

Representation of the «watermanship» and self-perception of swimming level in elementary school children

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Introduction

Swimming is one of the most common sports activities in Walloon region as in many countries (Bodson, 1997). According to Boullé (1999) swimming courses concern various sectors of practice: the awakening (blooming of the person), the discovery (educational purposes), the improvement (to pass a test or to carry out a performance), the leisure and maintenance (relaxation or improvement of the form and health), the practice in natural environment. Additionally, swimming is a prerequisite to other sports and cultural activities. Considering its place in individual safety, education, health and leisure, its importance in child and youth development is unchallenged.

Defining ones ability to swim has been set forth by authors of many books on swimming or on swim teaching methods. Hoog and col. (1983) in Australia, pointed out that to be swimming is generally described as “*performing a recognisable stroke and breathing in such a manner as to permit a reasonable distance to be covered*” (p. 12). Cateau and col. (1968) considered additional factors and proposed that being able to swim corresponded to the ability to solve in all circumstances qualitatively and quantitatively, the triple challenge of the best balance, the best breathing and the best propulsion in the aquatic environment. This concept is shared by Gal (1993): “*At the end of the secondary school level, to be able to swim can be summarized as being able to create different forms of imbalances and to manage their linking to propulse the body, at a low cost: (1) a long time or far, without tiredness, preferentially in crawl stroke (300 or 400); (2) as fast as possible, on varying distances; (3) differently, adapting varying moving modalities and using diverse motor spaces (on or under the water)*” (p. 18). Among the diversity of aspects of the swimming mastery, Schmitt (1990) mentioned the effective facet of the practice: “*To be able to swim, it is not only to be able to move but it is also to be able to cope with the requirements of the aquatic environment, of the activities and of the beginner’s needs and anguishes. To be able to swim is an autonomy in water which is translated in terms of ability to safe him/her self, to safe others, to use the environment for leisure and to practice water sports*” (p. 17).

Finally, the concept of “watermanship” used by Thomas (1990) gives an overall idea of what should be the aquatic environmental mastery. He defined it as “*... the ability to be at home in-to become one with- the water...*” (p. 1). Authors specialized in swimming share the opinion that the major key in learning swimming corresponds to the water habituation, giving to beginner the prerequisites to the acquisition of specific strokes. Hogg and col. (1983) pointed out water familiarity or confidence as important factors in the success of swimming programmes. Dubois and col. (1984) and Brassem (1993) proposed indicators of levels of confidence. The learner should be able to jump into deep water, stay underwater opening his/her eyes, blowing through the nose and/or mouth, and gliding back or forwards.

Ideas about swimming mastery clearly differ between pupils and teachers (Mestéjanot, 1992). Twelfth grade pupils, physical education teachers, and classroom teachers were questioned about what they considered as swimming mastery. For pupils, the priority on the production of an accepted pattern of stroke. Physical education teachers gave more importance to the factors of distance and time in continuous moving. Classroom teachers emphasized safety and the ability to survive in water. Mestéjanot (1992) pointed out that, contrary to adults, pupils did not refer to the fear of the water. As their swimming experience is shorter, it would be interesting to determine the notion of “watermanship” in younger pupils would differ from older people.

Moreover, despite the attention given by professionals to the multiple facets of the learning to swim, we expected that the public (parents) link it only to mastery on the surface of the water (Rivière, 1999). Such discrepancy between this utilitarian view of swimming and that of specialists could explain some lack of understanding of teaching methods and strategies. Parents are often in a hurry to see their children covering one length of the swimming pool, and practitioners face a dilemma: teaching children to swim or to float?

Schools usually include the acquisition of swimming competences among its educational objectives. The official curriculum in the French Community of Belgium mandates that children should be able “to swim” at the end of six years of elementary school (Ministère de la Communauté française, 1999). In other countries such as France, the directions and objectives to be reached are sometimes more precisely set forth (Touchard, 1999).

Generally, schools and teachers try to offer opportunities to pupils to learn swimming. However, lack of equipment, scheduling, and transportation are common factors in limiting the organisation of swimming activities in school programmes. Moreover, during physical education lessons, teaching conditions are frequently unfavourable (number of children, small space, large differences among students, ...) and official standards are seldom met (Gal, 1993). Thus, children must supplement their training in extra-curricular environments (e.g., swimming clubs, extra-curricular or individual lessons, family activities). Parents encourage this activity and by providing financial aid and encouragement.

In spite of these efforts, Touchard (1999) considered that the objectives at the end of the elementary school are still not achieved. Maillard and col. (1994) evaluated swimming competences of 282 pupils just finishing their elementary schooling and considered as "swimmers" (able to swim 50 meters without assistance in deep water). Only 28.5% of them passed the test. Success rate varied according to the school environment: 35% in downtown schools and 13.7% in an underprivileged district. If all pupils (swimmers or not) were considered these percentages decreased to 18 and 4%. This underlined that the society faces to a real problem of safety.

It is worthwhile to assess the swimming mastery of pupils completing elementary school. This would provide relevant information to the educational community about the effectiveness of the pedagogic structures. Various instruments and methods have been devised to assess the swimming levels. They concerned beginning children and teenagers or adults already able to swim. With children, Rivière (1999) recommended the use of situations based on imaginary and highlighted the importance of their implication in the learning process. He proposed to the children draw pictures of what they had just achieved in the swimming pool. Luts and col. (1998) used a similar approach using parts of puzzles representing the significant actions that the children had mastered. Other authors developed circuits in which participants performed various tests (Dumoulin, 1992; Gal, 1993; Maillard and col., 1994; Verger and col., 1994). These authors used general motor skills on the surface, entering water, balance on water, and underwater. The circuits had from five to ten tasks, and the evaluation focused on quality of performance and/or speed of execution.

This kind of evaluation is particularly useful in providing accurate data concerning learners' needs. The play-like situation generally associated to these circuits represents a motivational factor. On the other hand, a major problem of this approach lies in time needed to assess many pupils. It is worth developing other assessment strategies, and Rivière (1999) highlighted that children should be able to self-assess their performances.

This study focused on the identification of the representations of «watermanship» by pupils and parents of elementary school children. It examined also if elementary school pupils were able to validly assess their competences in swimming operationally, comparing children's responses to their actual swimming competences.

Methods

This research was a part of a study aimed at understanding the beliefs and competences of swimming by elementary school children and their parents. Sixteen elementary schools located in the urban area of Liège (east of Walloon region) and seven neighbor towns were randomly selected, respecting criteria such as state/private status or socio-economical environment. A questionnaire was completed in by 7.4% of 1st and 6th grade pupils living within the overall target area (Table 1). Parents of these classes were invited by the school's director to answer another questionnaire. Most returned it (81.9%) (Table 1).

Table 1 - Population

	1 st grade	6 th grade	Total
Population of the whole selected area	4886	4309	9195
Number of questioned pupils	331	320	651
Number of pupils tested in swimming pool	70	61	131
Number of questioned parents	331	320	651
Number of parent's answers	268	265	533

On pupil's and parents' questionnaire, representation of the "watermanship" was collected by asking the following open question: "What does mean to you the expression "watermanship"? The answers were analysed and classified into the categories (Table 2). Reliability of the analysis reached 88% of internalist agreement.

First grade pupils' questionnaire comprised a sheet with a drawing of a fish aiming to determine their self perception of swimming competences. Similar to a puzzle, the fish was divided in 10 parts each representing a basic skill (staying under the shower, doing the crocodile in shallow water, moving along the side in deep water, sitting under the water and blowing, jumping into the water, picking up objects from the bottom, floating like a log, doing a front glide by pushing off the side, moving backwards with a float board on the belly and gliding backwards kicking to go farther) (Figure 1). Children were to paint only the areas that corresponding to the skills they thought they were able to do.

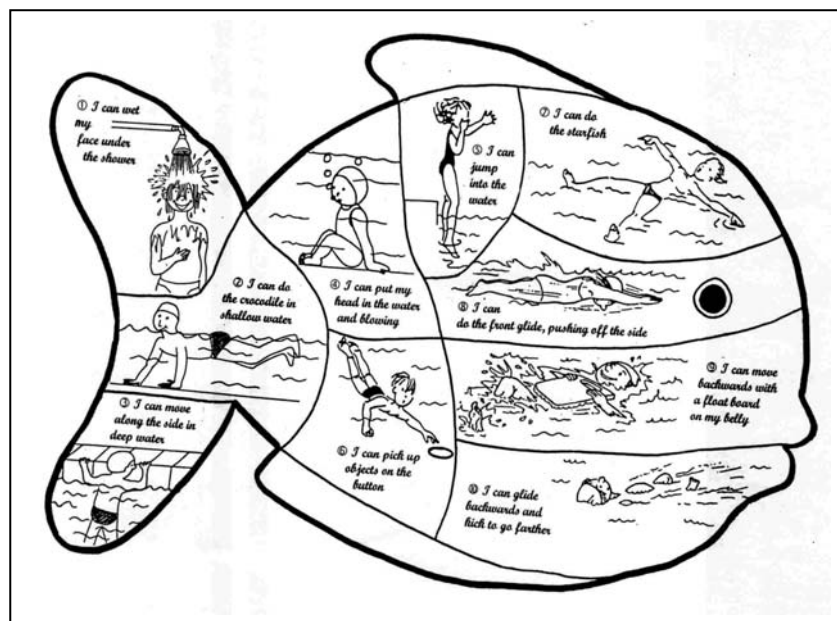


Figure 1 – Instrument designed to the self perception of swimming level in 1st grade pupils (initially developed by CEREKI)

One of the questions raised to the oldest children focused directly on their swimming level self perception. Seven items were proposed: (1)“I am able to dive”, (2)“I can swim front crawl stroke correctly:1 time 25m, 2 to 3, 4 or more”, (3)“I can stay 15 seconds in one place with the head out of the water treading water”, (4)“I can swim breaststroke correctly:1 time 25m, 2 to 3, 4 or more”, (5)“I am able to do the back float during 5 seconds without moving”, (6)“I can swim back crawl stroke correctly:1 time 25m, 2 to 3, 4 or more”, (7)“I am able to swim 10 meters underwater”.

A sample of 20% of the answering pupils (Table 1) were observed during a PE lesson at the swimming pool. First grade pupils tried to complete the skills represented in each part of the drawing fish while a trained observer assessed their ability to perform. Pupils' performances were reported on a trained observation sheet (maximum score: 10 points). Sixth grade pupils were also observed during swimming lesson and were tested through a circuit inspired from that proposed by Maillard and col. (1994). Seven skills were assessed (Figure 2). They matched to those proposed in the questionnaire.

An interview of schools' directors provided data related to the socio-economic status of the parents. It was an overall subjective evaluation of the school population and should be considered with caution. The extra-curricular swimming courses organized by the school were also assessed through these interviews. Assessment focused on lessons' frequency and number of school years during which extra curricular swimming lessons were organized by the school.

Pupils' answers and their actual ability were compared. Reliability of assessment was improved by using closed questions and a simple checklist. The test of comparison of two proportions and ANOVA were used (Glantz, 1988).

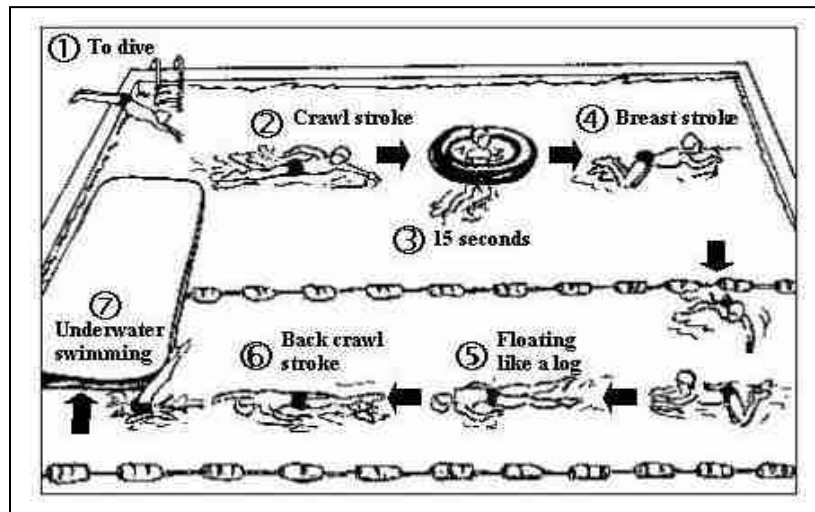


Figure 2 - Circuit designed to assess swimming in 6th grade pupils

Results and discussion

Representation of watermanship

Most respondents proposed at least one item to define the concept but 11.2% of pupils and 15.2% of parents did not provide any information. Parents could have been less motivated to answer than pupils. More parents of children in 6th grade than those with children in 1st grade did not answer (20% Vs 10.4%; $z = 2.968$; $p = .003$). Parents of older pupils are usually less involved in the pupils’ life in school than those of children entering school. Logically, parents tended to provide more items than children (2 Vs 1.7 item/answer).

Eight categories were identified (Table 2), and most referred to concepts in the literature. “Pleasure” was not identified out earlier. That category would exist because positive feelings could not appear without a real mastery of the environment. Practitioners know that, when a child is able to play in the water, laughing, moving in all directions and pursuing others on the surface or underwater, he/she has reached the fundamental level of the swimming mastery. It is interesting to see that young pupils and parents mention this aspect in their representation of the “watermanship”.

Table 2– Categories of themes used in the “watermanship” definition

Safety	To float, to avoid drowning, to help a friend in need, to stay alive, ..
Stroke technique	<i>Official styles:</i> learning of crawl, breaststroke, backstroke, butterfly, improvement of movements, horizontal position, breath... <i>Unofficial styles:</i> movements’ coordination
Pleasure	Play, freedom, relaxation, sports, enjoyment, competition...
Absence of help	To swim without help, in deep water, without support, to be able to stay alone
Confidence	To be at ease in water, to have no fear, to adapt him/her self to a different environment...
Displacement	To move in the aquatic environment, to cover a certain distance, to get stamina...
To manage	To be able to manage him/her self
Performing some skills	To be able to dive, to swim underwater, ...

Distribution of the categories differed by pupils and parents (Figure 3). The latter tended to share their answers among several categories, while pupils gave a special attention to safety. In both groups, safety ranked first and accounted for 43.5% of children’s and 27% of parents’ answers ($z = 6.130$; $p = .0001$). The opposite results was identify by Mesteanot (1992), but this difference could be explained partially by the age of pupils in the studies. Older pupils would be less influenced by their parents’ answers. As the aquatic environment is usually considered dangerous, parents tend to protect their children repeating care recommendations. This behaviour could lead the children to focus more on safety while adolescents would be more confident and not remember that concept.

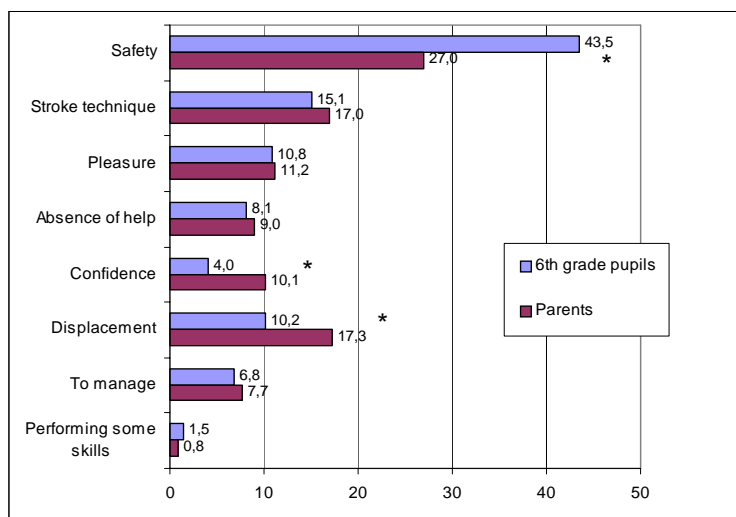


Figure 3– Comparison of the categories in pupils' end parents' 6th grade (*: P = .001)

The ability to perform a stroke technique was the second category, and its importance was similar in both groups (Figure 3). Logically, «watermanship» was related to the subjects' ability to use at least one swimming style. Most learn to swim programmes propose certificates based on the achievement of a distance covered with a correct movement control. The predominance of this reference was clearly in older children (Mestajenot, 1992). The pictures of a good technique would less influence younger pupils.

In both groups, 11% of the answers linked «watermanship» to the feeling of pleasure during swimming. This sport activity is one of the most usual in all periods of life (Bodson, 1997). It allows also practicing many aquatic leisure activities especially enjoyable for people, children as well as adults. The presence of that category is important for teachers and coaches: it underlines the emphasis that their «clients» give to a particular aspect of swimming and should urge them to focus on it during teaching.

The distance swum is easy to assess. It has cultural references and is often proposed as a goal in swimming programmes. Being able to swim a long distance or to a long time has already been identified as one of the most important representation of «watermanship» particularly by physical education teachers (Mestajenot, 1992). Compared to pupils, parents emphasized the ability to swim certain distance in the water more (17.3 Vs 10.2; $z = 3.431$; $p = .0001$). In a «process-product» perspective, parents often consider the distance swum as an indicator of teaching efficiency. In that way, it is logical that they give more attention to that element in defining «watermanship».

The ability to swim without help was identified in 8.1 and 9% of the answers. Floating can be considered as one of the first steps in the swimming learning process. Nevertheless, it is not sufficient to define «watermanship». There would be a gap between its meaning and that accepted by physical educators. Being able to manage oneself in the water was identified 6.8 and 7.7% of the respondents. That category showed again that subjects give importance to the ability to be independent in the water.

While confidence is one of the main aspects proposed by swimming specialists as an indicator of «watermanship», the item accounted only for 4% of the answers by children and 10.1% by parents ($z = 3.845$; $p = .0001$). Non-specialists would not be aware that confidence is a key for the swimming mastery. This observation underlines that the public needs to be more informed about its important role. Few items were related to performing specific skills like diving or swimming underwater. In fact, these skills were more frequent in «watermanship» definition of older pupils (Mestajenot, 1992). Age and experience could influence adolescents giving more emphasis to it than younger pupils.

Self perception

First grade pupils

The mean score for the actual ability level in swimming was $7.7/10 \pm 2.6$. This score was considered positive as at least two thirds of the pupils were successful in seven out of ten skills (Table 3). This means that the majority of

these young children have an appreciable experience of water. Skills concerning the swimming specific motor ability needed to move at the surface of the water (floating like a log, gliding front or back-wards) were less frequently achieved than the fundamental skills: 48.6; 51.4 and 52.9% of success. All these skills need floating and balance mastery. They need also confidence because the swimmer loses his/her eye control on the environment.

Table 3– Real performance and perception of the skill level by the pupils of 1st year (%)

	Test	Correct self-assessment	Under estimation	Over estimation
Shower	100	97.1	2.9	/
Crocodile	97.1	88.6	10.0	1.4
Move along the side	95.7	81.4	15.7	2.9
Blowing under water	91.4	80.0	14.9	5.7
Jumping	82.9	78.6	7.1	14.9
Picking objects	84.3	85.7	11.4	2.9
Floating like a log	51.4	90.0	7.1	2.9
Front glide	52.9	78.6	12.9	8.6
Backwards (board)	64.3	82.9	15.7	1.4
Backwards (free)	48.6	90.0	8.6	1.4

Important inter-individual differences were pointed out: 32 pupils out of 70 (45.7%) got the maximum score while two were only able to pass under the shower. The socio-economic status of the school environment was directly linked to problems encountered by pupils in the swimming pool ($F=6.2$; $p=.002$). Maillard and col. (1994) carried out a similar report. This situation must be linked to the financial investment that it is needed to allow children to regularly go to the swimming pool (e.g., displacements, entrance fees) or to follow swimming courses. Additionally, some parents consider that it is useless to devote time to their children. Others do not have the opportunity to do it.

Moreover, there was a clear relationship between the classes organized by the school and the pupils' level of swimming mastery ($F=8.2$; $p<.001$). This would be explained by the fact that these courses are generally not expensive and that pupils had the opportunity to quickly improve their skills.

The overall agreement between pupils' perception and performance amounted to 85.3% (Table 3). Variations occurred according to the skill (from 78.6% for jumping and front glide to 97.1% for the shower). Except for jumping, most errors (10.6%) were underestimations. Due to their limited experiences around water, 1st grade pupils found skills that they never tried before to be difficult. However, they were able to perform them. For example, the jumping test was in deep water. Although some children had no previously jump into deep water, they were stressed by this new task, but were able to do it. There were individual errors in perception. Some children systematically underestimated their level, while others – most from a low socio-economic status schools – overestimated their skills. We suggest that PE teachers organise various assessment activities allowing pupils to improve their own self-perception.

Sixth grade pupils

Two thirds of the pupils were successful in at least five of the seven skill tests (Table 4). The mean score for swimming level was $6.6/10 \pm 3.6$. Only 43.7% of children passed the underwater swimming skill. Similar results were identified by Maillard and col. (1994), who used comparable tests. The main problems encountered by these pupils also related to the stroke under water and floating like a log. They highlighted that the problem of these circuits was the tiredness of the swimmers who did not managed their effort in order to perform correctly the last tasks.

While 14 pupils succeeded in all skill tests, seven did not achieve any of them. It confirms that, at the end of the primary school, too many children have not mastered the basic water safety skills. Similar to Maillard and col. (1994), we found that the objectives defined in the official programmes of the elementary school level were not achieved. The problems are particularly acute when the parents' socio-economic status is low. All those who failed the tests were from to low socio-economic environment ($F=12$; $F<.001$).

Observed with youngest pupils, the frequency and the stability of the courses organized apart from the school schedules were related to the pupils' level of success ($F=2.7$; $.068$). This suggests that interest must be given to this type of extra-curricular activities, especially when parents do not have significant incomes. The school should try to make up for some deficiencies of families.

Table 4 - Real performance and perception of the skill level by the pupils of 6th year (%)

	Test	Correct self-assessment	Under estimation	Over estimation
Diving	65.6	82.0	6.6	11.7
Crawl stroke	70.5	90.2	0.0	9.8
Staying in one place	80.3	93.4	0.0	6.6
Breaststroke	62.3	82.0	0.0	18.0
Back float (15")	72.1	78.7	9.8	11.5
Back crawl stroke	80.3	95.1	0.0	4.9
10 meters underwater	43.7	75.0	14.6	10.4

With an agreement of 85.5%, the self-perception of 6th grade pupils was similar as that of their youngest classmates (Table 2). They would have been able to score at a higher level without two tests: the underwater swimming (75%) and the back float (78.7%). In these tests, under- and overestimations appeared in some proportions.

Sixth grade children more often overestimated their level than 1st grade pupils (10.1 Vs 4.1%; $z = 4.013$; $p = .0001$). Some of them thought that they were able to perform correctly all swimming styles, whereas they showed many technical errors. It is possible that they faced difficulties to visualise accurately the tasks proposed on the questionnaire. Moreover, at the end of the elementary school, pupils have a tendency to brag. They do not like to lose the face admitting they are not able to perform some usual actions.

Conclusions

Safety, ease (absence of help, confidence, ability to manage his/her self), technical mastery (stroke technique, performing some skills), and functional aspects (displacement, pleasure) were identified as major indicators of «watermanship». Children and parents differed in their definition of this concept. Moreover, it appeared that, except for safety, educational priorities were not necessary underlined by “clients” of the swimming environment. A better understanding of the concept should be sought in children and parents. It could be related to the utilisation of some tests highlighting the real “watermanship”.

At the beginning of the elementary school, the majority of pupils are able to carry out skills related to the familiarisation with water. At the end of this cycle of schooling, too many of them do not reach the necessary skill level enabling to survive an accidental fall in the water. This must be of concern to parents and school leaders. The school and the family should join efforts and resources to give the opportunity to children to be autonomous in water.

In elementary school, both young and old children held accurate self-perceptions of their swimming levels. Besides observing skills, physical educators could use well-devised questionnaires to collect valid and reliable information about their pupils swimming skills and enable placement at appropriate levels.

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