THE TEACHING OF SWIMMING BASED ON A MODEL DERIVED FROM THE CAUSES OF DROWNING

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1.0 Introduction

More than 400,000 people drown every year. Many of these episodes are avoidable. The lack of basic attitudes, knowledge and skills are often behind the tragedy. The causes of drowning should dictate the way we teach swimming, what children should learn. Yet the way we teach swimming has varied dramatically over time and still today there are many philosophies and methods that enjoy popularity. A post WWII phenomenon has been the commercialisation of the teaching of swimming. Here the variety is even greater and an unfortunate number of teachers or schools emphasize that which is popular with parents (the paying client). While some research has been conducted, conclusions are vague and are not popularly known. After all, reason many, learning to swim is really quite simple, we all know what it means to swim or to be able to swim. But do we?

Yes, it is simple. In the !930's the eminent anthropologist Margaret Mead, while studying the Manus people of New Guinea, observed that it was as uncommon for a Manus child of four to be unable to swim as it was for a western child of four to be unable to walk. But what was the ingredient that dictated success? Again, simple. These children, of people who lived by fishing, were in the water every day, all day. No one tried to teach them to swim, it happened naturally. It never occurred to any one that it would not happen and therefore was not an issue. Some modern researchers and educators even classify swimming as a "basic movement", like walking, something that is not learned but is part of development.

In the 1970's the Canadian swimming educator and motor learning researcher Prof. Murray Smith, reflected on Margaret Meads observation. In the developed countries, where admittedly we can not all swim outdoors all year round, we have swimming pools, swimming lessons, swimming instructors, agencies that train instructors, *ad infinitum.*   Yet we are happy with less than 100% success. Some are slow, some just don't seem to get it. Smith asked rhetorically, "why do we not reach 100% success when we put so much effort into it, when people like the Manus achieve 100% with no effort"? Insightfully he concluded, "The way we teach often runs counter to the way people learn".

We still argue about which stroke should be taught first, about the part vs whole issue, massed vs distributed learning, which if any teaching aids should be used, floatation devices or not, which methodology, by which criteria do we judge that the child can swim, etc. Wilbur Longfellow, the American swimming and life saving pioneer of pre-WWI days had much of the solution when he said, "we must entertain them mightily and teach them carefully". In the 1750's Benjamin Franklin had observed that the turning point in learning to swim is the recognition that "the water holds me up"! Today, fortunes are made by producers of a variety of devices designed to prevent the child from experiencing his or her own natural buoyancy. Shades of yore! The relationship between movement economy and survival is overlooked. Swimming is learned indoors while drowning happens primarily outdoors. How many children have the opportunity to experience swimming while clothed or the discomfort of cold water? For all too many, swimming is a matter only of performing the correct movements. We believe it is much more.

It is not the purpose of this paper to discuss methodology, although much has yet to be discussed and investigated. We admit that there is need for innovation and variety in method, especially given the concern of modern pedagogy for individualised teaching. At the same time, this must not be at the cost of essential ***content.*** It is our contention that there is content

that is so vital in terms of prevention of drowning, that it cannot be overlooked. Here there is much less room for variety and debate. The causes of drowning must dictate especially *what* we teach, content, and to a lesser degree, how we teach. Prof. H.T.H. Whiting characterized a person who can swim as "able to cope with an unexpected and involuntary submersion". A study in the UK showed that 40% of all drownings happened within 2 meters of safety, 60% within 3 meters. Experience also shows that many occur in relatively shallow water, only slightly more than the height of the victim, i.e. with the toes centimetres from the bottom. Can there be any doubt to the logic that it must be the causes of drowning that dictate what children should learn?

This paper then is about content. The aims are to 1) identify causes of drowning, 2) show how these can be translated to "what children should learn", 3) derive a definition of "can swim", and 4) demonstrate that water safety is more than just swimming skill.

Fig. 1 From the causes of drowning to what children should learn
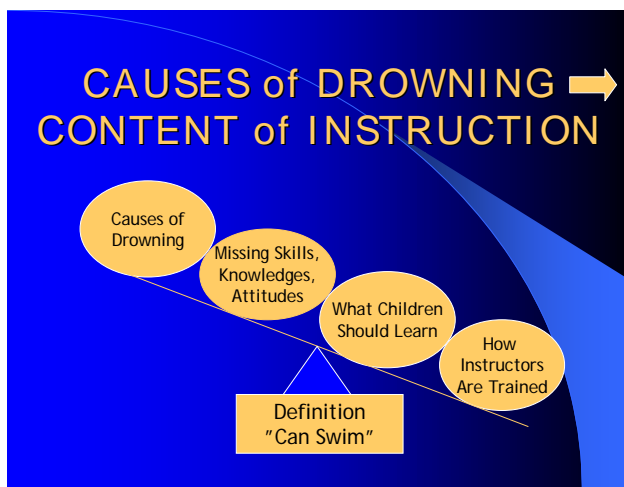
Methodology
2.1   The causes of drowning

The following sources were used to attempt to identify the causes of drowning:

        2.1.1   Examination of accident reports
        2.1.2   In-depth interview with survivors
        2.1.3   Observation of simulated episodes

2.1.1

Accident reports from both local community authorities and newspapers were analysed. References to outcome, weather and water conditions, activity if known before the victim found themselves in the water, distance and depth, whether or not alcohol had been used, were recorded. Eyewitness reports were sometimes included in accident reports and more often included in newspaper articles. In this case any description of the victims condition at the time of being first observed, were noted.

2.1.2

In depth interviews were conducted with survivors of drowning episodes. In some cases, these were people who were victims of a single episode, had either involuntarily or voluntarily gone into the water, had aspirated water and who would probably not have survived if not rescued. In several cases they were victims of a major catastrophe such as the Alexander Kjelland oil platform accident. While the interview was basically open, several

issues were brought up if and when the interviewee indicated willingness to discuss it. These points were; 1) where were you immediately prior to the accident? 2) what were you doing at that time? 3) did you anticipate any danger? 4) what was your immediate reaction when you saw that the accident was unavoidable? 5) what was your immediate reaction when you found yourself in the water?

2.1.3

Students were trained to simulate drowning episodes and they were observed and interviewed immediately after. These were only moderately skilful swimmers and in some cases experienced real stress, while in most cases they could objectively relate what movement difficulties they encountered.

2.2 *What children should learn*

The literature of 25 leading organisations was analysed with particular regard to the content of their programs. In each case these were public or semi-public organisations (such as the American Red Cross) who offered swimming and water safety instruction and trained instructors. They were nation wide in their respective nations and had a long history of aquatic activity. They were selected because of the advanced level of their professional activities and the professionalism of their publications. Eighteen nations were represented. Whether or not they had a particular course which they believed culminated in the participants "being able to swim", was recorded. If that information was not readily available from the published materials, representatives were contacted. In some cases the language contained a single word meaning "can swim". The content of these courses was analysed. Whether or not some form of combined test was used for final evaluation was also recorded or whether another form of evaluation was used. Lastly the form of reward (diploma, etc) which was used, if any, was recorded.

2.3 *A theoretical approach*

When considering the skills of swimming/survival, a movement problem solving approach has considerable merit and has figured strongly in the writings of several aquatic educators. Wilke (1974) and Madsen (2006) for example, focus on the characteristics of the water and the relation of the human body to the water. This involves coping with the temperature, texture, pressure and even the taste of the water. It involves developing a feel for the water in order to produce propulsion and reduce resistance. Prof. Fred Lanoue (1963) has said that people don't drown because they can't swim but because they can't get air. Breathing and breath holding in all its nuances are involved here also. Closely tied to breathing/breath holding is the mastery of the buoyancy of the body and the control and regulation of buoyancy. Opening the eyes under water is obviously essential. Movement in all its forms, about the sagittal, transverse and longitudinal axes, may save your life. Here we are obviously talking about the all around development referred to in the expression "watermanship". Langendorfer has modernized this traditional phrase to "aquatic competence". He in fact, also includes in this concept, the related activities that take place on and around the water, e.g. canoeing. Swimming is not just moving the body from A to B in the water but both forward and backward, sideward, under the water and at the surface. Sinclair and Henry (1893) referred to "scientific swimming" or "fancy swimming" when characterising the aquatic shows so popular in the UK in the late 1800's and the desired development of any swimmer.

2.4 A definition of the "ability to swim"

The results of the above described investigations were combined in an effort to delineate a definition of "can swim".

Fig. 2 Start early but do it right

3.0 Results

When considering the analysis of accident reports, the interviews of survivors and observation of simulated episodes together, several key elements constantly appeared. The list is as follows:

a) Didn't realise the danger. It looked safe.
b) Didn't know about the undertow (for example)
c) Fall from height, awkward landing
d) Loss of breath, wind knocked out at landing
e) Deep submersion after fall, difficulty in regaining the surface
f) Unable to turn back toward safety
g) Unable to roll over and change strokes
h) Couldn't swim in waves
i) Couldn't see where I was going
j) Became quickly tired, couldn't swim far
k) Couldn't stop and rest/float
l) Water was cold, clothes heavy

These weak or missing skills, attitudes or knowledge are deemed causal elements in precipitating the drowning episode. It doesn't take much imagination to translate these reports to concrete items that demand attention in aquatic education.

3.1 Analysis of course content

When the items included in the first course (or course designated as Beginner) were analysed, a pattern emerged. Most of the organisations examined, having been chosen because of their progressive programs, were concerned about attitudes and knowledge. They either had fixed topics that were systematically introduced in every lesson or they strongly advised their instructors to include pool side chats about safe swimming, safety at sea, boating safety, safety on the ice, etc.

Regarding skills, a pattern of three elements repeated themselves in almost every case.
1. Children should be as comfortable and efficient under the water as at the surface.
2. They should be as comfortable on the back as on the front.
3. They should develop an all around movement repertoire, i.e. the tradition of seeking "watermanship" was upheld.

This pattern was sufficiently consistent that we have chosen to consider the three points as guiding principles. In only two cases was there a tendency to degrade swimming on the back to second place. Many strokes were imparted to their charges and while some were more popular than others, there was a sense that each stroke had its mission, there were no first and second class strokes. Sadly in some parts of the world, this is not the case.

At the beginning level, about 20 skills repeated themselves systematically. Some were sufficiently similar that they could be combined. Eight elements emerged finally as both irreducible and irreplaceable. They were:

1. Jump or dive into deep water
2. Regain surface, level off and swim
3. Surface dive and swim underwater with comfort
4. Two strokes, one on the front, one on the back
5. Breath in a relaxed way and with optimal technique relative to the stroke
6. Roll over from front to back and back to front
7. Turn left and right both on front and back
8. Stop and rest with minimal movement (no movement for children and women, all can float).

Notice that there is a close match between the causal elements of drowning and the central items contained in the courses analysed. In addition, the items above reflect movement in every direction, as described in 2.3 - A theoretical approach. Swimming with clothes was included and some organised their program such that if the teaching had been done indoors, a lesson or two were held outdoors at the conclusion.

Nearly all of the organisations in question practiced evaluation, either item-wise or by a combined test. The common attitude toward evaluation was that it was both necessary to assist in further planning and to keep a continuous overview of each child's progress.

3.0 Water Safety

These 8 skill items, while clothed and preferably outdoors, form a kind of conceptual definition of the ability to swim. Self dependence and self confidence go hand in hand and are an integral part of the process. When combined with knowledge and attitudes, we have water safety. The relationship between these concepts is depicted in Fig. 2 below. Water safety education must strive to make teaching as realistic as possible. This by no way implies being less entertaining. On the contrary, children and youth thrive on the challenge and the variety provided by the all around approach.

Fig.3 Relationship Between Attitudes, Knowledge & Skills: A Definition of Can Swim
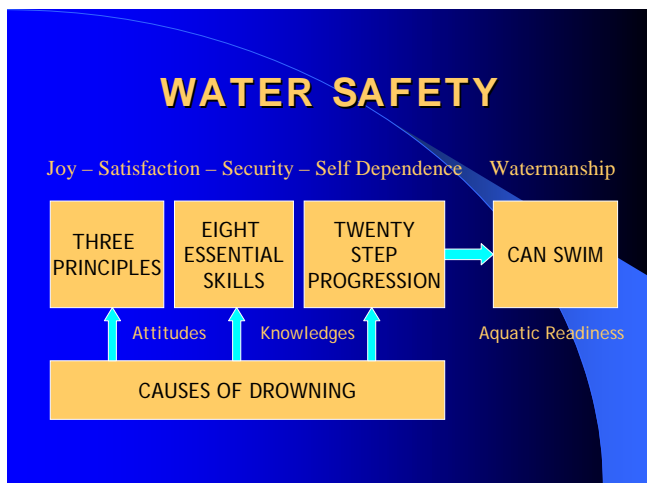
Notice that the definition does not refer to either a specific *stroke* or a specific *distance*. We believe that it is not "how far you swim" that counts but "how you swim". In one pilot study, children were scored on the distance they swam as well as a subjective assessment of their degree of relaxation while swimming. Children who managed only 10-15 meters but with a high degree of relaxation/economy of effort were matched with children who managed 25 m. but with considerable effort, on guts (they wanted that diploma, Papa was watching). The first group arrived earlier at both 50 and 100 meters than the second group. Not only did they arrive earlier, but the time interval was very short. A proper foundation, slow in the start, pays off later. In some cases children who swam 25m for the first time but very easily, managed 200 m only a few days later, sometimes on the next attempt. One complete non-swimmer managed 200m after 30 minutes of instruction (a bit older and very goal oriented). Another went from 50m to 1500m over the weekend with no swimming in between.

Fig. 4   Watermanship at its best

5.0   A Graded Approach to the Definitio

No one would consider a child who only can swim 25 m to be a good swimmer or to be particularly safe in an emergency. Remember however, that the definition does not specify stroke or distance. What is specified however, is economy of effort and multiple skills (all around development). The child who swims 25m by only moving the body in one fashion and

one direction is far less prepared for an unexpected visit to Davy Jones than the one who swims the same distance but with the above named skills built into the swim. In a study involving 200 school children, Junge (1984) found that although they had all managed 25m by the traditional criterion (straight ahead, nothing else), and been declared swimmers, only about 5% managed a combined test (jump or dive, 12.5m on front, turn, roll over, stop and rest 30 sec., 12.5 on the back). We have also observed that those with a more all around development not only manage 200 m earlier, but they retain and improve on their watermanship. At the same time, some who manage 200m without developing the all aroundness, that is, a 200m effort, one stroke, turning on a wall, nothing else, may be less safe than the all arounder who is still at 50 or 100m. The argument that 200m is somehow the magic number is of itself, not acceptable. To allow for continuous development while retaining the watermanship ideal, a graded approach is suggested. Meeting the definition at 25m means that one can swim but at a minimal level. Keeping the same pattern at 50, 100 and 200 m. means that all elements of the definition progress in a balanced way. New skills are introduced and the challenge increased on the old ones.

Fig. 5   A Graded Approach to the Definition "Can swim"
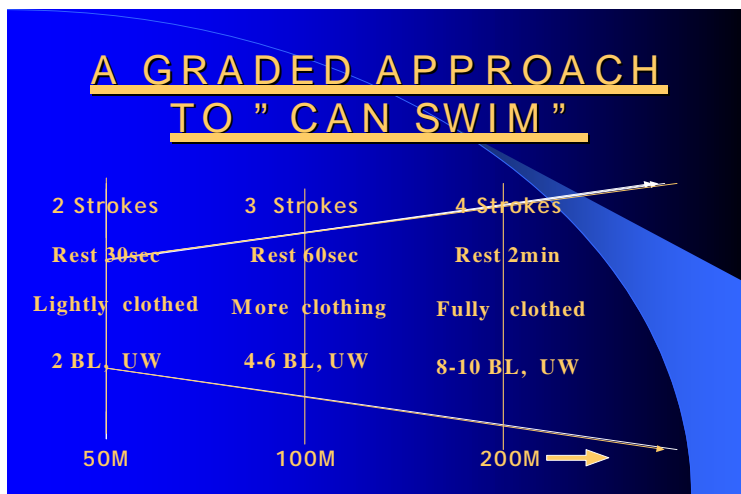
6.0   Conclusions

In too many cases, children are not taught what is necessary for them to cope with an unexpected submersion. Perhaps because of a lack of coordination, those who have insight into the causes of drowning have little contact with those who teach swimming. While logic tells us that, of course, what we teach should prevent people from drowning, we often fail to make the correct connection. The great variation in "what" we teach from one program to another, is evidence that we have not yet arrived at our goal. Too often swimming is seen as only a matter of correct movements. It is indeed much more. The concept of aquatic competency or "watermanship" is as relevant today as ever. All around development is synonymous with optimal development for drowning prevention. While skill is not enough to survive in many cases, e.g. the Tsunami tragedy, in many other cases death was avoidable.

The analysis of the causes of drowning is not finite and will certainly develop in the future. And how that translates to what children should learn may also require future adjustment. The real challenge however is to promote this way of thinking among the teachers of swimming and the organizations they represent. We believe there is a universal definition of the ability to swim. We have presented a suggested definition here. After all, kids are kids and water is water. We believe that swimming skill is only part of "water safety" and that

both knowledge and attitudes must be part of any comprehensive program. Swimming is an art. Teaching swimming is also an art. But it is also a science. Learning to swim may be easy but when for any reason children do not have continuous access to the water, we can still make great improvements on our "water safety" education programs.

Fig. 6   Aquatic competence at its best

7.0   References

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