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AQUATIC ACTIVITIES

UNDERWATER VISION: TEACHING, ADAPTATION AND ASSESSMENT IN SWIMMING INSTRUCTION

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UNDERWATER VISION: TEACHING, ADAPTATION AND ASSESSMENT IN SWIMMING INSTRUCTION

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Accepting that your face and body will be submerged is essential for adapting well to the aquatic environment. Furthermore, good underwater vision allows for a more relaxed and controlled interaction whilst moving underwater, as well as better underwater orientation, whether in relation to an object or whilst moving, thereby ensuring greater safety whilst underwater.

Introduction

Although some students have no difficulty submerging themselves and retrieving objects, many express a fear of putting their face in the water and opening their eyes underwater, and report discomfort or a stinging sensation caused by the chlorine. This discomfort is relatively common in early swimming lessons and forms part of the process of visual adaptation to the aquatic environment, particularly in swimming pools treated with chemicals used for disinfection, which can contribute to the onset of eye and nasal discomfort (Vasconcellos & Nascimento, 2023).

The ability to swim without wearing swimming goggles can be regarded as an essential aquatic skill, particularly as it promotes adaptation to the underwater environment and breath control (Rejman et al., 2024). In this regard, wherever possible, the initial learning process for aquatic activities may include periods without the use of such equipment, not as a restriction on its use, but as a teaching strategy aimed at enhancing the participant's adaptation and autonomy in the aquatic environment. After this initial stage, swimming goggles remain an important resource for comfort, protection and sporting performance. Thus, the aim is not to eliminate the use of goggles, but to enable the swimmer to develop, from their very first experiences, the ability to cope with being underwater without relying exclusively on this equipment.

Following this initial phase of visual adaptation to the aquatic environment, whose duration varies depending on the methodology used and the individual characteristics of the pupils, the use of swimming goggles is recommended to minimise discomfort during practice. This process should be carried out gradually, progressively and on an individual basis, respecting each participant's own pace of adaptation.

With this resource, we aim to provide a guiding framework for the teaching and assessment of underwater vision, with direct application to the context of learning to swim.

The ability to see underwater

It is a fundamental skill for interacting with the aquatic environment, aquatic orientation,

changes of direction, underwater movement, and learning to swim. When properly developed, it helps to increase a sense of security, improves spatial awareness and aids body orientation during movement in the water (Vasconcellos, 2024).

On the other hand, when a learner is unable to open their eyes naturally whilst submerged, difficulties may arise relating to breath control and a perceived difficulty or inability to see and orientate themselves underwater (Vasconcellos et al., 2026). This situation can increase feelings of insecurity and hinder exploration of the aquatic environment. When a learner displays behaviour such as avoiding looking around, seeking to surface quickly, and showing insecurity, these behaviours may indicate difficulties in adapting to underwater vision.

The development of underwater vision

This can be achieved through a pedagogical progression that begins with familiarisation with the water and gradually moves towards the functional use of vision whilst submerged. Initially, activities are proposed that promote confidence, reduce muscle tension and encourage facial relaxation, followed by gradual contact between the water and the face, and partial and full submersion. As comfort levels during immersion increase, the gradual opening of the eyes is encouraged, initially for short periods and subsequently for longer periods.

At a later stage, instruction can move on to visual orientation activities, in which the learner is encouraged to identify submerged objects, shapes, colours and spatial landmarks. Subsequently, tasks involving locating and retrieving objects may be introduced, linking underwater vision with breath control, spatial orientation and movement control. In this way, the progression moves from tolerance and comfort during immersion to the active use of visual information as a means of orientation and interaction with the aquatic environment.

During this process, the systematic observation of the student's facial expressions and behaviour enables the teacher to identify signs of relaxation, confidence and satisfaction, as well as signs of tension, worry or fear (Vasconcellos, 2024). These indicators can guide the choice of difficulty level and the pace of progression of the activities, taking into account the learner's individual characteristics and promoting a safe, enjoyable and gradual adaptation to the aquatic environment.

In summary, the instructor can work on developing underwater vision through a teaching progression organised into eight stages:

1. Approximation and familiarisation with the water
Firstly, the aim is to create an atmosphere of trust, reducing fear and tension when coming into contact with water. The instructor looks out for signs such as anxiety, nervousness, muscle tension, and resistance to approaching the water.

2. Adapting the face to contact with water
Activities are carried out to gradually get the face wet, initially in a voluntary and controlled manner. The aim is to reduce facial tension and increase tolerance to water coming into

contact with the eyes, nose and mouth.

3. Facial relaxation
The student is encouraged to relax their facial muscles whilst in contact with the water. Playful activities such as blowing bubbles, moving the mouth and making different facial expressions in the water may be used.

4. Gradual submersion of the face
Progression takes place from partial submersion to complete submersion of the face, always respecting the pupil's individual response. The aim is to remain submerged calmly, without showing signs of tension or immediately pulling the face away.

5. Gradual opening of the eyes
Once the student has become more comfortable during the dive, activities are introduced to encourage them to open their eyes underwater. Initially, this is done for short periods, gradually progressing to longer periods with their eyes open.

6. Underwater visual orientation
With their eyes open, the learner begins to identify objects, people, colours, shapes, or spatial landmarks underwater. At this stage, vision ceases to be merely a means of tolerating immersion and begins to play a role in orientation within the aquatic environment.

7. Locating and retrieving objects
Subsequently, the learner is encouraged to locate and retrieve submerged objects, initially those that are close by and at shallow depths, progressing to different positions and distances. This stage integrates vision, breath control, spatial orientation and movement.

8. Functional use of vision in different situations
Finally, underwater vision integrates with other aquatic adaptation skills, enabling the student to use visual information to guide movement, locate reference points, and carry out tasks more independently and with greater control.

Below is a sequence of photographs illustrating pupils with underwater visual adaptation (Figure 1), along with a table showing observational indicators of behaviours associated with adaptation and (mal)adaptation to underwater vision (Vasconcellos et al., 2026) (Table 1).

Figure 1. Sequence of photographs illustrating pupils exhibiting the characteristic of underwater visual adaptation.

Table 1. Observational indicators of behaviours associated with adaptation and (mal)adaptation to underwater vision (Vasconcellos et al., 2026).

Body region	Adaptation to underwater vision	(Mal)adaptation to underwater vision
Eyes	Open, stable and directed towards the aquatic environment	Closed, half-closed or blinking frequently
Eyebrows	Relaxed, in a neutral position	Raised or furrowed, showing tension
Mouth	Relaxed, smiling or exhaling naturally	Excessively open, tense or biting the lips
Forehead	Smooth or with few wrinkles	Furrowed or with pronounced wrinkles
Cheeks	Raised by a smile or relaxed	Sunken or tense
Face	Expression of comfort, enjoyment or calm	A grimace, expression of discomfort, worry or fear
Neck	Relaxed, aligned with body movement	Stiff or excessively stretched
Shoulders	Relaxed, following the body's natural movement	Raised, tensed or hunched
Breathing	Controlled exhalation during the dive	Breathing blocked or excessive air retention
Body	Fluid and natural movements	Body stiffness and abrupt movements

Based on the systematic observation of pupils' facial expressions and body language, researchers at UERJ (Vasconcellos et al., 2026) developed a tool for monitoring beginner swimmers, known as the Underwater Adaptation Visual Index (UAVI), which can be found in the article "Use of the Underwater Adaptation Visual Index as a Monitoring Tool for Beginner Swimming Students".

Figure 2. Levels of visual adaptation developed by Vasconcellos et al. (2026).

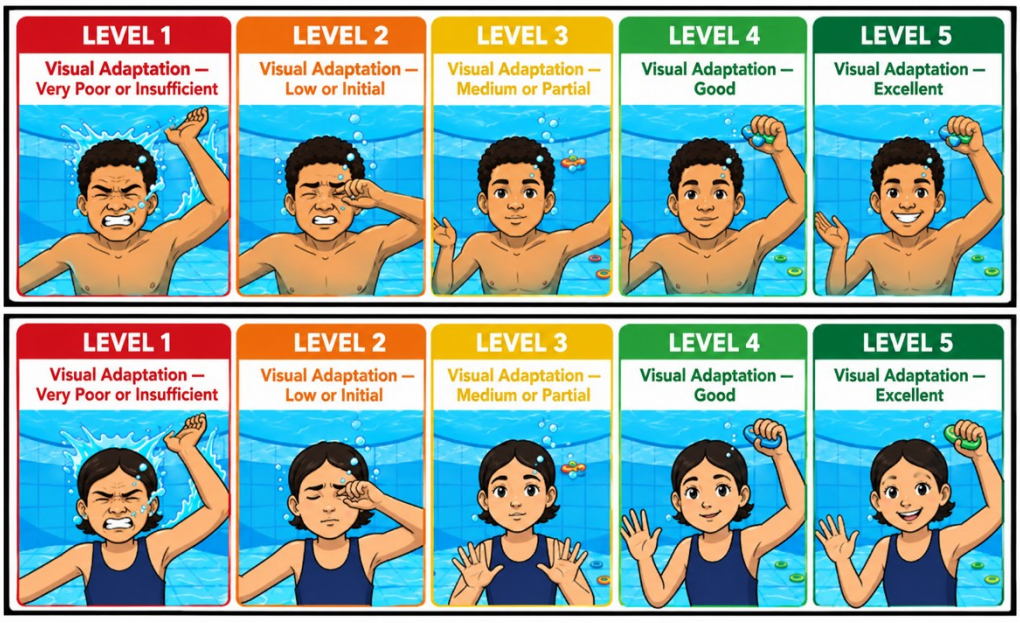

Table 2. Summary classification table for the Underwater Adaptation Visual Index.

Level	Puntos	Visual adaptation category	Predominant indicator	Proposed pedagogical response
1	0–2	Very poor or insufficient	Muscle tension and fear	Stop the activity and gradually resume the adaptation process
2	3–4	Poor or initial	Moderate discomfort	Use gradual eye-opening and immersion exercises
3	5–6	Moderate or partial	Neutral facial expression	Encourage visual exploration
4	7–8	Good	Relaxation and comfort	Develop orientation and object retrieval
5	9–10	Excellent	Relaxation, interaction and spontaneity	Expand the challenges of exploration and autonomy

For example, a pupil who closes their eyes, shows facial tension and has difficulty orienting themselves visually during a dive can be identified, through systematic observation, as someone who needs more time and specific teaching strategies to develop their underwater vision. In this case, the instructor may propose progressive activities involving opening the eyes, visual exploration and locating objects at different depths, whilst respecting the student's level of adaptation. In this way, the assessment ceases to be merely a means of grading and instead guides individualised teaching interventions, contributing to a safer, more enjoyable and gradual adaptation to the aquatic environment.

In unexpected submersion situations, the ability to open one's eyes and orientate oneself visually in the aquatic environment can contribute to more appropriate responses, helping the swimmer to remain calm, maintain control of the situation and make decisions in the face of the circumstances. This skill can increase the swimmer's autonomy and reinforce self-protective behaviours in the aquatic environment, contributing to a safer response to unforeseen situations.

Vision for retrieving submerged objects

Vision plays an important role in underwater orientation, changes of direction, water safety and the retrieval of objects. The latter can be used as a teaching strategy to encourage pupils to open their eyes and develop their underwater vision. Furthermore, object retrieval is an activity that integrates various aspects of adaptation to the aquatic environment, as it involves immersion, breath control, keeping one's eyes open, spatial orientation, body control and movement.

This skill contributes not only to visual and respiratory adaptation, but also to the development of the learner's autonomy, confidence and body and spatial awareness. Safely exploring the bottom of the pool allows for a better understanding of the limits of one's own body and the environment in which they find themselves.

Thus, retrieving objects from the bottom of the pool without wearing goggles represents an important stage in adapting to the aquatic environment and is directly linked to underwater vision. This activity stimulates underwater vision, breath control, spatial orientation and safety whilst submerged. Gradual and controlled exposure to exercises of this kind promotes the swimmer's visual and emotional adaptation, reducing reactions of fear and disorientation when faced with unexpected situations in the aquatic environment.

By successfully locating and retrieving submerged objects without the aid of goggles, the learner demonstrates progress in their adaptation to the aquatic environment, greater composure whilst submerged and improved underwater spatial awareness. This skill can encourage safer behaviour, such as remaining calm, using vision for orientation, controlling breathing, recognising body position and performing movements in a more controlled and independent manner during aquatic training sessions.

Conclusion

Underwater vision is an important part of the process of adapting to the aquatic environment and learning to swim. The ability to open one's eyes, remain comfortable whilst submerged, orientate oneself visually and explore the aquatic environment can help develop breath control, spatial awareness, independence and safer behaviour in the water.

In this process, the systematic observation of facial expressions and body language provides the teacher with relevant information about pupils' individual responses whilst submerged. The use of indicators relating to the eyes, eyebrows, mouth, forehead, cheeks, face, neck, shoulders, breathing and the body allows for a more comprehensive analysis of underwater visual adaptation, going beyond the isolated observation of the ability to open one's eyes.

The Underwater Adaptation Visual Index (UAVI) represents, in this context, a means of organising and systematising this observation, helping the instructor to identify the individual characteristics of beginners and to select progressive teaching strategies. Retrieving submerged objects, in turn, is a practical activity that integrates underwater vision, breath control, spatial orientation, body control and autonomy.

Therefore, teaching underwater vision should be understood as part of the process of developing adaptation, progressing gradually, in a personalised manner and with due regard for each pupil's individual characteristics. Swimming goggles remain an important aid for comfort and aquatic practice; however, developing the ability to cope whilst submerged without relying exclusively on this equipment can enhance the swimmer's autonomy and safety in various situations in the aquatic environment.

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