impact on the formation of the person as a human being (value system, knowledge of aquatic environments, preservation of the environment, beliefs that are passed on from generation to generation, etc.).

For this, in the teaching-learning process it is necessary to build a progression appropriate to the stage of development and the aquatic activity to be practised, as what is learned and how it is learned is different, this being a challenge of the content and process.

Regardless of the aquatic activity (swimming, diving, artistic swimming, etc.) or nautical activity (surfing, rowing, etc.), it is important to recognise the value and potential of aquatic competence from the early childhood stage, where the formal education system can have a great responsibility (Albarracín & Moreno-Murcia, 2018).

Figure 3
Aquatic competences (Stallman et al., 2017).
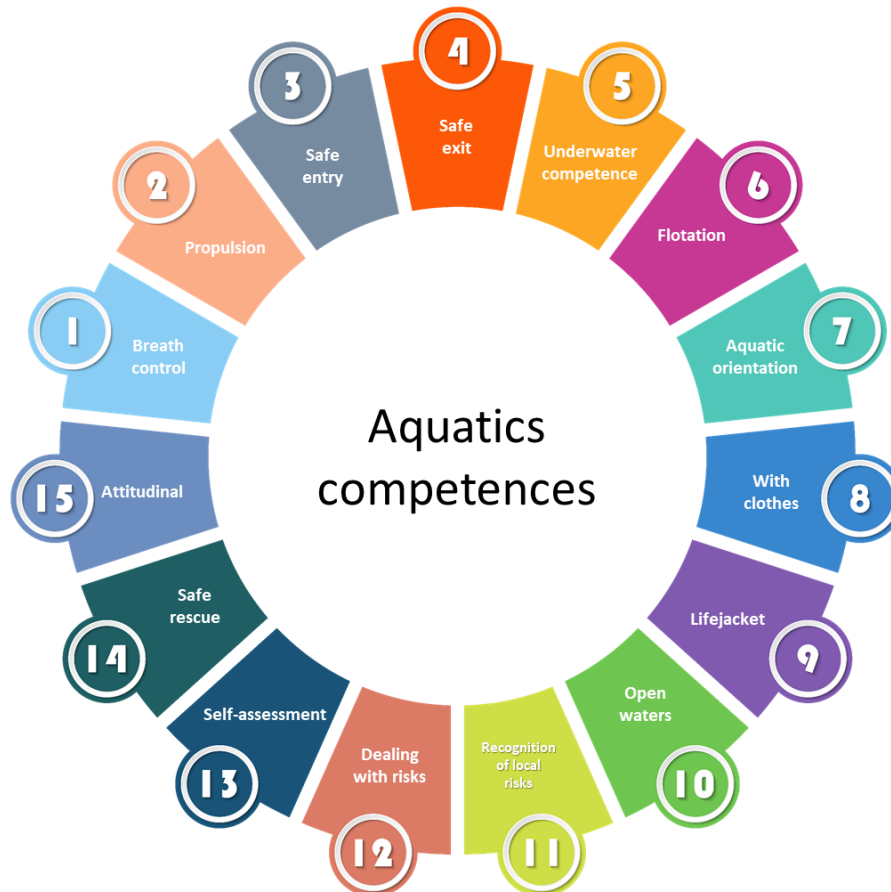
According to this vision, aquatic literacy is understood as a part of physical literacy. According to the International Physical Literacy Association (2014), physical literacy is defined as the motivation, confidence, competence, knowledge and behaviours that can maintain and contribute to a human being's lifelong commitment to practice. The need for this concept arises as a consequence of addressing the question of what are the physical capabilities that will enable us to make the most of the bodily dimension to interact with the world and awaken human potential (Whithead, 2001). And as can be seen, this is a concept that goes beyond how to do, it speaks of perception, of knowing what to observe and interpret, knowing how to respond to stimuli or demands of the environment and what to decide (based on knowledge, emotions and competences). In this way, physical literacy promotes the teaching of the very young, aiming at a participation adjusted to the demands of the chosen physical practice (Silverman & Mercier, 2015), beyond the completion of tasks, as the practitioner is able to take the initiative in their practice and is able to deal with the difficulties and obstacles of the context (Chen & Sun, 2015). This learning

progresses from the simplicity and generality of motor gestures to the complexity and specificity of the intended activity.

Although it is learning through motor behaviours, the evidence proves that developing these competences influences the adoption of positive attitudes from which we all benefit (Silverman & Mercier, 2015). Motivation is determinant in this process of learning and evolution and is built, hand in hand, with competence and knowledge (Chen, 2015).

Specifically, in the aquatic environment (Figure 4), a possible evolution of exercise in the aquatic environment has already been shown (Moreno-Murcia & Ruiz, 2022), where the passage through fundamental aquatic skills is essential for the inclusion of aquatic physical exercise throughout life and where the step towards this may or may not be preceded by specific aquatic skills by never discarding basic and transversal skills and know-how about the aquatic environment (how to adjust behaviours according to the demands of the context and considering individual characteristics). The importance of aquatic literacy starts from the ground up and has unlimited power to develop human potential (Whitehead, 2001). Depending on what you decide to do from this initial stage, moving on to specialization or opting for fundamental competencies, the important thing is that there is a motivation towards regular aquatic activities, where the level of perceived competence influences the motivation, frequency and quality of the aquatic activity. Aquatic literacy can be understood as embodied in physical literacy, which plays an important role in the development of positive self-realization, self-confidence and self-esteem (Whitehead, 2001).

Drowning Prevention

Over the past 40 years, research has made great strides in better understanding the phenomenon of drowning, its causes and how to prevent it. Data have allowed WHO (2014, 2017) to recognise that aquatic education is one of the main tools for prevention. Due to cultural diversity, different realities are present in each aquatic context, so it is important to be aware of the potential risks that occur in recreational aquatic practices, not forgetting the different practice settings and the age of the participant. Science (Brenner et al., 2003) describes that men are the most vulnerable population due to a tendency to overestimate their competence and underestimate the dangers. On the other hand, low-income countries have higher drowning rates, as well as social differences, within the same culture, confirm that caucasians are privileged in the opportunity to attend educational/formal aquatic programmes (Dawson, 2018; Denny et al., 2021; Sakamoto et al., 2020).

Figure 4
Aquatic activities for life
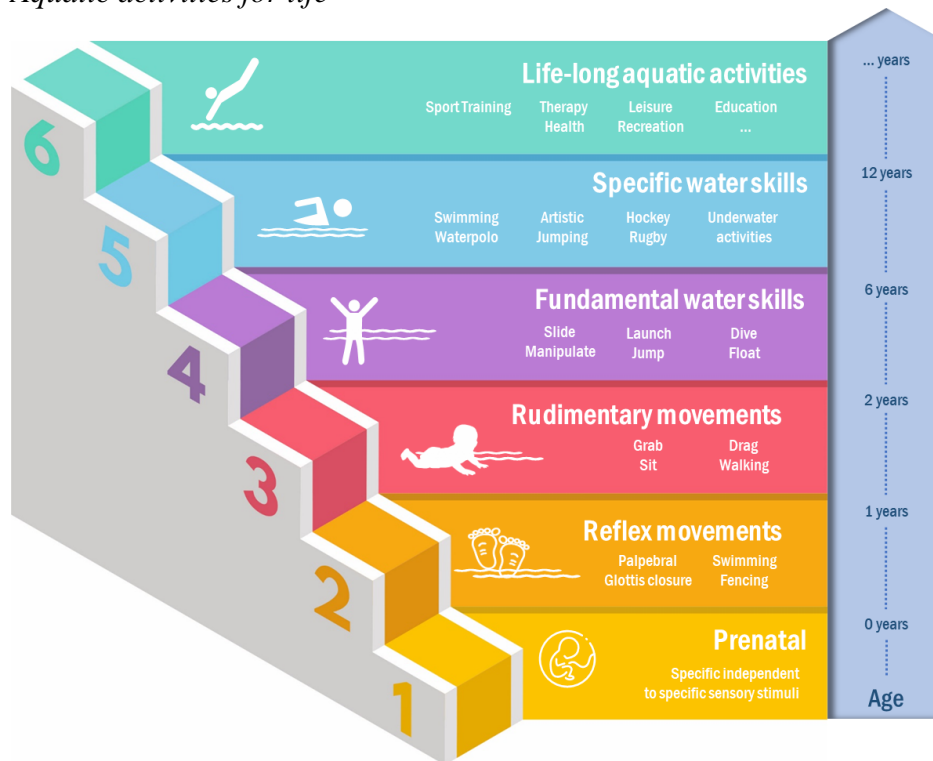
We must not forget the multitude of possible human interactions with the aquatic environment that require an ability to adapt to different realities with a degree of aquatic competence beyond the traditional motor domain. Shallow and/or deep pools, the different types of currents in the sea, its undulation, wind direction, visibility, fauna and flora, the variety of river soils, among others, are some of the examples that anyone can encounter in their practices. These can determine the different decisions of the human being, in which to be, to know and to do participate with equal importance.

Due the contribution of previous studies (Button et al., 2020; Leavy et al., 2017; Stallman et al., 2008, 2017; Wallis et al., 2015), it is now possible to know what happens before drowning. The characteristics of the aquatic environment that most challenge people in these interactions are: incorrect assessment of the situation (underestimation of danger, not knowing the "behaviour" of the aquatic environment, e.g. its dynamic, specific and varied characteristics), frequent learning in artificial spaces such as swimming pools, not guaranteeing their contribution to know how to act in another pool (proximal transfer) or in a natural environment (distal transfer). Associated with this, people are unaware of the dangers, making the situation seem safe, where something unexpected has happened before or during entry or something unexpected has happened during immersion (Stallman et al., 2008). There is the drowning timeline, which clarifies that prevention can occur at three points in

time (Szpilman et al, 2016): before with an active preventive attitude (avoiding or reducing certain behaviours in risky areas), during with a reactive preventive attitude where the person activates their aquatic competence to avoid the drowning that is about to occur, or when drowning is already in progress through rescue or self-rescue.

Considering the information available, and bearing in mind that learning benefits from proximity to the real environment (physical and socio-cultural), from practice with peers, from the balance between motor experiences (what I know to do) in interdependence with knowledge and cognitive awareness (what I know), from the ability to apply what I know (knowing how to be and to be, regardless of the place or situation), the preventive dimension is presented. This dimension is organised in three areas (Drowning Prevention Auckland, 2020; Moran, 2006b; Morrongiello et al. 2010): general knowledge, recognition of local risks, attitudes and values, which together contribute to the mastery of aquatic competence (Figure 5).

Figure 5.
Areas of the preventive dimension
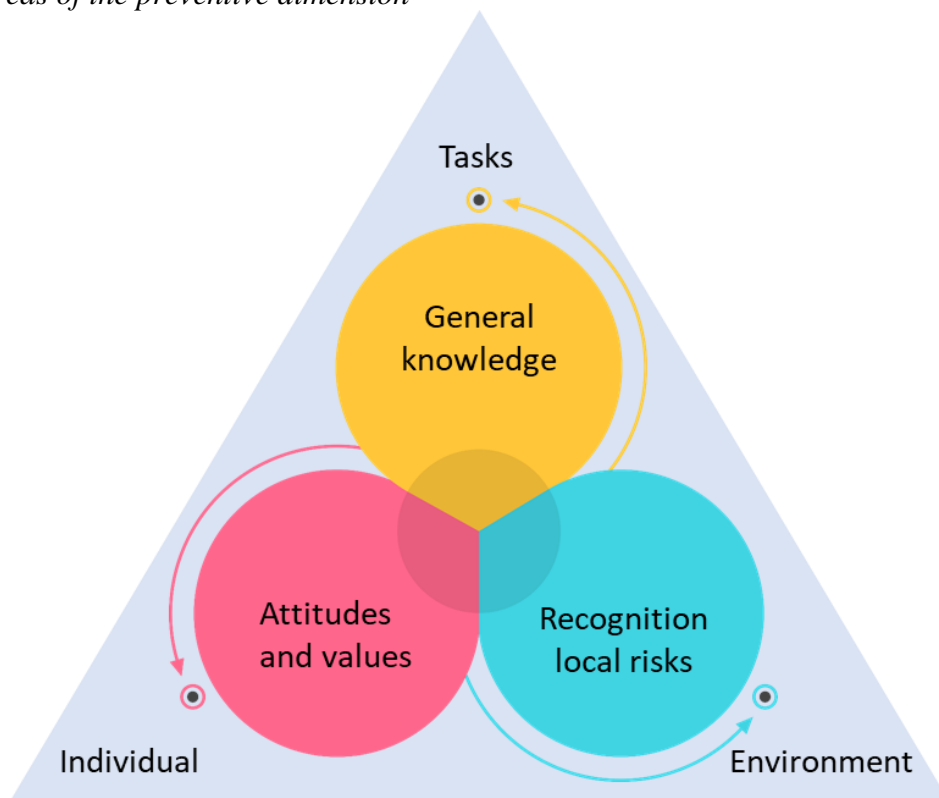
Area of General Knowledge on How to Deal with Risks
Dealing with risks would consist of a set of aquatic safety principles through knowledge about the safest behaviours in different aquatic environments (pool, sea, river, etc.) in simulated situations and/or educational practices in real

environments. For example, aware that the risk is higher when swimming in turbid water, what is the safest technique to use to move out? What are the implications of wind direction when, for example, playing with a ball in the sea?

Local Risk Recognition Area
This consists of the ability to observe and identify, in different aquatic contexts, the local information that is essential for safer practice. This reading of the local considers the physical information of the environment and the perception of competence, allowing the adoption of behaviours of greater personal safety and safety towards others, regardless of the aquatic activity to be carried out. For example, when arriving at an aquatic environment, is there surveillance? What is the colour of the flag and what does it indicate to me? What is the wind direction and its effect on the coast?

Attitudes and Values **Area**
These are directly related to personal and social responsibility, referring to the choice of risky behaviour that may cause harm to oneself or to others. They are subjects that are present in educational moments that the teacher will use for joint reflection, being the mediator of this. Its contents are organised in three families: respect among equals (do you think that making risky decisions is more fun and exciting than making safe decisions?), what is the probability of injury (what risk do you consider to be involved in doing an acrobatic dive to enter the water?) and beliefs, which aim to influence the awareness of these beliefs (when you get injured in the pool, river, sea or lake, is this due to bad luck or because you did something wrong?), seeking to positively influence the construction of personal beliefs.

When talking about the risk of the aquatic environment and the concern with preventing/avoiding accidents, it is known that risk is not a specific property of the environment, it is an emergent condition of the interaction between a person and a concrete condition of the environment (Cordovil et al., 2015). It should also not be forgotten that variables such as age, gender, socio-economic factors and temperament can also affect the consideration of risky behaviour (Peden et al., 2008).

Environmental Education
Since the United Nations Conference that gave rise to the Stockholm Convention in 1972, the importance of environmental education as a strategy to curb climate change has been recommended. This environmental problem has worsened over time and today it is not possible to remain indifferent to it, as climate change is due to negative effects produced directly and indirectly by humans (Ferrero, 2021). Despite all the information available to us, this does not translate into responsible environmental behaviour (Álvarez & Vega, 2009).

To overcome this situation, a profound transformation is needed, based on the fundamental reorientation of human values, knowledge and behaviour in

order to encourage sustainable living (Álvarez & Vega, 2009; Steffen et al., 2018). In this sense, evidence (Ferrero, 2021) indicates that educational programmes that integrate environmental education have the potential to reconnect society with nature, enabling a transformation that will result in the survival of the human species and the quality of life of current and future generations (United Nations, 2015).

While this is a relevant topic, it is easy to ask the question, what is the relationship between environmental education and the development of aquatic competence, and why should it be integrated into aquatic education programmes? In response, we consider three arguments in this new conception (Figure 6):

Figure 6

Supporting rationale for the inclusion of environmental education in aquatic education
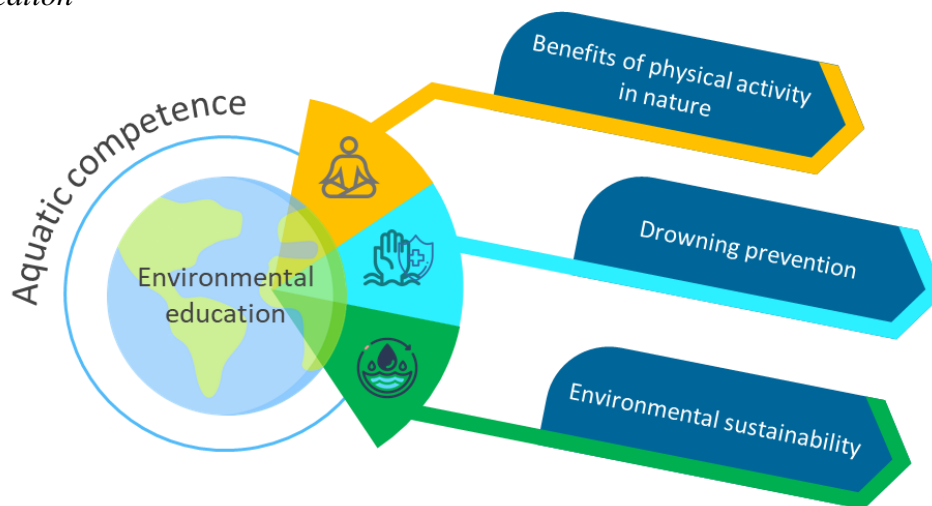
Benefits of Physical Activity in Nature. Practising in natural environments presents more significant and favourable results than practising in artificial and closed environments, such as: more energy, decreased anger, depression and greater commitment to practice (Thompson et al., 2011), in addition to generating greater pleasure, satisfaction and fostering social interactions (Maas et al., 2009). Thus, due to the diversity of natural aquatic settings, whenever possible, it would be ideal to experiment in different natural contexts.

Drowning Prevention. The variety of contexts in which aquatic activities take place is great, however, there is no evidence to show that what is learned in closed environments (swimming pools) is transferable to other contexts, especially when transitioning to natural spaces (Guignard et al., 2020). This highlights the need to consider simulated experiences in real environments as an integral part of learning programmes.

Environmental Sustainability. The environmental problem is a reality and we must all be part of an intervention plan favourable to the development of pro-nature behaviours. To this end, educational aquatic programmes can become a privileged place for water care. This can contribute to the development of a scientific-environmental literacy that leads to greener behaviours (Álvarez & Vega, 2009).

Children's experiences in nature connect them positively with nature, maintaining these habits into adulthood (Hughes et al., 2018). In turn, this connection to nature is a strong predictor of children's interest in nature and adoption of ecologically friendly practices (Cheng & Monroe, 2012). In contrast, the decline of nature and the development of urban centres, which remove us from this contact with the natural environment, make people less likely to value and act against its disappearance (Kareiva, 2008; Soga et al., 2016).

Programmes that incorporate environmental education therefore have the potential to bring society closer to nature, in this case by generating greater environmental literacy through increased education about the aquatic environment (Figure 7). This may lead to a greater possibility of drowning prevention and, as a direct consequence, a greater emotional affinity between humans and the natural environment (Favara & Moreno, 2020; Salazar et al., 2020). This circumstance may lead to a greater interest in the preservation of natural resources and the adoption of more sustainable behaviours to protect the environment (Corral-Verdugo & de Queiroz Pinheiro, 2004).

Figure 7
Flow chart in aquatic and environmental education

Environmental education, being considered an integral part of the development of aquatic competence, must therefore incorporate simple activities with a greater presence of the cognitive area to more complex activities such as coexistence in natural spaces (observation, reading, involvement, knowledge and protection of fauna and flora, cultural myths, perception of the effects on human beings in the present and future, etc.), where the socio-affective, cognitive and motor areas have an active, interdependent presence and are embodied, one into the other, without it being possible to segregate or dissociate them.

Triple Function of Aquatic Competence: To Be, To Know and To Do

Human beings are a combination of bio-psycho-social systems (Figure 8), i.e. the body (the awareness of being), the mind (that which enables it to adapt to the environment) and the social (which is expressed through cultural contents) are interconnected and together result in a unique human being. In the search for aquatic competence, these areas are present in a holistic way, however, we offer a separate explanation of them and establish the relationship that occurs in the aquatic environment.

Figure 8

Flow chart of internal decision-making processes
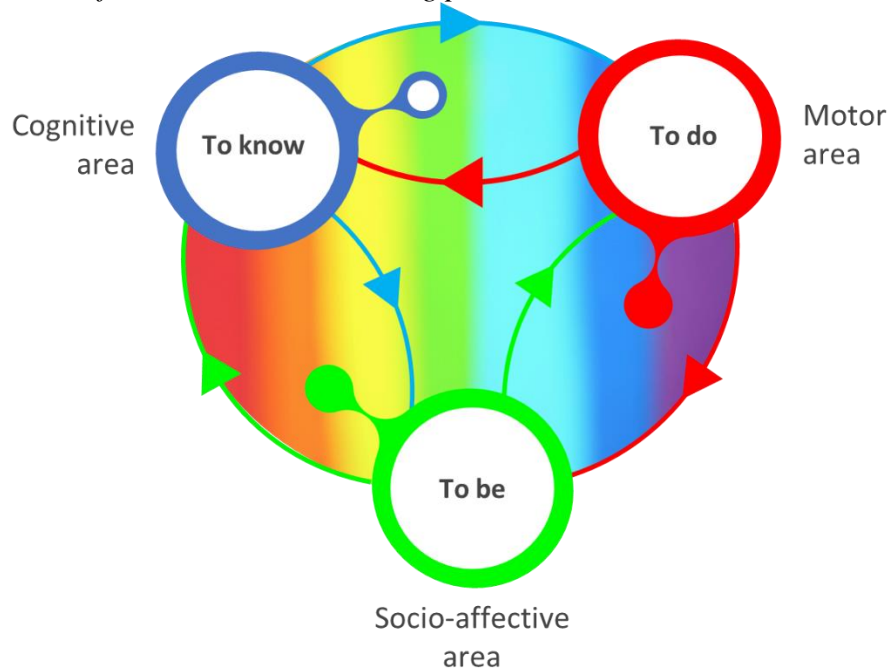
In the **motor area** is where the know-how is identified, it is concretised in the behaviours chosen to do things. It is observed through actions (motor behaviours) such as, for example, when there is a displacement from point A to B, when a vertical sustentation is performed in water polo and synchronised swimming, or when calling for help with a life jacket on.

But this motor response depends on a flow of information between what is felt (emotional reactions) and what is known (cognitive reactions) and can be influenced by the moment or situation being experienced (thinking before acting or acting reactively). Choosing what to do is a cognitive and emotional process (Morrongiello & Matheis, 2007) involving what I think I know how to do, previous experiences and neuroception. In this way, the quality of the motor area improves if the cognitive area, where knowledge (about what to do and how to do it) and the socio-affective area (how the situation in front of me makes me feel, what internal parts are activated) are developed in parallel. All these

dynamics are personal and moment-specific, varying according to age, gender and culture (Cordovil et al., 2015).

The **cognitive area** is where the knowledge is focused, which must go from the most general to the most specific, always in connection with a deep self-awareness and seeking to know others. Some examples of important knowledge in the aquatic environment are self-consciousness (self-awareness), knowledge about the aquatic environment (what properties, what changes from the pool to the sea or river, how the aquatic environment behaves at different times of the year, etc.), identifying environmental problems, discussing possible protective and environmentally friendly behaviours (knowing the natural resources, the fauna and flora of the aquatic place, recycling of waste, etc.), a transversal understanding of the environments (e.g. recognition of local risks, what to observe), familiarity about others (what aquatic competence do my peers have) and what are the safest behaviours according to the environment and the situation (the differences in acting in front of a green or yellow flag sign, how to enter or move in the sea with or without waves, etc.).

The degree of knowledge always depends from socio-cultural context in which the human being has been immersed and is not the same between children, young people and adults, as the most effective knowledge is that which is constructed based on experience, the experience of real or simulated situations and interaction with others, sharing experiences and reflecting together. Reasons that lead us to consider that the aquatic educator has an essential role in the proposal and mediation of this learning.

The **socio-affective area** (wisdom to know how to be) is related to an interpersonal dimension, where socio-affective skills such as emotions and motivation are included, as well as socio-cognitive skills that refer to one's understanding of others (awareness of their beliefs and intentions) (Valk et al., 2017). In this sense, emotions will influence attitudes and finally personal values that will be determinant in understanding oneself, others and make sense of how this interpersonal dimension can end up influencing the environment.

The sense of what has just been argued, fulfils the dynamics of a spectrum of infinite possibilities, that based on an ecological perspective, the degree of manifestation/intensity or request of the different areas in a person, depends on the demands of the situation. In other words, the difference in responses to a similar situation depends not on the nature of the area, but on the typology of the stimulus.

The Importance of the Characteristics of the Aquatic Environment
The aquatic world is immense, about 80% of our planet is water and we can find it in the most varied places (shallow pool, deep pool, the sea with different types of currents, ripples, wind direction, visibility, fauna and flora, rivers with a variety of bottom, etc.). Depending on the place of choice for aquatic exercise,

the objectives or practice intentions may vary. There is a set of (transversal) potential risk characteristics and safety opportunities in aquatic environments that need to be known and learnt from childhood (Table 1). Because of their specificity, the characteristics of the aquatic environment are unpredictable and unrepeatable, so we are committed to knowing them in order to know how to think/reflect/observe and read the environment.

The Impact of the Characteristics of Self and Others
Human and societal development occurs because of the dyad between "self" and "others". Bronfenbrenner (1987) considers the person as a bio-psycho-social being in which the social environment in which he grows up has a determining effect on his development. This view follows the systemic model initially presented by Engel in 1981 which already recognised the principle of interconnectedness within and between systems.

The intention of looking at the self and others as determinants in the concept of aquatic competence is not in the sense of manipulating or controlling the person or with the aim of eradicating drowning. This would be impossible due to the diversity of possibilities in the human relationship to the aquatic environment. Although behavioural tendencies may exist, human behaviour is unpredictable, and young children need constant supervision as they are more vulnerable due to their age and lack of experience.

The self is nothing without others, we are social beings who learn from others and others from ourselves. This personal construction in interaction with others, based on the principle of equal value, will allow us to observe, reflect, share and build knowledge, from thinking, to being and ending in doing. This is a civic necessity of this model focused on the person destined to live in society. For this reason, one of the most important objectives of this proposal is the focus on the person, on his or her personal characteristics and conditions, inserted in an aquatic environment, but with the need to be prepared for the diversity of possibilities that the future will bring. The aim is to contribute to the formation of an emotionally healthy human being, conscious and self-aware of himself/herself and his/her impact on society. The way in which aquatic competence is sought in human beings, taking into account their physical, physiological, psychological and emotional characteristics, can make a healthier society (physical, mental and emotional) possible, contributing to a better world. This model should not be a privilege, but a condition of aquatic programmes.

Table 1

Cross-cutting characteristics to recognise in aquatic environments

Type of environment	
Beach, sea, river, lake, etc.	
Deep pool, shallow pool.	
Water level or not with the curb.	
Characteristics	Description
Aquatic environment monitoring	• Existence of supervision. • Type (adult, professional guard, family member, etc.). • Emergency response capability.
Signs	• Colour of the flag. • Identification of safe bathing area. • Hazardous area identification (diving, rip currents, underwater reefs, streamers, etc.).
Wind conditions	• Intensity. • Direction: 　− Offshore (from land to sea). 　− Onshore (from sea to land). 　− Sideshore (sideways).
Tides	• High tide. • Low tide.
Depth	• Shallow for long distance. • Shallow for short distance. • Deep.
Type of ground	• Sand and grain size (coarse-grained - deep beach; fine-grained - flat beach). • Stones. • Rocks, etc.
Visibility	• See the feet on the ground.
Water	• Fresh or salty (affecting buoyancy and swimming density). • Visibility (clear or obscured). • Temperature (cold, warm or hot).
Wildlife (fauna and flora)	• The characteristics of the environment.
Pollution	• Perceivable degree of cleanliness of the water and the surrounding space.
Ambient and water temperature	• Estimate in degrees Celsius.

It is important to be aware that the way the aquatic educator presents the practices influences the inner discourse, the view of oneself and the way of acting in front of others (outer discourse). It is also inseparable from the other socio-cultural factors of the family, school, society (beliefs, customs, knowledge, etc.) and the aquatic environment. The way one acts in the aquatic environment can influence one's own reaction and vice-versa. This awareness induces an active participation of the practitioner in the process of building his or her learning, as this process will contribute to the formation of personality and identity. It should be the person who chooses who he/she wants to be and the aquatic professional should help to discover and develop this potential, which implies that the aquatic educator acts as a mediator in the processes and helps the self-knowledge, self-development and social construction of the aquatic competence.

Aquatic programmes should fulfil three functions in this regard: the self with me, the self with others and the others with me. In order to be prepared to recognise the needs of others, it is important to build self-awareness, self-esteem and emotional intelligence. Possibly, from this wellbeing with oneself, social wellbeing, the replication of respect for the characteristics, needs and rhythms of others, can be achieved.

Therefore, the strategy would be focused on promoting the development of essential or specific competence profiles (their usefulness in aquatic activities) and general ones (transversal to other environments), seeking an active involvement throughout the process while building knowledge of being, how to know and how to do.

The socio-cultural environment
The existence of different aquatic cultures and realities in a locality, country and/or in the world, underlines the importance of learning around, with and in the aquatic environment. But, unfortunately, the difference in opportunities is a reality that different cultures offer for access to formal aquatic activities, influencing the degree of mastery of aquatic competence and, consequently, the levels of wellbeing or risk of aquatic injury in a community (WHO, 2014).

According to Mecrow et al. (2015), aquatic behavioural profiles vary according to culture as well as age, gender and socio-economic conditions (Brenner et al., 2003, 2006). This is because, while constructing "the self", the community where we are born and grow up culturally influences who we are and will be. Family, peers and school are the closest influences, but also the culture of that place or tribe (Bronfenbrenner, 1987).

From the different knowledge acquired from others, there is an influence on the relationship with the aquatic environment and the degree of mastery of aquatic competence (customs and practices), but not enough is known about the content of the knowledge (what concepts, beliefs, perception of the situation,

etc.) that is transmitted about "aquatic wisdom" from generation to generation on a longitudinal and transversal level. We do know that the socio-cultural dimension leaves an imprint on the human being (Moran, 2006a) that causes a system of beliefs, knowledge or concepts, attitudes towards aquatic practices, mainly through everyday life, narrative and myths (Carvalho et al., 1980; Phillips, 2020), which lead to the development of critical thinking that can influence access to practice (formal and informal), determining the characteristics of a society's water competence.

Therefore, the socio-cultural effects on the characteristics of aquatic programs, including their existence or non-existence, are indisputable and unexpected. The challenge is to create equal opportunities in formal practice where the school can help in this regard.

Pedagogical Implications Associated with the Proposal
Based on the assumption that behaviour depends on the relationship between the constraints of the person, the environment and the task (Newell's theoretical model, 1986) and with the aim of understanding and positively influencing one's behaviour, the typology of the task is presented as an essential factor. The task approach allows us to answer the question: how can we best meet the needs?
There is a tendency in traditional models to prescribe convenience tasks with hypothetical situations, determined by adults, which condition the diversity of emotional responses, underestimating what can happen in a real situation. This convenience suppresses or limits the cognitive and emotional effect on decision-making (Morrongiello & Matheis, 2007).

It is our intention in this approach to contribute so that the aquatic program participant develops an aquatic competence capable of adjusting his or her behaviour to the constraints of the environment. To this end, we take as a reference Newell's (1986) model of constraints and the references of ecological psychology, where decision-making plays an unquestionable priority role in the pedagogical approach.

Therefore, we are committed to real, activating and promoting experiences of learning by discovery, developing greater self-awareness (behaviours, emotions and knowledge) (Balan & Davis, 1993; Morrongiello & Matheis, 2007). It is very important in this variety of scenarios to share a reflective practice (metacognition), on the part of the teacher, by observing the behaviour of the students when they seek the goal of the task (Balan & Davis, 1993), as has been previously advocated (Moreno-Murcia & Ruiz, 2019).

In order to meet this need for knowledge of the possible behaviours of the student and consequently, awareness of the real competence of each one, it must be taken into account that age and gender may condition the response. Previous experience can also influence the emotional and cognitive responses to the stimulus (Morrongiello & Dawber, 2004; Morrongiello & Matheis, 2007),

which requires that the surprise/novelty factor is always present in the approach to the task.

In order to be able to answer questions such as: Why teach? What to teach? When to teach? When to progress? and How to set up a scenario that fits the objective? we present below some pedagogical implications of the proposal:

- The teacher becomes an enabler or mediator of aquatic experiences, where he/she pays special attention to the objective of the tasks, seeking to generate significant learning and to have all the variables addressed in the model.
- The intention and objective of the tasks are essential as a starting point. The teacher participates in the discovery (helping the student to find the best solution to the problem posed) of the self through the aquatic environment, with a positive and enthusiastic attitude during practice (Balan & Davis, 1993).
- It is important to know how to wait and pay attention to the rhythm (physical and emotional), to the diversity of the students' response to the stimulus. The teacher should generate expectations about the student's potential for growth but avoid generating closed models of how learning should occur.
- It is a priority that students achieve their aquatic competence with autonomy. One strategy for this is to progress from the simple to the complex, for example, first achieving a short distance movement with help (teacher or material) and gradually increasing it, as they build their autonomy with and, progressively, without help. As indicated above, the construction of aquatic competence is associated with self-awareness (emotional perception, real competence, etc.), as well as the responses of the context to their actions (effects of decision-making).
- As far as assessment is concerned, it is proposed to avoid an exclusive verification of performance. We urge the establishment of moments of joint educator-student reflection so that the learner acquires and develops an awareness of how meaningful relationships are being established for the self-regulation of the learning process itself.
- This focus on the search for learner autonomy must always go hand in hand with the joy of learning. The presence of the teacher in an emotionally positive and safe environment will help the learner to maintain the aquatic practice throughout life.
- It should not be forgotten that the teacher's reflection with the student in overcoming challenges and frustrations will be essential in this process, which is why we are committed to dynamic, varied pedagogical models, with the existence of risk factors (controlled by the teacher), emotional, cognitive and experimental, which allow safe opportunities for experiences with the real world.

Conclusion

The aim of this proposal has been to present a contextualisation approach to aquatic competence based on a model composed of three dimensions: aquatic

literacy, prevention, and environmental education. These dimensions are interdependent and are embodied in each other as their content is part of the learning and development process of aquatic competence. They are based on three types of know-how: to do (motor area), to know (cognitive area) and to be (socio-affective area). This knowledge is influenced by the socio-cultural environment (the culture of the country, the city, socio-demographic characteristics), by the characteristics of the aquatic environment (the natural and artificial aquatic resources accessible nearby, but also considering the possibility of other realities), as well as by the self and others (individual physical, cognitive, emotional and temperamental characteristics). In doing so, we have tried to reason out a model that can provide answers to questions such as what to do? how to do? why to do? what are the consequences of doing? how does what I want to do or what I do make me feel? and what are the effects on others?

The stage of acquiring aquatic competence (i.e., taking into account the diversity of environments) is an optimal moment for the development of the transference of learning. For this, it is important to learn to observe and evaluate the environment in a transversal way (i.e., not only where one learns and lives, but also where one explores and travels), thus becoming a transcultural learning.

Being aware of the predominance of aquatic learning that takes place in controlled and supervised environments, it is important to remember and reinforce that practice should aim at preparation for life. Because young people need to experiment in order to learn to decide (according to their age and safeguarding their safety), aquatic teaching environments should simulate the real world through suggestive proposals, encouraging the ability to adapt to contexts far from the reality of the moment (transferring at a distance). It should not be forgotten that when making decisions (Morrongiello et al., 2007), emotional reactions take on a special role, as they are active when responding to the demands of the situation (take risk vs. avoid risk).

This approach requires an active participation of the individual in their learning and development process, and can become a challenge, at an early stage, for the aquatic professional because it also requires a broader set of knowledge beyond just the mastery of technical skills. This should not become a deterrent, but a motivating variable for the personal and professional development of the 21st century aquatic educator. Perhaps, an approach such as the one presented here can lead to better health and wellbeing in the future and contribute to a decrease in the number of drownings, as well as a healthier planet.

As a whole, regardless of the objective pursued in the aquatic program, we seek to awaken and promote from the base, a relationship of the self (human being from a holistic perspective) with the world through the aquatic

environment, where we propose an ecological model of teaching through knowledge, know what to do (attitudinal), awareness (conceptual knowledge about oneself, about the aquatic environment and awareness of the culture of the place) and self-wisdom to know how to be (awareness of personal and social values). We are aware of the complexity of the model, which is why we have made profuse argumentation and reasoning of a new dynamic, ecological, non-linear proposal that aims to meet the transcultural need to grow in freedom with the aquatic environment, thanks to the construction of a useful, variable and present aquatic competence throughout life.

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