

# Aquatic Education for School Children: An Educational Expert Statement from the Nordic Consortium

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## Abstract

**Background:** Swimming and aquatic activities in aquatic environments have a significant impact on human physical activity and well-being, particularly in Nordic cultures with abundant water resources. The importance of swimming and water activities, from survival skills to recreational activities, underscores the need for aquatic movement competences and development of suitable pedagogical approaches/practices in aquatic education. The aim of this expert statement is to consolidate current practice and evidence-based knowledge related to aquatic education in the Nordic countries to inform future development of practice and research. Also, this statement intends to elaborate upon terminology, practical approaches, and perspectives on learning and pedagogy in aquatic education.

**Methods:** The material for this position statement is based on a comparison of the different practices and an analysis of national documents in the Nordic countries related to aquatic education and drowning prevention. It also draws on a 2 1/2-day workshop where research and developmental activities and best practices in children's aquatic education were presented and discussed. The data for this position statement were generated through presentations, discussions and comparisons of documents, and were analyzed using Eggebø's (2020) collective qualitative analysis procedure.

**Analysis and statement outcome:** Aquatic education and swimming lessons are mandatory in all Nordic countries, teaching swimming skills from grades 1–10. The goal is for students to achieve specific swimming competencies by the end of compulsory school, with a sport-focused approach emphasized. However, there is a need for a broader perspective on aquatic skills and competencies,

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emphasizing water competence beyond traditional definitions. Children should be able to handle various water environments and activities. Concepts like water competence and aquatic literacy can enhance lifelong enjoyment of movement and promote meaningful experiences. Research on swimming competence in the Nordic countries is lacking, with existing data being based on children's perceived abilities rather than actual skills and competencies. This expert statement presents recommendations for researchers and practitioners to promote aquatic education and research for the benefit of children and young people.

**Keywords:** *aquatic education; swimming proficiency; Nordic countries; water competence*

## **Introduction**

Swimming and activities in blue spaces bring immense joy to many people's lives and play a substantial role in human physical activity, with potential positive effects on health, quality of life, and well-being (Overbury et al., 2023; White et al., 2020). Blue spaces are described as aquatic environments, both in natural and in urban areas including standing and running water (Finlay et al., 2015). The engagement in activities in, on, and around water, both occupational and recreational, has historically constituted important facets of Nordic cultural practices. This enduring trend persists, owing to the geographical setting characterized by numerous inland lakes, an extensive river network, and encompassing a comprehensive coastal zone. Furthermore, the seasonal variations from cold winters to warm summers influence the utilization of open-water environments in these Nordic countries. Aquatic movement competences are considered a fundamental requirement throughout the life span (Button, 2016), not only for personal safety and drowning prevention, but also as a factor amplifying an individual's capacity to participate meaningfully in aquatic pursuits.

Politicians and stakeholders hold swimming education as a paramount competence for all children and adolescents, and swimming has traditionally been a central content of the school curriculum (Borgonovi et al., 2022). Implementing basic swimming and water training programs for school-aged children are strongly recommended by the WHO (2022) to reduce the risk of drowning, which is recognized as the leading cause of injury-related death worldwide, with an annually global estimate of 236,000 drownings (WHO, 2023). Implementing swimming programs has shown to be effective in improving swimming skills (Field et al., 2022; Strašilová et al., 2020). However, since learning to swim indoors in a warm swimming pool is quite different than swimming in cold and open water, researchers suggest that water education programs should also take place in a wide range of representative environments and situations that children could be exposed to in real life (Button et al., 2023).

Researchers in the field of aquatic skill learning request more research and evidence-based knowledge (in schools and teacher training) in different water contexts (e.g., outdoors) internationally (van Duijn et al., 2021). Research also shows socio-cultural and season-based differences in the drowning pattern (Pilgaard et al., 2020). Most accidents occur in June–August, and mostly among males (Claesson et al.,

2021). Further, socio-economic status is also associated with swimming skills, showing higher swimming skills for people with higher socio-economic status (Leavy et al., 2016; Löhmus et al., 2022). This is particularly concerning given the potential positive health benefits of swimming (Overbury et al., 2023; White et al., 2020) and the significant impact that positive childhood experiences in swimming and water activities can have on lifelong engagement with these activities (Allen et al., 2016; Field et al., 2022; Mekkaoui et al., 2022).

Aquatic movement competence and swimming skills are a relatively new field of research and there is a need to map the status in the Nordic countries; what do we know about Nordic school pupils' competence in water, including the content and organization of the training and education. The scope of this expert statement, made on behalf of the Nordic Consortium (NC) for Aquatic Education, is to consolidate current practice and evidence-based knowledge related to aquatic education in the Nordic countries to inform the future development of practice and research. Also, this statement intends to elaborate upon terminology, practical approaches, and perspectives on learning and pedagogy in aquatic education.

### **Historical and social influences on swimming proficiency**

While swimming in ancient times was associated with pleasure for the upper classes (Terret, 2004), the roots and traditions for swimming competence can be traced back to early human survival such as catching food in the water or for military purposes. For example, a 3000-year-old image from Mesopotamia shows an Assyrian soldier using an animal skin as a means of buoyancy (Lidström & Svanberg, 2019). In Icelandic sagas from the 13th century, swimming proficiency of the early settlers is revealed through heroic swimming achievements, and stories of using hot pools for bathing, relaxation, and socializing (Elliðaárstöð, n.d.; Westiceland, n.d.). Even today, sea nomad cultures exist, where life, culture and physiology are adapted to life in and on the ocean (Ilardo et al., 2018).

Swimming and bathing culture disappeared in Europe during the Middle Ages, and in the early 1800s few Europeans could swim. This can partly be attributed to the Christian doctrine, where swimming was associated with immoral and inappropriate behavior (Terret, 2004). Together with epidemics, and since the military did not have the same need for swimming ability, the population's swimming skills were seriously reduced (Dawson, 2006).

Throughout the 19th century, swimming abilities were poor in the Nordic countries. The number of drownings increased in the population, especially among fishermen (Ívarsson, 2007). Recognizing the importance of swimming skills, the military started the first official military swimming education in Sweden in 1760 (Lidström & Svanberg, 2019). Late in this century, swimming became more significant for hygiene purposes for the working classes as part of the industrial revolution resulting in establishment of swimming clubs (Terret, 2004). The political interest grew

as poor swimming skills among the population were discovered (Olstad & Tønneson, 1987). The integration of hygienic, commercial, and leisure objectives led to different effects, where sport performance was one of them (Rothwell et al., 2024). Swimming pools were built for competition and a change towards sport performance became more intense (Pelayo & Alberty, 2011). For educational purposes, this development resulted in two distinct directions of swimming competence, one for people with recreational purposes, and the other for those who enjoyed the competition of swimming.

Throughout the 20th century and into the 21st, there have been several examples of how swimming education and political interests are intertwined. For instance, drowning statistics have had a great impact on education in terms of content in the curriculum in schools, i.e. mandatory swimming in schools since 1940 (Iceland), or substantial changes in competence aims as in Norway (Lyngstad, 2019).

In 1995, Langendorfer and Bruya (1995) introduced the concept of water competence. The concept embraces a holistic view on aquatic activities and drowning prevention including swimming skills, knowledge, attitudes and risk assessment. It was further developed by Stallman et al. (2017) into a model consisting of 15 competence areas. These competences are important to safely enjoy activities on, near, and in water, be aware of local hazards, understand and reflect on risks, and prevent drowning accidents (Stallman et al., 2017).

However, despite the central role of swimming in many educational curriculums, research on swimming skills is relatively scarce. Historically, research has mostly been conducted on swimming as a sport competition examining factors such as biomechanics and physiology (Pelayo & Alberty, 2011). In recent years, studies have linked swimming and aquatic programs to increased physical activity and health parameters (Field et al., 2022), but also to understand swimming from a functional perspective (Grellier et al., 2017; Overbury et al., 2023; Thompson & Wilkie, 2021; White et al., 2020). Swimming has been identified by stakeholders as one of the most important activities for lifelong physical activity (Allen et al., 2016). Hence, a more paramount picture depicts the importance of aquatic movement competence.

## **Methods**

### **The panel of experts**

A group of experts (N=10) from all the Nordic countries constitute the Nordic Consortium for Aquatic Education (NC) for children. All six of the Nordic countries are in northern Europe but differ in environment and cultural traditions related to aquatic activities and education. The members of the Consortium were recruited based on a) their affiliation to teacher education/physical education teacher education (PETE) in their respective country in the Nordic region b) research and development (R&D) activities related to swimming proficiency and water competence or

experience with teaching in aquatic education programs in PETE, and c) familiarity to legislation, curriculums and gray literature related to the topic. Their expertise within PETE ranges from 10–25 years. Six of the experts hold a PhD and seven have published more than six scientific publications. The researcher group is led by a professor in the field. The participants in the NC are the authors of this article.

### **The consensus process: data generation and data analysis**

A 2½-day workshop was organized at the host university in October 2023 and members from the NC gathered to present, share and discuss R&D activities and good practices related to children’s aquatic education. Prior to this workshop, the members communicated through online meetings and e-mail to plan the agenda and the points for discussion. Moreover, in advance, authors representing all countries analyzed relevant statistics, websites, legislation, national curriculums, and literature/research on aquatic education and water competence based on specified questions related to the six different points that were developed and refined in the consortium. The answers are shown and summarized in Table 1, and the six points were:

1. Swimming proficiency (e.g. definitions and assessment)
2. Statistics about swimming proficiency (e.g. how many adults and children can swim)
3. School swimming (e.g. organization and time used in aquatic education)
4. Legislation and curriculum (e.g. is school swimming compulsory, main content of the curriculum)
5. Teachers/instructors (e.g. who teaches the aquatic programs/education in schools)
6. Teacher education program (e.g. PE teacher students training in aquatic education and drowning prevention)

The workshop featured presentations, discussions, national document comparisons, and the development of the data for this position statement. The group leaders facilitated the process, taking notes and summarizing the discussions at the workshops. The discussions were mainly centered around the national definition of swimming proficiency, aquatic education in the contexts of PE and educational purposes in primary school children, aquatic education in different water environments, barriers and facilitators to successful aquatic education in different age groups, aquatic education in a historical and cultural context, and aquatic education and lifesaving in the light of contemporary perspectives of water competence and motor behavior. Also, research projects and best practices for aquatic education in primary school and teacher education were presented.

In this way, the workshop included presentations and discussions, along with national document reviews and comparisons, which collectively created the data of this expert statement. Once all the empirical material was collected, we followed Eggebø’s (2020) recommendation for ‘collective qualitative analysis’ to direct our analytical approach. This approach facilitates a collective analysis process involving

several researchers and is similar to Braun and Clarke's (2006) thematic analysis both when it comes to the steps in the process and the flexibility (Eggebo, 2020). In the initial phase of the analysis, we individually reviewed the data and noted the aspects we found particularly relevant. In the second step of our analysis, we created a preliminary draft of what we initially identified as relevant themes. In the third step, we discussed the relationships between the themes and determined which could be grouped as subthemes. This process led to the identification of the three final themes: 1) content and organization of swimming education in the Nordic countries, 2) still a traditional sport-focused approach in swimming education, and 3) research in aquatic movement competence and education. The final step of the analysis involved creating an outline and work plan for the writing process. A draft of the manuscript for the statement paper was established, where the NC engaged in writing different sections. The writing tasks were divided among the participants of the NC, and throughout the writing process we continued to refine our ideas and further develop the themes. The authors engaged in written communication, e-mail exchanges and discussions on a co-writing platform. The group leaders presented the themes from the analysis to the consortium for another discussion which continued until consensus was reached. The final version of the manuscript was developed in the following months after the workshop, based on input and comments on all sections of the paper from all participating members of the NC.

### **Analysis and statement outcome**

The data material led the consortium to formulate three themes to consolidate current practice and evidence-based knowledge related to aquatic education in the Nordic countries: "content and organization of swimming education in the Nordic countries", "traditional sport-focused approach in swimming education", and "future research in aquatic movement competence and education", which are presented below (see also Table 1). Moreover, the themes and data material were used to inform the future development of practical approaches, research and perspectives on learning and pedagogy in aquatic education presented in the section "Final reflections."

### **Theme 1: Content and organization of swimming education in the Nordic countries**

In all Nordic countries, the regulatory framework for teaching basic swimming and water safety in primary school is a legislative requirement regulated through the national or state curricula for physical education (PE). Swimming lessons are compulsory in all countries, and the education in primary school is governed by objectives and standards aimed at basic components necessary for the achievement of specific water skills and being able to swim. In all countries, the PE curriculum



outlines a structured progression of swimming skills that spans from 1-(9)10 grades in primary and lower secondary school. Although there are some variations between the countries when the various competence aims and objectives are to be achieved, typically, swimming lessons commence during grades 1–3, focusing on water familiarization and safety through play and activities to introduce students gently to the aquatic setting. In the following grades (4–6), students are expected to swim independently and demonstrate basic swimming competencies like diving, gliding, and navigating in water. In the last period (grades 7-(9)10), the curriculum emphasizes refining swimming techniques, achieving specific distances, and acquiring life-saving abilities. Beyond the competence aims for each age level, the Nordic countries have progression recommendations for swimming competence at the conclusion of compulsory school.

Despite the stated competence aim and objectives in all curriculums the content and organization of swimming education varies both between and within the Nordic countries. For example, the amount of time (hours) spent on swimming education is usually not regulated and differs between countries and between municipalities and schools within them. There is also a lack of national data on the number of hours spent, except from Iceland, where students receive one lesson per week during grades 1–10. There is variation in whether training is provided for short intensive periods (weeks) or is given as one lesson per week during primary school. Mainly, the teaching takes place in indoor swimming pools. However, in Finland, remotely located schools may use natural water outdoors in Norway, about 23% of education occurs in an outdoor/open-water environment (Bergene et al., 2022). In Iceland, Denmark, and the Faroe Islands, the school education is provided only by qualified PE teachers or teaching staff. In Norway, Sweden, and Finland, swimming instructors from sports clubs or municipalities (i.e., outsourcing of learn-to-swim programs) are provided in addition to PE teachers in schools, although PE teachers can be involved in planning and assessing the students. Differences in the given education seem to be based on cultural traditions, such as facilities and access to pools/water environments as well as the teachers' competencies in aquatic/swimming education.

## **Theme 2: Still a traditional sport-focused approach in swimming education**

Except for Norway and Iceland, all countries use the Nordic definition of swimming proficiency, i.e., “The child is expected to enter the water completely submerged and to swim a minimum distance of 200 meters in deep water, of which at least 50 meters completed using some form of backstroke technique.” In Iceland, a greater emphasis is placed on swimming technique, and children are required to master specific skills to be considered proficient swimmers: “Roll over from stomach to back and vice versa, dive and swim short distances in freestyle, backstroke, breaststroke, school backstroke, and crawl with or without aids.” The Norwegian definition diverges to some

extent from the other countries as it comprises six consecutive aquatic skills, clearly defined within a specific competence aim (Norwegian Directorate for Education and Training, 2020, 6), stating that every child should: “Show the ability to swim by falling into deep water, front stroke swimming 100 meters, during which the pupil dives down and picks up an object with their hands, stopping and resting for three minutes (while keeping afloat on one’s stomach, orienting oneself, rolling over, floating on one’s back), then swimming 100 meters backstroke, and climbing ashore.” This conventional approach to definitions of swimming proficiency in most Nordic countries, except Norway, is probably a consequence of a sports-focused approach in PE curriculums where the focus is put on technique and swimming strokes. According to Stallmann (2017) swimming education and programs have traditionally viewed teaching swimming strokes and forward propulsion as core aspects of swimming, and this excessive focus on strokes and competitive swimming has caused many aquatic programs to concentrate almost entirely on instructing the four main strokes used in competitions. In Norway, on the contrary, the last and current PE curriculum shifted towards a less sports-focused approach (Bratten & Kilanowska, 2021). This shift indicates that swimming is now conceptualized beyond the traditional focus on technique, propulsion, and forward movement.

### **Theme 3: Research in aquatic movement competence and education**

The analysis shows a lack of research on swimming competence in the Nordic countries. The knowledge of children’s swimming skills is mainly based on national questionnaires asking children about their perceived abilities to swim. The questions in these questionnaires are not consistent, hence it would be difficult to compare them. For instance, questions like, “Do you think you can swim 200 meters” and, “What is the longest distance you have swum” are reported to measure if children can swim 200 meters or not. Obviously, the results need to be handled with care. The research methods have their strengths and can be useful for example to follow national or regional trends. However, students’ perceptions can be biased to under- or overestimate their actual aquatic competence (D’Hondt et al., 2021; Jidovtseff et al., 2024). This lack of valid results has several implications. First, the knowledge gathered in these surveys cannot be compared and aligned as the surveys do not measure the same things. Additionally, it is impossible to compare the results across countries as they would not measure the same competence. It is a necessity to measure both the perceived and actual aquatic competences. Second, the knowledge from these surveys may result in limited evidence-based pedagogical practices and actions. For example, to assess the effect of practice and experience on different skills and competence in various aquatic environments, it will be central to have assessment tools that can measure the development and learning of actual aquatic skills and competence.



*Table 1. Fact sheet on swimming proficiency in the Nordic countries*

	Norway	Finland	Sweden	Iceland	Faroe Islands	Denmark
<b>Definition of swimming proficiency</b>						
	Show the ability to swim by falling into deep water, front stroke swimming 100 m, during which the pupil dives down and picks up an object with his or her hands, stopping and resting for three minutes, then swimming 100 m backstroke, and climbing ashore (1)	After jumping in the deep water, person is able to swim at least 200 meters of which 50 meters is swum on the back (2)	Fall into the water, submerge their head underwater, and after resurfacing, swim 200 meters in deep water, of which 50 meters is backstroke (37, 42)	Roll over from stomach to back and vice versa, dive and swim short distances in freestyle, backstroke, breaststroke, school backstroke, and crawl with or without aids (18)	After jumping in the deep water, person is able to swim at least 200 meters (2)	All children should be able to swim at least 200 meters of which 50 meters is swum on the back (3)
<b>Swimming proficiency nationally</b>						
<i>Number (percentage) of adults who can swim</i>	79% (self-reported) (4).	53% (self-reported) (5)	79% self-reported (200 meters). Among newly arrived immigrants, 38% (39)	Data unavailable	Data unavailable	87% (self-reported data) (3)
<i>Number (percentage) of children who can swim</i>	41% can swim 200 meters, 39% according to the Norwegian benchmark (self-reported) (6)  40.5% according to the Norwegian benchmark (self-reported) (7)  62.5% (practical assessments) (33)	55% of 6 <sup>th</sup> graders (self-reported) (5)	93% (teacher-reported), non-response: 41% (40)	82% of 5 <sup>th</sup> graders (by passing the swimming test) (10)	43% of 5 <sup>th</sup> graders (self-reported) (2).	48% of children aged 7-14 (self-reported) (11)

*(Continued)*

Table 1. (Continued)

	Norway	Finland	Sweden	Iceland	Faroe Islands	Denmark
<i>Age at which children learn to swim</i>	Mean age is 7.4 years (self-reported) (4)	Mean age 9 years (median age 10 years) (5)	Children usually do not learn to swim before the age of four. When they learn is individual, but also related to socio-economic and family-related factors (35)	Swimming proficiency in Iceland is usually reached in 4 <sup>th</sup> grade (9–10 year of age) (18)	50% before the age of 7, when they start school (self-reported) (2).	80% before the age of 9 (self-reported) (11)
<i>Place where children learn to swim</i>	51% vacation time, 20% school, 12% swimming course, 4% swimming clubs, 12% other, 6% don't know (6)	64% leisure time, 22% swimming school, 7% school, 4% kindergarten (5)	Research data unavailable.	Research data unavailable. Children learn to swim in compulsory PE classes in schools/swim clubs.	Research data unavailable.	Research data unavailable. Children learn to swim through private lessons/swim clubs as a child, at compulsory PE classes at school or on vacations.
<i>Number of children who take part in swimming lessons in swim clubs</i>	7% practice swimming in swimming clubs (6)	Data unavailable	Data unavailable	5.5% (2.628 children) practice swimming in swimming clubs (14)	2.2% of 5th graders report that they are members of a swim club and 27% report that they swim in clubs or in their spare time (2)	60% (aged 3–6) (15)

**School swimming**

<i>Grade where school swimming lessons are provided</i>	Varies, depending on local prerequisites and distance to swimming pools. However, there are competence aims after 2 <sup>nd</sup> and 4 <sup>th</sup> grade (able to swim) (1)	1 <sup>st</sup> to 9 <sup>th</sup> grade (5)	Not regulated, varies(38)	1 <sup>st</sup> to 10 <sup>th</sup> grade (18)	Varies, depending on local prerequisites and distance to swimming pools. However, there are competence aims from 1 <sup>st</sup> to 9 <sup>th</sup> grade (21)	Primarily in 3 <sup>rd</sup> , 4 <sup>th</sup> or 5 <sup>th</sup> grade (ages 8–12) (16, 20). Self-reported data: 4 <sup>th</sup> grade 43%, 5 <sup>th</sup> grade 22% (11)
<i>Number of hours/ lessons children receive school swimming</i>	No national standard exists, varies between municipalities and schools. Number of hours differs from 20–76 (33)	Not regulated, varies between municipalities and schools.	Not regulated, varies (38)	At grade 1–10 (age 6–16): one lesson per week. In some compulsory schools there are intensive swimming course for in 1 <sup>st</sup> and 2 <sup>nd</sup> grade then students attend swimming every day for 2–3 weeks (20 lessons) (18)	Not regulated and varies between municipalities and schools.	Not regulated and varies between municipalities and schools. Self-reported data: 93% have received swimming lessons once a week over half or a whole school year (11)

**Legislation and curriculum**

<i>Compulsory or voluntary swimming lessons in primary and lower secondary schools?</i>	Compulsory	Compulsory	Compulsory	Compulsory	Compulsory	Compulsory
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(Continued)

Table 1. (Continued)

	Norway	Finland	Sweden	Iceland	Faroe Islands	Denmark
<i>Overarching aim of swimming education</i>	After 10 <sup>th</sup> grade: students should know how to use different swimming techniques and be capable of swimming a longer distance as well as understand and carry out lifesaving skills in, on and by water in natural environments (1)	After 9 <sup>th</sup> grade: students should have swimming skills (defined as Nordic description) and skills to save oneself and rescue others (24)	To enjoy the sea and lakes for recreation and to prevent accidents. For exercise or fitness. (38)	After 10 <sup>th</sup> grade: students can perform well in all swimming styles and have stamina for swimming. They should also know the safety rules, how to apply first aid and rescue from water, and swim a 25 m rescue swim with a peer (18)	After 9 <sup>th</sup> grade: students should be able to be active and safe in, on and by water and sea. This involves understanding and carrying out lifesaving skills, as well as knowing how to use different swimming techniques (21)	After 5 <sup>th</sup> grade: students should be able to secure themselves in water and have knowledge of swimming and floating techniques. They should be able to behave responsibly in and on water, have knowledge of rules for safe behavior in and on water as well as have knowledge of and can perform salvaging and lifesaving techniques (19)

<p><i>Main focus and content of the competence aims</i></p>	<p>1<sup>st</sup> - 4<sup>th</sup> grade: Feel safe in water, dive, jump, dive, float, glide, propulsion in water, be able to swim</p> <p>5<sup>th</sup> - 7<sup>th</sup> grade: Basic skills, on the front, on your back, under water</p> <p>8<sup>th</sup> - 10<sup>th</sup> grade: Use different techniques, swim a longer distance (1)</p>	<p>Skills in terms of swimming, aquatics and lifesaving skills (24)</p>	<p>To be able to swim continuously for 200 m, of which at minimum 50 m on back.</p> <p>The curriculum focuses on swimming ability and water safety issues (36)</p>	<p>4<sup>th</sup> grade: Dive, roll, games, dolphin kicks, breaststroke, backstroke, crawl.</p> <p>7<sup>th</sup> grade: To swim eight meters backstroke, crawl and underwater swimming, dive from the pool bank.</p> <p>10<sup>th</sup> grade: Swim without stopping, breaststroke, backstroke, crawl, butterfly stroke, underwater swimming, tread water (18)</p>	<p>1<sup>st</sup> - 4<sup>th</sup> grade: Safety and lifesaving skills.</p> <p>From 5<sup>th</sup> grade: Also strokes like breast, crawl, backstroke (21)</p>	<p>After 5<sup>th</sup> grade: That the student can:</p> <p>1) secure themselves in water, and have knowledge of swimming and floating techniques,</p> <p>2) can behave responsibly in and on water, have knowledge of rules for safe behavior in and on water as well as</p> <p>3) knowledge of and can perform salvaging and lifesaving techniques (19)</p>
<p><i>Placement of swimming lessons</i></p>	<p>100% indoors, 23% also open water (34)</p>	<p>Indoors (only very few schools with remote location may use natural water outdoors)</p>	<p>Indoors</p>	<p>Both indoor/ outdoor swimming pools</p>	<p>Indoors</p>	<p>Indoors (20)</p>

*(Continued)*

Table 1. (Continued)

	Norway	Finland	Sweden	Iceland	Faroe Islands	Denmark
<i>Type of stroke most popular when teaching swimming in schools</i>	Front crawl (from experience and advice in literature)	Front crawl and breast swimming Starting with elementary crawl (dog paddle head down+longer stroke) -> elem. back stroke -> crawl -> back stroke -> breast stroke (30)	Breast stroke and double arm backstroke are common. However, no available research	Front crawl and breast swimming (18)	Breast, crawl, backstroke, and lifesaving skills (21)	Crawl or backstroke (25)
<i>Testing or a grading of the children's swimming competences</i>	No compulsory test, but it is obligatory to evaluate competence aim after 4 <sup>th</sup> grade (1). A scale for assessment of swimming competence proposed (33)	Yes. In 6 <sup>th</sup> grade and in 9 <sup>th</sup> grade (24)	Yes. To be able to swim 200 m, of which 50 m should be on the back(29)	Yes. Children are evaluated at the end of each school year (18)	No. There is no national test at a specific age/grade (21)	No. But there is material explaining possible voluntary tests (25)
<b>Teachers and teacher education</b>						
<i>Provider of the school swimming</i>	Teachers with PE: 76%, swimming instructors (not related to schools): 28% (34)	Primary school (grades 1-6): Swimming instructor Secondary school (grades 7-9): PE teacher (30)	The PE teacher is always responsible for planning the lessons and assessing the students' knowledge. Swim clubs (or municipal swim teachers) can assist schools (38)	Certified PE teacher (27)	Certified PE teacher (31)	Teacher certified as swimming instructor (26). Locally this can be in combination with an instructor from a swimming club



<i>Education of swim teachers</i>	Teacher educator at university or university high schools	The Finnish Swimming and Lifesaving Federation provides courses for swimming teachers to teach primary school swimming lessons.	Universities (physical education teacher education), but also the Swedish lifesaving society and the Swedish swimming association provide courses for swimming instructors	Universities in Iceland that offer program in sport science and PE.	Teacher education at university	Teacher education at university college
<i>Minimum requirements for being qualified as a swimming instructor in primary and lower secondary schools</i>	No requirements, beyond the requirements in the regulation to the educational act for the responsible adult for supervision §12-1: The supervisors must be good at swimming and diving and must know how to save lives.	In primary school the swimming instruction certificate of the Finnish Swimming and Lifesaving Federation. PE teacher education to teach swimming secondary school.	PE teachers sometimes take care of the school swimming themselves. Otherwise, a certification from the mentioned education is required. (However, the PE teacher is responsible for planning the lessons and assessing the students' knowledge) (38)	A degree from university in sport science and PE. To get teachers certification you have to complete BS and Master's degree.	The PE Teacher Education includes course for aquatics and lifesaving. To pass the course the students must do practice teaching and pass the lifesaving test. The lifesaving test is described in fact sheet 4 question 2.	Is different from the different university colleges. At some colleges, you can be qualified for the course for aquatics and lifesaving just if you are enrolled as a student (teacher education), but at some colleges you need to have PE as your main subject.

(Continued)

Table 1. (Continued)

	Norway	Finland	Sweden	Iceland	Faroe Islands	Denmark
<i>Main focus in swim teacher education</i>	Progression, didactics, learning swimming skills	Progression on water skills, strokes and lifesaving skills, didactics and safety on learning to swim and in pool environment, how to support participation (psychological and social safety)	Exercises that focus on children getting used to water, development of personal skills in different swimming styles, how to teach swimming and lifesaving	To teach them to become a teacher and how to teach children and adolescents to swim. Technical skills, rescue skills and first aid	Lifeguard and water safety training. Swim competency development. Teaching practice in school swimming	Learning swimming skills, how to pedagogically communicate and teach sports, knowledge about safety in the water and lifesaving
<i>Number of lessons of practicing swimming provided at the teacher program</i>	Ranging from 0 to 75 lessons	Swimming instructor: 100 hours (The Finnish Swimming and Lifesaving Federation) Teacher education: Ranging from 2 hours to 50 hours PE teacher education: 40 hours compulsory aquatics + 35 hours optional	Varies between universities.	50–60 hours (approximately)	25 hours (approximately)	72 hours

<i>Lifesaving course and test</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Location of learning</i>	Usually, indoor training but also outdoor practice	Usually indoor training (very few experiences in outdoor practice)	Usually indoor training	Usually, indoor training but also outdoor practice	Usually indoor training (very few experiences in outdoor practice)	Usually indoor training (very few experiences in outdoor practice)
<i>Availability of pedagogical resources for teachers</i>	Yes, resources from the government/website (23), and website including an App (13)	Yes, websites from sport institutes, Swimming Teaching and Lifesaving Federation, universities, and books (example ref. 30)	Yes, websites	Yes/no	There is a collection of games and water activities and video material made by the Faroese Swimming Federation (32).	Yes, websites

*NOTE:* References and documents for this table can be found in Appendix by number.

## **Final reflections**

Obtaining specific aquatic skills and being able to swim is outlined in the PE curriculums in all Nordic countries, however, swimming should also be carried out through a holistic approach to PE in line with the subject's relevance and values. Aquatic education and educational approaches should emphasize the importance of stimulating the lifelong joy of movement and enhancing a physical active lifestyle throughout the life span in accordance with PE's overall aim. In an educational context, the use of contemporary perspectives and theories can facilitate a shift from a sport technique perspective towards a "compound and holistic" approach to the diversity of aquatic skills and competencies in various water environments and activities. It underscores the importance of a broader range of aquatic skills and competencies (Sundan et al., 2023, 2024). This new direction aligns closely with the concept of water competence as outlined by Langendorfer and Bruya (1995) and Stallman (2017). Swimming skills alone are not sufficient to prevent drowning (Brenner et al., 2009). As such, the concept of water competence (Langendorfer & Bruya, 1995; Stallman, 2017) and the perspectives of aquatic literacy (de Martelaer, 2023; Dudley, 2019; Mekkaoui et al., 2022), are applicable learning approaches. The concept of water competence represents a paradigm shift in swimming education and drowning prevention from a narrow focus on swimming techniques and strokes to a broader focus on physical, cognitive, and affective competencies (Stallman, 2017). The perspective of aquatic literacy, developed from the concept of physical literacy (Cairney et al., 2019; Whitehead, 2001), underlines the importance of movement/physical competences integrated with the cognitive and affective aspects. Especially, enjoyment and motivation are considered to be prerequisites to participation in various aquatic activities across a wide range of water environments, including the outdoors/open water (de Martelaer, 2023). In the Nordic countries, outdoor swimming and aquatic activities are a potential component of sports and recreation (Haapala et al., 2023). Aquatic education should therefore build children's aquatic movement competence, preparing them to handle the element safely and providing meaningful experience in aquatic activities leading to an active lifestyle and lifelong joy of movement. In this context, children should learn to handle different water environments that they may meet in the local environment during their free time or in sports activities. For example, it is just as important to be able to make good assessments of dangerous places and situations as it is to master a variety of different aquatic skills. Also, one could question the outsourcing of swimming education seen in many Nordic countries, where the teaching is completed by swimming instructors/teachers without formal education in PE and without pedagogical competence (Olstad et al., 2021). Pedagogical competence plays an important role both as an element in adapting the students' learning process and in ensuring the students' safety, as the education must be tailored to each student's abilities and prerequisites. The pedagogical work with learning and safety in education highlights the teachers' professional judgment in practice (Porsanger et al., 2025).

Regarding research, gaining more valid knowledge into children's abilities in all aquatic environments may support adapted teaching content to ensure a physically active lifestyle in, on and around water. Valid knowledge from research may have influence on the population in terms of reduced drowning in the long run. Increased awareness and insight into people's aquatic competence may change their behavior. Also cultural, geographical and socioeconomic factors should be addressed both in research and education (Lõhmus et al., 2022). Today, children in the Nordic countries are mainly taught swimming techniques and lifesaving indoors in school. Enhanced understanding of aquatic competence can significantly impact students' education and lifestyle. This includes not only the students' self-awareness of their abilities, but also the teachers' insights into the students' proficiency. Moreover, it informs how educators should structure optimal instructional practices. Therefore, to ensure research on aquatic movement competencies in the future, there is a need to develop tools and research methods that are valid and that can give politicians and stakeholders correct and comparable knowledge about aquatic competence.

Recommendations for aquatic education in the Nordic countries:

- Children should practice in various outdoor environments in school programs suited to local and cultural conditions, guiding them in assessing risks in safe conditions. This could be environments like using the local beach or harbor, the local pond or a creek for practicing water education. Therefore, teachers must enhance their competence to teach using the holistic approach.
- Practice of a variety of aquatic techniques, not just swimming techniques/ skills as in terms of the four Olympic disciplines. This includes a broader understanding of aquatic movement competence as demonstrated by the 15 competences in the Water Competence model. For example, practicing on getting from the water and into a boat, evaluating currents and finding safe exits, to mention a few.
- It is important to incorporate joy and play into education and learning as aquatic movement competence is important for a lifelong enjoyment of aquatic activities. This is the primary goal of PE, rather than simply preventing drowning.

Aquatic research:

- We need more research to understand the barriers and facilitators (personal, environmental, societal/cultural)
- Further research is necessary to identify suitable pedagogical approaches/practices in education for a holistic approach to learning
- Valid research tools are needed to map the performance levels among different populations, both perceived and actual aquatic competence.
- We also need to expand our knowledge of the transfer of learning of aquatic competence across different water environments.

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