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The Assessment of Swimming and Survival Skills: Is Your Programme Fit for Its Purpose?

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Abstract

Assessment of swimming and survival skills is a crucial part of any swimming and lifesaving programme. Unfortunately, quite often, it is also the weakest part of the programme itself. Inadequate skills assessment and verification might lead to ineffective skills acquisition and development, to a false sense of safety and over confidence in the water that can be extremely dangerous. Assessor experience and observation skills, assessment methodology, and criteria are all closely inter-linked and their interaction will somehow determine the assessment outcomes. Our paper analyses some of the current issues in these areas of the assessment process, such as assessor's lack of theoretical knowledge and experience, criteria not fit for purpose, and methodological constraints. As examples for our discussion and to highlight these issues, we used two very important core aquatic skills, which are also fundamental survival skills: sculling and eggbeater kick. We also stressed the importance of having a sound understanding of the principles of movement in the water as a corrective capability. Finally, based on motor learning and motor development studies, we proposed an assessment process that focuses more on the observation of performance improvement, consistency or stability, persistence, level of effort, attention, and adaptability.

Keywords: survival skills, core aquatic skills, assessment, swimming skills, skill acquisition, motor learning and development

Many swimming and lifesaving programmes, although well-structured on paper, lack valid and reliable skills assessment and verification, which in turn might lead to inadequate skills acquisition and development, to a false sense of safety and to over confidence in the water that, as we all know, can be extremely dangerous. Too often the assessment of swimmers' and lifeguards' skills tends to be the weakest link of these programmes and to let their overall philosophy down. For example: a swimming teacher is moving some swimmers up based on the criteria outlined in the syllabus of the programme in use in their facility, but to what extent have the swimmers really met the criteria? Have they actually met the criteria or has the validity and reliability of the assessment process been weak? Are they consistent and comfortable in their performance or would they be in difficulty under stress and/or in a different environment? More importantly, are the criteria themselves valid for intended purpose?

Our study will try to highlight some of the current issues in swimming and survival skills assessment through specific examples. We will also try to indicate possible solutions, based on our experience as well as studies on motor learning. But what factors do we have to consider when analysing skills assessment in swimming? We have identified the main ones we believe influence assessment outcomes:

- a) Criteria.

Are they fit for their intended purpose? Are they all relevant to the skill being assessed?

- b) Teacher/Assessor experience and observation skills.
Have they got what it takes to do the job? Have they got enough experience? Have they deliberately and meaningfully practiced their observation skills? Do they fully understand the underpinning principles of movement in the water? Do they know themselves how it should feel? Do they really know what to look for?
- c) Assessment process and methodology.
Are there any flaws in the process because of external or internal interference and/or pressure (parents, pool management, governing body, need to qualify more teachers/lifeguards etc)? Are all the factors being considered? Is the swimmer's level of skill acquisition taken into account? How about their physical and motor development?

All the above-mentioned factors are closely inter-linked and their interaction will determine the assessment outcomes. The Teacher/Assessor's experience and ability to effectively observe is perhaps the most important one and could, to some extent, compensate for shortcomings in the methodology and/or choice of criteria. We should also always bear in mind that the assessment is an integral and very important part of the learning process (Langendorfer & Bruya, 1995; Scales, 2008). Therefore, it should be seen as a starting point of a virtuous circle and not just as a test to determine whether our swimmers/lifeguards will pass or fail.

To begin our analysis we shall consider the process and methodology itself. Normally there are two types of assessment in swimming:

- a) Summative assessment (typically done at the end of a term/session)
- b) Formative assessment (done continuously throughout lessons)

Summative assessment, which typically occurs at the end of a term or session, gives us only a brief snapshot of what the swimmer is somehow able to perform at a particular moment in time, but has learning really occurred? We need to understand that there is a difference between *performance*, which is something temporary, and motor *learning*, which represents relatively permanent change (Haibach-Beach, Reid, Collier, 2018). The word, *performance*, might evoke the idea of great competence and mastery but that is often not necessarily the case. A prime example could be that of someone who quit swimming at the age of 11/12 and then returns to the pool as an adult to take up Masters swimming. They perhaps have relatively good swimming technique but, although they might have the capability to perform a single somersault in the water, they struggle to do flip turns at the end of each lap, especially when tired. Although they have the basic technique and the relevant fundamental motor skill to perform a flip turn, they cannot repeat it reliably throughout their training session, especially when fatigued or under stress from

competition. This is because they dropped out of the sport before that particular skill was acquired and developed to expert status. Therefore, in assessing swimming skills we should check if that skill can be repeated, if it can be repeated under stress, and perhaps more importantly, if it can be repeated after a period of time with little or no practice. As children we learn how to ride a bike and we practice that skill for a number of years in different contexts and situations. As adults, even if we haven't been on a bike for decades, we would still be able to jump on one and ride it (Haibach-Beach et al., 2018). It might feel a bit awkward and tiring at first, but we would have few problems doing that. The same applies to core aquatic skills; once properly acquired, they should stay with us for life!

Formative (or continuous) assessment, on the other hand, although probably the best option, at least in theory, might be misleading in that we see or we think we have seen a swimmer achieve certain outcomes, perhaps only once, and similarly to what happens in the case of summative assessment, we might make assumptions on their motor learning without monitoring their capability to repeat that skill and/or to retain it over a period of time. In other words, if we see a swimmer managing to perform a somersault in the water or a front flip at some stage during the term in which that skill should be first learned, we might tick the relevant box on the assessment sheet. But after the swimmer has been moved to the next level, will we be monitoring that the skill has been properly acquired and that it can still be performed consistently? This is particularly important for skills that don't necessarily and directly influence the capability to swim strokes. For instance, a back flip, a surface dive, the ability to tread water using effective sculling and/or eggbeater kicking technique, which could easily be overlooked if insufficient time has been dedicated to practice them. Besides, formative assessment tends to be mostly carried out by the teacher who normally teaches the pupils being assessed. Therefore, their objectivity, impartiality, level of observation skills, experience, and technical preconceptions all play a strong role in the assessment outcomes.

Furthermore, both formative and summative assessments are prone to be influenced by the afore-mentioned internal and external factors. Parents and pool management seem to be particularly difficult to keep at bay, especially for inexperienced teachers/assessors. Whoever has worked in a swimming pool knows this very well. There seems to be a general attitude in pool management all over the world to keep parents happy, giving children as many badges/certificates as possible, as opposed to educating them, which obviously would require more energy and effort (Langendorfer & Bruya, 1995). In addition to this, there is also the need for many organisations (national governing bodies, lifesaving organisations) to keep up with the turnover of swimming teachers and lifeguards, which in turn creates cohorts of insufficiently educated and experienced teachers and assessors (Stallman, 2018).

Another important issue in terms of assessment process and methodology, as well as teaching, is that we tend to use a number of descriptors that tell us, and the swimmer, how the effective skill should look as opposed to how it should feel whilst being performed. This is a significant limitation as feel for the water and proprioception are of paramount importance in aquatic activities. For example, the sculling action is generally described, regardless of what type of sculling we are trying to do, as making a “figure of 8” with the hands (ASA, 2016) as opposed to emphasising the importance of feeling the constant pressure of the water on the palm of the hand and of being able to use that pressure to generate lift and consequently produce movement in the water that can be controlled changing the pitch of the hands (Maglischo, 2002). Obviously we understand the need for standardisation and for providing simple, straightforward guidelines to teachers/assessors, but there is a risk of getting bogged down with the script and of being misled by it, especially in situations when the teacher/assessor lacks the experience and the knowledge to interpret it. First and foremost, teachers and assessors need to have a good knowledge of principles of movement in the water and an understanding of why we have some specific movement patterns in the water, what they mean, and what their implications are in order to do their job effectively.

Another consequence of focusing too much on these descriptors is that we tend to overlook some visual indicators that would tell us a lot about the level of skill acquisition reached (e.g., how easy it looks, whether the movement looks effortless vs. effortful, whether there are any non-required extraneous movements, whether the swimmer can focus on other tasks whilst performing the skill itself).

As already mentioned, many teachers seem to have limited, if any, understanding of those foundational principles of movement in the water (e.g., Bernoulli’s principle of hydrodynamics in relation to sculling and eggbeater kicking) which would greatly increase their capability to assess their students’ performance. We should, of course, give them some guidelines, but we believe they should also be better educated and should have a deeper understanding of what swimmers are doing in the water and why. Shockingly, in courses to qualify swimming teachers all over the world, not much emphasis is given to the principles of movement in the water, whilst swimming strokes tend to be described in a dogmatic, status manner (AUSTSwim, 2008; Lau & Purvis, 2016).

To highlight two typical situations in which the criteria might not be fit (or valid) for the purpose, as well as to further support what we have discussed so far, I now propose to focus on two core aquatic skills (ASA, 2016; Lau & Purvis, 2016):

- 1) Sculling
- 2) Eggbeater kick

These two core aquatic skills are of fundamental importance for anyone who wants to partake in a range of aquatic disciplines (swimming, synchronised swimming, water polo, lifeguarding) and enjoy them to the fullest, but they are also extremely important survival aquatic skills (Melchiorri, Viero, & Triossi, 2015). Unfortunately, these two tasks are very often overlooked, partly because many teachers/lifesaving instructors find it difficult to understand them and therefore to teach/assess them; but sculling and eggbeater kick are both important elements of a survival task we call “treading water.” Treading water can be achieved in different ways and its definition is almost as vague as the definition of swimming. Although it could be considered a skill in itself, we have to bear in mind that it is something we do using core aquatic skills. We can tread water using different kicks (e.g., scissors, eggbeater) and arm actions (e.g., paddling, sculling), but there is no doubt that the most efficient and safe way to do it is using sculling, egg beater kick or, even better, a combination of both! These two core aquatic skills are fully developed and used by water polo players and synchronised swimming athletes to meet their sport’s requirements. They allow a swimmer to tread water efficiently and almost indefinitely, even with a certain amount of weight applied on them.

We have already mentioned that sculling is often described as making a “figure of 8” with the hands, but is it really? If we watch slow motion videos of different types of sculling being performed, perhaps we wouldn’t be so sure. Sometimes the movement pattern might resemble that of a figure of 8 but not all the time. It really depends on whether the swimmer is stationary or moving and in which direction, with what type of sculling action and with what body position. Describing too many variables to make them fit in such a generic description that might confuse the swimmer. Wouldn’t it be better to have an understanding of the foundational principles of movement in the water (e.g., Bernoulli’s principle) to get an idea of what is happening when we are sculling and therefore know what we are looking for? Besides, we wonder how many teachers/assessors would really be able see that figure of 8 whilst observing from a pool side a swimmer who is in the water.

How many of those teachers have an understanding of the Bernoulli principle of lift? If they did, they wouldn’t focus so much on the “figure of 8” but would focus more on the feel for the water that the sculling movement should generate and help develop; they would look for indicators that the swimmer is feeling the water and maintaining the pressure on the palm of the hands (e.g. ability to hover, change direction or position smoothly, accelerate, decelerate). The swimmer should aim at maintaining that feel as much as possible, with their hands pitching in relation to the direction of travel and/or the type of scull being performed. It’s all about feeling that pressure on the palm of the hand and using it to get where we want to get. What is done habitually by the expert swimmer should be understood by the teacher/assessor. How many times have we heard a teacher telling swimmers to focus on feeling the pressure

of the water, experiment as they focus on the feeling, and subsequently telling them to try and change the pitch of their hands to move in different directions? Probably not many times, because very few teachers actually know all this. Obviously, without knowing Bernoulli's principle it is very difficult to understand it. They normally just tell their pupils to make a "figure of 8" and perhaps offer them a demonstration that vaguely resembles the skill being practiced. Such a description and demonstration rarely produces effective results from novice swimmers.

Sculling is also a typical example of the afore-mentioned overuse of verbal cues or descriptors. In the current Swim Ireland Learn to Swim Programme (level 3), for example, there are 10 of what they call Teaching Points for Assessment Criteria for a head first scull (1 relaxed, 2 head back, 3 eyes looking up, 4 hips up to surface, 5 engage core, 6 long legs and toes pointed, 7 arms by side, 8 fingers pointed upwards, palms facing towards the feet, 9 sculling action using a figure of 8, 10 continuous movement), but we shouldn't be so sure they are all relevant to the skill being performed and therefore assessed. Funnily enough, none of them describes what sculling actually ought to be and we suspect that some of them might somehow confuse and mislead the assessor. For instance, there is no mention whatsoever of the angle of attack (Maglischo, 2002), which is of crucial importance in sculling.

We also have to comprehend and consider that this is a skill where an understanding of the level of skill acquisition, as well as of the child's developmental stage, is very important to properly assess and further develop the skill. For example, one of the teaching points for assessment criteria is described as *engaging core*, and this is considered a criterium regardless of the child's age and/or stage of development. Paradoxically, because of this, we could have an older swimmer being passed thanks to their body position, even with a poor sculling action, whilst a younger swimmer, who is performing the sculling action better but struggling to hold the horizontal body position due to their young age and lack of core strength, is being failed.

To help the teacher/assessor, Swim Ireland provides a skill grading system with a scale from 1 to 5 (1-2 are fail grades, 4-5 pass grades and 3 borderline with the possibility of passing the swimmer at the teacher's discretion). Similar methods exist in learn to swim programmes all over UK. In this grading system the word 'error' recurs in grades 2 to 4. But what do they mean when they say 'error'? Are they considered errors based on the descriptors? Are these errors incorrect movements or non-required movements, which could instead be indicators of motor learning/development in progress? We believe that these assessment tools, meant to simplify the assessor's task and offer them guidelines, most of the time end up confusing them even more, especially when paired up with the above-mentioned cues or descriptors.

The other core aquatic skill we are focusing on here, the eggbeater kick, is also a skill very often overlooked during swimming programmes. A number of swimming and lifesaving programmes ask swimmers to tread water for a certain amount of time, depending on the level/qualification, but don't indicate any specific technique to do so, and if a technique is not systematically and deliberately practiced it is quite unlikely it will develop into an acquired skill at an expert level (Haibach-Beach, et al., 2018). Many swimming teachers struggle to teach eggbeater kick because they can't perform it themselves and we suspect this is why many programmes don't require this skill to be developed whilst, thinking they are somehow covering in this way the teaching of survival skills, they ask swimmers to be able to tread water for a specified amount of time. This is the case of the afore-mentioned Swim Ireland Learn to Swim Programme, which is in line with similar programmes all over UK. It is also standard practice in lifeguard courses and assessment in many countries (UK, Ireland, USA, Australia). But treading water *per se* is not a skill, it's performance task! We think it's very important to understand this. As we have just said, most programmes that are currently in use here in Ireland and in other countries, expect swimmers/lifeguards to be able to tread the water for a number of seconds/minutes regardless of the way it is achieved. So the outcome and the performance at that moment in time is given priority whilst there is no assessment of a preferred effective kicking treading technique. This is extremely dangerous as that swimmer/lifeguard might not be able to repeat such a performance even after a short period of time and/or under different circumstances and stress factors. They might be able to reach the 60/90 seconds of water treading required to pass their qualification today (after having trained hard for a number of weeks) but would fail miserably only two weeks later, after a period of inactivity, whilst someone with an expert level eggbeater technique would be able to perform the skill almost indefinitely regardless of their level of fitness. Remember the bicycle example?

There is also another danger in focusing too much on the performance at that moment in time and on the outcomes: the development of ineffective or inefficient habits, which in turn would make it more difficult to learn and develop proper, more effective techniques. In the case of treading water, especially if introduced too early in a learn to swim programme, when swimmers are not yet ready (Langendorfer, 2015) and using any choice of technique, there is a risk of developing what is known as a "screwed kick" (inefficient habit), which will make it more difficult for the learner to dorsiflex their feet in the future, for example in the breaststroke kick. This will impact on their capability to tread water effectively using an eggbeater kick and consequently on their safety in the water.

So, how can we better assess swimming and survival skills? Well, after what we have discussed so far, it should be clear that having a sound understanding of the principles of movement in the water (i.e., hydrodynamics)

is of paramount importance. Then, based on motor learning and motor development principles (e.g., goal setting, practice schedules, progressions and stages of learning) (Haibach-Beach, et al., 2018), we should look for: performance improvement, consistency or stability, persistence, level of effort, attention, adaptability.

Performance improvement over time is probably the most visible indicator of motor learning, so if a swimmer can perform an eggbeater kick for an increasingly longer period of time, we could assume that some motor learning is occurring and that the relevant motor skill is being acquired. Another important indicator is consistency, for instance, the ability to consistently execute a dorsiflexion whilst doing an eggbeater kick (this might not have been the case at the initial stage of learning this skill). Persistence, or the ability to perform even after periods without any practice, tells us that motor learning has occurred because, as indicated by Haibach-Beach and colleagues (2018), motor learning is a relatively permanent change in the capability to perform a motor skill. We have already used riding a bicycle as an example of a well-learned task, but to be more specific, anyone who played water polo likely would instinctively perform an eggbeater kick if they fell into the water, even after many years of inactivity.

Level of effort indicates the capability to use a certain motor skill in the most efficient and effective way. Whilst treading water, for example, some swimmers can achieve a very stable position without much effort and stay afloat almost indefinitely, their heads and shoulders look very stable and there are no bouncing movements; they can slow down their movement and still keep their head above the water (Langendorfer & Bruya, 1995). Attention required to perform the skill also is an important indicator of the level of skill acquisition; learners at more advanced stages don't need to focus on the movement patterns (this could actually be counterproductive for them) whilst executing the skill itself but can also focus on other tasks. This indicator can become a useful tool during the assessment of swimming and survival skills. For example, we could engage swimmers in conversation whilst they are performing an eggbeater kick or a sculling action and see how much they can actually focus on the conversation whilst still maintaining effective technique. Last, but not least, adaptability is very important especially when we consider survival skills. If a swimmer can proficiently perform an eggbeater kick under different conditions (e.g., water temperature, clothing, open or rough water) their chances of survival in critical conditions will increase. When teaching and assessing we should try to re-create some of the scenarios and stressors the swimmer/lifeguard might encounter.

Based on our experience we have also found that observing what technique/skill swimmers choose to use when given a task with limited instructions can be a good indicator of their competence in the water and of their

level of skill acquisition. For example, if we ask a group of swimmers who are participating in a relay game to swim using doggy paddle after the dive, without telling them how far they can go with the dive, what they decide to do under the water will tell us a lot about their capability to streamline, their level of breath control, and other performance capabilities.

Conclusions

In conclusion, it is our opinion that swimming and survival skills could be better assessed doing the following:

- a) Educate teachers and assessors to give them a better understanding of the principles of movement in the water and make them focus less on preconceived and dogmatic ideas on technique. This doesn't necessarily mean they would need a degree in science, although some theoretical knowledge would definitely be beneficial. It can be achieved through practical training in the pool. Therefore, the role of teachers' developers (tutors) is to transfer the theoretical knowledge into the practical environment, using examples and exposing teachers to relevant and illustrative first-hand experiences in the water.
- b) Greater use of deliberate practice and self-reflection on observation skills. Observational skills take extensive time and need to be guided by more experienced teachers and tutors. In addition, the use of video and other technology can enhance observational skills.
- c) Focus more on assessing the level of skills acquisition without getting lost in the jungle of descriptors. Perhaps Fitts and Posner's (1967) model of learning stages (cognitive, associative, autonomous) could be satisfactory to assess and classify the swimmers' level for individual skills. The sum and the combination of all these skills will contribute to creating the general level of water competence (Langendorfer, 2015).
- d) Strive to have more individual-centred, inclusive syllabi and assessment tools that allow for programmes to be delivered highlighting and recognising what the learner can do well and effectively, whilst giving them the tools to improve in areas that need further practice and development. Challenging them when they are at an advanced level of skills acquisition, providing timely and relevant feedback at intermediate levels and allowing for experimentation and self-discovery at beginner levels are all important pedagogical strategies that take into consideration a learner's current state of skill acquisition.

At the end of the day we have to remember that whatever syllabus, with whatever number of levels, has all been invented at some point and contains certain arbitrariness. What really counts is what our swimmers can actually do, what happens in the water, and why it happens!

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