



A pilot study evaluating a Before School Survival Swimming Program

Findings of an innovative survival swimming and water safety education program for primary school children in metropolitan Victoria



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Executive summary

Snap shot of findings of the Before School Survival Swimming Program

- The Before School Survival Swimming program successfully demonstrated the significant value of providing survival swimming education to Victorian students.
- Survival swimming skills may be highly impactful and beneficial for non-swimmers and provide a foundation progression to 'learn to swim' programs. In addition, survival swimming skills can be taught in a short time.
- Sixteen students were identified as non-swimmers at the commencement of the program. By the end of the program, of the 16 non-swimmers:
 - 56% swam 50m or more continuously and 25% swam between 100 and 300m;
 - 44% could float, scull and/or tread water continuously for 1 minute; and
 - 50% completed the survival sequence whilst fully clothed.
- Overall, of the 102 students who completed the pre- and post-program skills tests:
 - 90% students were able to swim 50m or more continuously in lesson 10, a 20% increase from lesson 1;
 - 84% could float, scull and/or tread water continuously for 1 minute, a 35% increase from lesson 1; and
 - 78% of students were able to complete the survival sequence whilst fully clothed, placing them in good stead to be able to recover from an unexpected entry into water and move to a point of safety.
- Delivering lessons before school is a feasible and cost-effective solution, particularly when one-way transport and in-kind supervision is included.

Background

In Victoria, drowning remains a leading cause of mortality and morbidity in children aged 5-14 years. Between 2000 and 2014, there were 229 drowning incidents involving children in this age group (32 fatal and 197 non-fatal hospitalisations) and particular strategies are therefore required to address drowning deaths in this age group.

The Royal Life Saving Society – Australia (RLSSA) believes that in order to prevent drowning, every Australian child must have basic swimming and water safety skills and knowledge of how to be safe when they are in, on, or around the water. Additionally, in 2015 the Victorian Coroner made the recommendation that 'swimming and water safety education should be a compulsory skill taught within the primary school curriculum to all Victorian children'.

It is estimated 60% of children leaving primary school in Victoria are unable to swim 50 metres continuously, and schools have identified cost, crowded curriculum and time out of the school day as barriers to participating in swimming programs. In an attempt to address some of these barriers, in 2015, LSV in conjunction with

Federation University Australia investigated the feasibility of a Before School Swimming and Water Safety Program in regional Victoria. Following the success of this pilot research project and subsequent modification to some elements of the program curriculum, one recommendation was to conduct another pilot program with a school in metropolitan Melbourne to determine any variation in feasibility between metropolitan and regional schools. The modified curriculum was tested in a second pilot program known as the Before School Survival Swimming Program (BSSSP), conducted within the Greater Melbourne area, at the Peninsula Aquatic Recreation Centre (PARC), Frankston. This report outlines the results of the evaluation of the metropolitan BSSSP.

Aims and objectives

The overall aim of the metropolitan BSSSP was to teach key water safety and survival swimming skills to primary school children in Year 5 and 6 and empower them to recreate safely and confidently in, on, or around the water. In the long-term, the ultimate goal was to reduce the number of aquatic related drowning deaths of children in Victoria.

The specific objectives of the metropolitan pilot program were to determine:

1. the effectiveness of a 10-lesson curriculum tailored to achieve survival swimming and water safety outcomes;
2. the knowledge and skill progression of students without any swimming capability in 10 lessons;
3. any variation in accessibility between metropolitan and regional stakeholders;
4. the cost-effectiveness of the Before School Survival Swimming Program model and its' feasibility for state wide implementation.

Methodology

Frankston City was chosen as the study location based on: (i) the high number of drowning incidents (20) that occurred in this local government area between 2004 and 2014; and (ii) the high relative socioeconomic disadvantage of several schools in the region. Through a partnership with PARC, a school from within Frankston City was selected to participate in the BSSSP in Term 1, 2016.

The BSSSP content was developed based on an evaluation and subsequent review of the regional pilot program, conducted in 2015. The program comprised 10 lesson plans of 45 minutes each, which aimed to prepare a child for aquatic-related emergency situations as well as unexpected entry into water, particularly open water environments. The program therefore had a focus on 'survival swimming' which is defined by The Royal Life Saving Society Commonwealth as 'the skills to survive an unexpected fall into deep (open) water'. Survival swimming incorporates aspects of water safety and lifesaving knowledge and skills, self-awareness, decision-making, problem-solving, cooperation and leadership, all aimed at building a student's personal resilience, further supporting the direction of the Victorian Curriculum; Health and Physical Education and The Emergency Management Strategic Action Plan 2015-2018 (SAP). This approach is in contrast to a strokes focussed 'learn to swim' curriculum which implies correct stroke technique over a particular distance;

because, based on the evidence relating to why, where and how children drown, the survival swimming curriculum is best able to prepare students to be safe when in, on and around the water, both now and in the future within a relatively short timeframe.

At the completion of the BSSSP students were expected to achieve six learning outcomes. The extent to which students met these was assessed via three methods: pre- and post-program tests by independent trained assessors; a pre- and post-program questionnaire and an in-class assessment by the swim teacher.

Feedback was obtained from students, parents, school teachers, swim teachers and the swim school manager to determine the overall feasibility and impact of the BSSSP. Lastly, a cost per student for participation was determined by calculating the cost of program delivery, supervision, transport, breakfast and resources.

Results

Overall, 111 Year 5 and 6 students completed the BSSSP. Of these, 102 students completed the pre- and post-program skill testing. Sixteen students were identified as non-swimmers before the program. These students would not enter the water to try floating/sculling/treading water and would either not swim at all, or could not swim one length of the pool (25m) and required one-on-one assistance from a swim teacher. The level to which the non-swimmers achieved the key survival swimming outcomes was:

- Outcome 1: Knowledge associated with safety in and around water – The average correct response rate to water safety questions increased from 5.9 to 7.6 out of 9;
- Outcome 2: Ability to float, scull and/or tread water continuously for 1 minute – substantial increase from 0.0% to 43.8%;
- Outcome 3: Ability to swim continuously on front and/or back for 50 metres – vast increase from 0.0% pre-program to 56.3%; and
- Outcome 5: Ability to complete a survival sequence – 50% successfully completed each stage of a survival sequence whilst clothed.

The level of achievement among all 102 students who completed the pre- and post-program skill testing for each outcome is outlined in the table below.

| Learning outcome | Results | Outcome achieved |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 1. Knowledge associated with safety in and around water | <ul style="list-style-type: none"> Average correct response rate to True or False water safety questions increased from 6.7 to 7.6 out of 9; Biggest improvements in: knowledge that freestyle is not the best stroke to do over a long distance (92.5% increase); not to jump straight into the water (without any rescue items) if someone is in trouble and try to tow them to safety (26.9% increase); and not to panic if they get into difficulty (25.9% increase). | Yes |
| 2. Ability to float, scull and/or tread water continuously for 1 minute | <ul style="list-style-type: none"> Increase in the proportion of students able to float, scull or tread water for 1 minute, from 70.3% to 84.3%. | Yes |
| 3. Ability to swim continuously on front and/or back for 50 metres | <ul style="list-style-type: none"> Increase in the proportion of students able to swim 50m or more continuously, 66.7% to 90.2%. | Yes |
| 4. Ability to perform a talk, reach and throw rescue | <ul style="list-style-type: none"> Majority of students able to successfully perform rescues: <ul style="list-style-type: none"> - Talk rescue: 95.7% - Reach rescue: 97.4% - Throw rescue: 96.6% Substantial increase in knowledge of rescue techniques and appropriate objects to use in specific rescue contexts. | Yes |
| 5. Ability to complete a survival sequence | <ul style="list-style-type: none"> 77.6% of students successfully executed all five elements of a survival sequence post-program; The 25m swim whilst clothed was the most difficult element. | Yes |
| 6. Ability to demonstrate basic emergency response skills (DRSA) | <ul style="list-style-type: none"> 92.3% of students successfully performed the first steps of basic emergency response in-class; Insufficient knowledge of the correct order of steps first steps of basic emergency response (increase from 3.3% to 29.6%). | Partial |

Logistically, the BSSSP differed from a typical school swimming program and the impacts of this include:

- Time of day – Parents commonly rated the time of day (before school) as either very good (29.7%) or good (43.2%);
- Family routine – For some families the early start was challenging, as it disrupted routines, left students tired and impacted on other siblings. However, parents recognised the benefit of the BSSSP and that their children enjoyed it and quickly adapted to the new routine;
- Transport - From a school perspective, without the provision of the bus from the school to the facility the BSSSP would not have been possible, and the program's impact was greater due to the provision

access for those who would otherwise miss out;

- Provision of swim teachers - Sourcing teachers to participate in the early morning program was challenging; however the facility always managed to accommodate for every student safely;
- Impact on the school - The BSSSP presented logistical challenges, but they were manageable due to PARC and LSV's communication, professionalism and organisation.

The total cost per student to participate in a 10-lesson program varied from \$134 to \$248 (or \$13.40 - \$24.80 per lesson) based on two factors: the need for transport one-way (facility to school) or two-way (school to facility and return), and the ability of the school to provide a school teacher for supervision in-kind or at an

additional cost. However, parents' willingness to pay to participate in a program varied between \$10 and \$30 per student for 10 lessons. The school stressed that cost is a major inhibiting factor for families in the area and without funding the BSSSP would not reach those most in need.

Discussion

The BSSSP enhanced the personal resilience of participating students by increasing their survival swimming skills. In addition, their confidence grew and they learned valuable lifelong personal survival skills, including techniques to assist others in danger whilst avoiding harm to themselves.

- Impact on non-swimmers

The observed improvement and positive impact the BSSSP had on those classified as non-swimmers was particularly impressive. The marked improvements they made were complemented by the sense of pride and achievement they demonstrated and by their increased confidence and enjoyment of the water. The fact that over half of these students were able to complete a full survival sequence (including a 1 minute float) whilst fully clothed just ten lessons after they would not let go of the pool edge and attempt to float is testament to the effectiveness of the specific skills the BSSSP taught. In its current format the BSSSP has demonstrated its suitability for improving the survival swimming skills among those with limited or no experience of aquatics.

- Program effectiveness to achieve survival swimming outcomes

The high level of achievement of the learning outcomes demonstrates that the BSSSP developed key survival swimming skills among students, which will enable them to recreate safely and confidently in, on, or around the water.

The change was exemplified by the fact the majority of students could perform a survival sequence whilst clothed, placing them in good stead to be able to recover from an unexpected entry into water and move to a point of safety. Their ability to recognise the most appropriate dry rescue for a given scenario and to perform it effectively, will empower them to help someone in need without placing themselves in danger.

Overall sentiment was that delivering lessons before school was suitable and should be considered in the implementation of a school survival swimming program. Furthermore, the program's success would be diminished if

transport was not included as it enabled access for students who could otherwise not attend. Combining transport into any before school program will therefore be critical to its success.

- Variation in accessibility between metropolitan and regional participants

The running costs of the BSSSP were marginally greater in metropolitan Melbourne than regional Victoria. Additionally, parents in the metropolitan pilot were less willing to pay for their child to participate in such a program. There is a recognised need to provide access to survival swimming for as many children as possible, and particularly those from low socio-economic and CALD backgrounds and such a program therefore requires subsidisation.

- Cost-effectiveness and feasibility of the program model

Compared to traditional stroke focused swimming lessons, survival swimming skills can be taught in less time and at lower cost. The significance of providing access to survival swimming education to Victorian students must not be undervalued and the rapid development observed among the students demonstrates the benefits the BSSSP can have on equipping students with survival swimming skills in a short period. Students learned important skills that may one day save their life or that of another, at marginally greater cost to a standard school swimming program. This evaluation therefore recommends that the BSSSP be considered for state-wide delivery.

There exists a disparity between the cost per student and the willingness of families to pay for lessons. Targeting one-way transport and seeking in-kind supervision from school teachers each lesson is the most cost effective method of program delivery. Despite adding to the overall operational cost of the BSSSP, the bus was an invaluable factor for providing access to all students, including those who may need lessons the most. Therefore avenues of providing subsidies for transport are particularly recommended.

Recommendations

The recommendations listed below are based on the evaluation of the metropolitan Before School Survival Swimming Program pilot.

1. To improve the resilience of the Victorian community, delivery of practical survival swimming skills should be mandated in the school curriculum. This is supported by the Victorian Coroner's recommendation 'that swimming and water safety education should be a compulsory skill taught within the primary school curriculum to all Victorian children'.
2. Conduct an education and aquatic industry consultation to review the school survival swimming program, and establish a working group with key stakeholders for refinement. The program should be made readily accessible for all Victorian schools and aquatic facilities, and this may include development of a specific resource portal, i.e. website, with current and evidence-based best practice survival swimming resources for schools and facilities.
3. Identify scope to develop classroom resources, aligned to the Victorian curriculum, that will both complement and enhance the theoretical learning of risk identification, behaviour modification and basic survival swimming skills. Resources should also utilise technology solutions, such as digital game-based learning and virtual reality to ensure sustainability and student engagement, i.e. equipment and technology that simulates movement and immersion. Incorporating these into the classroom setting maximises the application of skills and integration of theory to practice when in an aquatic setting. These activities will provide theory for all students, including those who do not participate in a practical program.
4. Identify scope to develop recognition of prior learning models to upskill and deliver accredited training for school teachers. This will increase the number of qualified teachers of swimming and water safety in Victorian schools, ensuring the long-term sustainability and cost effectiveness of school survival swimming programs, particularly in regional and remote areas.
5. Develop and deliver targeted survival swimming professional development sessions for swim teachers and school teachers, focusing on the importance of survival swimming and upskilling in teaching basic emergency response.
6. Investigate the percentage of improvement for a group that engages in a combination of school based aquatic education in conjunction with a before school swimming program to determine the best way to maximise the learning outcomes. Undertake a retention study to investigate the amount of survival swimming and water safety knowledge that is retained both short and longer term from undertaking an intensive before school survival swimming program.
7. Consider at what age this program would best be subsidised, especially if the only way to deliver school survival swimming programs is with funding. If this is the case, knowing when the outcomes will be maximised is essential.
8. Develop and implement an online student swimming competency database to track student swimming capability state-wide, and provide a platform to continuously monitor and evaluate any interventions and identify best practice delivery models.
9. Investigate the feasibility of incorporating the BSSSP into existing outside school hours care (OSHC) programs.
10. Prioritise participation of students from low socio-economic and CALD backgrounds and improve promotion of the BSSSP to encourage students of all abilities and backgrounds to participate. This includes highlighting the unique content of the survival swimming program, which focuses on skills to prepare a child for emergency scenarios in water as well as unexpected entry into water.

Background

In Victoria, drowning remains a leading cause of mortality and morbidity in children aged 0-14 years (Life Saving Victoria [LSV], 2014). While multiple strategies have been developed and implemented to address drowning in the 0-4 age group, recent trends indicate that drowning deaths are increasing in children aged 5-14 years (LSV, 2015). In the period 2009-2014 there was a 36% increase in the five year average drowning rate in children aged 5-14 years (LSV, 2015) and therefore strategies are required to address drowning deaths in this age group.

The Royal Life Saving Society – Australia (RLSSA) believes that in order to prevent drowning, every Australian child must have basic swimming and water safety skills and knowledge of how to be safe when they are in, on, or around the water (The Royal Life Saving Society – Australia [RLSSA], 2012). Additionally, in 2015 the Victorian Coroner made the recommendation that ‘swimming and water safety education should be a compulsory skill taught within the primary school curriculum to all Victorian children’. However, research conducted by Life Saving Victoria (LSV) with teachers of Year 6 primary school children revealed that school teachers estimated 60% of Victorian students leave primary school unable to swim continuously for 50 metres and that 39% lack sufficient water safety knowledge (Birch and Matthews, 2013). The study also identified barriers for schools to participate in swimming and water safety programs, including: the cost of swim lessons; crowded curriculum; a high demand on classroom time to attend; transport costs; and specific obstacles for culturally and linguistically diverse (CALD) students.

In an attempt to address some of the barriers for schools to participate in aquatic programs, in 2015, LSV in conjunction with Federation University Australia and with the support of The Helen Macpherson Smith Trust, investigated the feasibility of a Before School Swimming and Water Safety Program in regional Victoria. The regional pilot program which provided swimming and water safety education to students was successful (refer to Box 1 and Birch, Matthews, Petrass and Blitvich, 2015) and as part of an ongoing improvement process the program was modified subsequent to its evaluation.

A recommendation of the pilot research project was to conduct another pilot program with schools in metropolitan Melbourne to determine any variation in feasibility between metropolitan and regional schools. The modified curriculum was therefore tested in a second pilot program known as the Before School Survival Swimming Program (BSSSP), which was conducted within the Greater Melbourne area, at the Peninsula Aquatic Recreation Centre (PARC), Frankston. This report outlines the results of the evaluation of the metropolitan BSSSP.



Box 1 Findings of the regional Before School Swimming and Water Safety pilot program (Shepparton 2015)

Before School Swimming and Water Safety Program

The aim of the regional Before School Swimming and Water Safety Program pilot was to teach key water safety and survival swimming skills to primary school children in Year 5 and Year 6 and empower these students to recreate safely and confidently in, on, or around the water. Consistent with the purpose of aquatic education, the ultimate goal was to reduce the number of aquatic related drowning deaths of children in Victoria. Specific objectives of the regional pilot program, conducted with two schools, were to:

Objective 1: Enhance the personal resilience of Victorian students by increasing their swimming skills and water safety knowledge

Of the 68 participants, the proportion able to swim 50 metres, (the minimum recommended distance by RLSSA), increased by 7% following completion of the program. The proportion of students who could float for over 2 minutes (the minimum recommended length) increased by 22%. Additionally, the average correct response rate for water safety questions increased marginally (1%) following the program with students already having high levels of knowledge in the assessed areas.

Objective 2: Determine the feasibility of the Before School Swimming and Water Safety Program delivered by qualified swim teachers, in partnership with Victorian schools and community aquatic facilities

Overall the program was determined to be feasible. Feedback obtained from 32 parents, indicated that the program had a clear positive impact on the students; with every parent from both schools highlighting that they would recommend the program to other families. School teachers at both schools also indicated a desire to continue with the program in the long-term. They observed positive changes in the students who participated, including substantial improvements in students' confidence in the water as well as a higher level of engagement in the classroom.

Objective 3: Determine a cost effective model for presentation to Government to ensure sustainability of the Before School Swimming and Water Safety Program

The cost for each student to participate in a 10-lesson program varied from \$12.70-\$21.70 per lesson, based on three factors: the proximity of the school to the facility, the need for one-way transport or two-way transport and the ability of the school to provide a school teacher for supervision during the program in-kind or at a cost to the program. The program was determined to be cost effective because the overall cost was less than that reported nationally (\$32.77 per person per lesson) for swimming programs (Birch *et al.*, 2015).

Aims and objectives

The overall aim of the metropolitan Before School Survival Swimming Program (BSSSP) was to teach key water safety and survival swimming skills to primary school children in Year 5 and 6 and empower them to recreate safely and confidently in, on, or around the water. In the long-term, the ultimate goal was to reduce the number of aquatic related drowning deaths of children in Victoria.

The specific objectives of the metropolitan pilot program were to determine:

1. the effectiveness of a 10-lesson curriculum tailored to achieve survival swimming and water safety outcomes;
2. the knowledge and skill progression of students without any swimming capability in 10 lessons;
3. any variation in accessibility between metropolitan and regional stakeholders;
4. the cost-effectiveness of the Before School Survival Swimming Program model and its' feasibility for state wide implementation.

Methodology

Program methodology

Program location and transport

Frankston City was chosen as the study location based on: (i) the high number of drowning incidents (20) that occurred in this local government area (LGA) between 2004 and 2014 (LSV, personal communication, July 2015); and (ii) the high relative socioeconomic disadvantage of several schools in the region (Australian Bureau of Statistics, 2013). Through development of a partnership with PARC, a school from within the Frankston City local government area was selected to participate in the BSSSP in Term 1, 2016.

The selected school was located in close proximity (under 10km) to the PARC facility. Parents were required to drop their children at the facility each day at 8:00 AM and a bus (with capacity for 57 students) was provided free of charge to those students who could not otherwise attend. The bus returned all students to school by 9:30 AM. Each morning at least two teachers assisted with student supervision including the commute back to school following the lesson. As part of the BSSSP funding, fruit was provided after each lesson for all students alongside bottled water donated by Officeworks.

Additional support for the BSSSP was provided by Swimming Victoria who generously donated swim bags and goggles for each participating student and AUSTSWIM who provided support by way of merchandise and online professional development vouchers for the BSSSP swim teachers.

Program structure

The BSSSP content was developed based on an evaluation and subsequent review of the regional Before School Swimming and Water Safety pilot program conducted in 2015 (Birch *et al.*, 2015). The Education Services Department at LSV and PARC developed the program curriculum which comprised 10 detailed lesson plans, of 45 minutes each. Overall, the program aimed to prepare a child for aquatic-related emergency situations as well as unexpected entry into water, particularly open water environments. The program therefore focused on 'survival swimming' which is defined by The Royal Life Saving Society Commonwealth (RLSSC, 2016:3) as 'the skills to survive an unexpected fall into deep (open) water' (see Box 2). Survival swimming incorporates aspects of water safety and lifesaving knowledge and skills, self-awareness, decision-making, problem-solving, cooperation and leadership, all aimed at building a student's personal resilience, further supporting the direction of the Victorian Curriculum; Health and Physical Education and The Emergency Management Strategic Action Plan 2015-2018 (SAP) (Emergency Management Victoria, 2015).

Each lesson comprised learning outcomes based on survival swimming skills, to enhance the student's personal safety. The survival swimming skills covered in the 10-lesson program included: safe entries and exits; floating, sculling and treading water; swimming on back (survival backstroke) and swimming on front (breaststroke); rescue strategies; survival strategies (lifejackets); basic emergency response; and open water hazards.

The lessons were sequential, meaning swim teachers followed Lesson 1 on Day 1, and Lesson 6 on Day 6 and so on. The content was also progressive, with each lesson building on knowledge and skills that were introduced in the previous lesson/s. Each lesson also contained a consistent format including revision, skill and knowledge practice, emergency role play scenarios and assessment (water safety question, skills assessment and homework task); all relating specifically to the learning outcomes of that lesson. The final lesson (Lesson 10) was scenario based, with students applying and implementing all skills and knowledge acquired throughout the BSSSP to real life scenarios that were relevant and engaging.

At the completion of the BSSSP students were expected to meet the following learning outcomes:

1. Knowledge associated with safety in and around water;
2. Ability to float, scull and/or tread water continuously for 1 minute;
3. Ability to swim continuously on front and/or back for 50 metres;
4. Ability to perform a talk, reach and throw rescue;
5. Ability to complete a survival sequence*;
6. Ability to demonstrate basic emergency response skills (DRSA^).

* Survival sequence: Dressed in t-shirt and shorts, students need to recover from a fall in entry; face down, rotate on to back, float, scull and tread water for 1 minute, swim 25 meters to a point of safety and secure themselves, then climb out to exit.

^ DRSA is the acronym for the first four components of basic emergency response and refers to 'Danger', 'Response', 'Send for help', and 'check Airways'.

Due to the high level of interest among students, three consecutive 10-lesson programs were delivered in Term 1, 2016 to accommodate all 117 students.

Box 2 What is survival swimming?

Survival swimming is defined by The Royal Life Saving Society Commonwealth (RLSSC) as 'the skills to survive an unexpected fall into deep (open) water' (RLSSC, 2016). The skills required to survive an unexpected fall are considered to be:

- entry into deep water and emerge with head above water;
- any action to keep the head above water for 30 to 90 seconds;
- swimming in any manner in a controlled direction for 10 to 50 metres; and
- water safety education including self-rescue skills and CPR actions.

Incorporating these knowledge and skills can contribute to improved self-awareness, good decision-making and leadership, all aimed at building a student's personal resilience,

This approach is in contrast to a strokes focussed 'learn to swim' curriculum which implies correct stroke technique over a particular distance; because, based on the evidence relating to why, where and how children drown, the survival swimming curriculum is best able to prepare students to be safe when in, on and around the water, both now and in the future within a relatively short timeframe (RLSSC, 2016).

In its 'Global Report on Drowning', the World Health Organization (2014) determined ten evidence-based, effective, feasible and scalable actions to prevent drowning. Action 3 is to 'Teach school-age children basic swimming, water safety and safe rescue skills'.

Swim teacher training

All swim teachers who provided instruction to the students were fully qualified AUSTSWIM Teachers of Swimming and Water Safety. Swim teachers came with a variety of experience, ranging from three months to almost 30 years, with median experience of two years.

A training workshop for swim teachers was provided by LSV to ensure consistency in delivery and accuracy of information collected throughout the BSSSP. The workshop provided teachers with training on the following elements of the program:

- the background and rationale behind the BSSSP;
- details of the program curriculum including training on lesson delivery to achieve the learning outcomes;
- the evaluation process and the importance of accuracy in assessment of student skills and knowledge; and
- use of the Attendance Record and Assessment Checklist (see Appendix A).

Swim teachers were provided with a detailed plan to follow for each lesson to ensure consistency of delivery and LSV was available to provide assistance. A lead swim teacher was appointed to monitor information collected on the Attendance Record and Assessment Checklists and this was regularly reviewed by LSV throughout the program.

Assessment Methodology

Assessment of student knowledge and skills

The extent to which students achieved the six learning outcomes was assessed via three methods: pre- and post-program tests by independent trained assessors; a pre- and post-program questionnaire and an in-class assessment by the swim teacher. How each of the outcomes was assessed is outlined in (Table 1).

Table 1 Outline of testing method for each learning outcome

| Survival swimming test method | Test method |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 1. Water safety knowledge | Questionnaire: Pre- and post-program |
| 2. Float, scull and/or tread water continuously for up to 2:30 minutes and exit safely | Independent assessment: Pre- and post-program skills tests |
| 3. Swim continuously on front and/or back for up to 300 metres | Independent assessment: Pre- and post-program skills tests |
| 4. Talk, reach and throw rescue | Questionnaire: Pre- and post-program Swim teacher: Practical test in Lesson 6 |
| 5. Survival sequence | Independent assessment: Post-program skills tests only |
| 6. Basic emergency response (DRSA) | Questionnaire: Pre- and post-program Swim teacher: Practical test in Lesson 9 |

Following school and parent consent and prior to beginning the BSSSP, participating students completed a validated and reliable self-report questionnaire, comprised of closed-ended questions designed to examine swimming ability; knowledge of water safety (Outcome 1); elements of rescue techniques (Outcome 4); and basic emergency response (Outcome 6) and exposure to aquatic environments. Practical skills tests of students' ability to swim (up to 300m) (Outcome 3) and float, scull or tread water (up to 2:30 min) and exit safely (Outcome 2) were also conducted by independent trained assessors pre-program before any skills were taught, and repeated post-program.

An additional test included in post-program testing was a simulated unexpected entry into the water (wearing shorts or light trousers and t-shirt or long-sleeved top) and associated survival sequence (Outcome 5). Due to safety concerns associated with students swimming in clothes before any formal instruction, it was not appropriate to include this test in the pre-program assessment.

Due to time limitations in conducting post-program testing, swim teachers were trained to assess students' ability to perform a talk, reach and throw rescue (Outcome 4) and basic emergency response actions (Outcome 6).

Swim teachers used the Attendance Record and Assessment Checklist to monitor participation and progress by: recording attendance daily; performing specific water safety knowledge checks after each lesson; and subsequently recording students' skills and knowledge. Seven skills required assessment during the program and for each skill a student was marked as Competent (C), Not competent (NC), or Did not attempt (DNA), For a student to be marked as Competent they had to consistently demonstrate a skill.

Qualitative and quantitative program feedback

Feedback was obtained from students, parents, school teachers, swim teachers and the swim school manager to determine the impact of the BSSSP on students, their families and other stakeholders. This feedback was collected via a number of avenues for the different participant groups. Students were encouraged to record any thoughts in a feedback book that was kept at PARC for the duration of the program. Parents/guardians provided feedback via a questionnaire comprising closed-ended questions about their overall satisfaction with the program, challenges faced and willingness to pay, and open-ended questions to describe feedback received from their child, and to provide further comment.

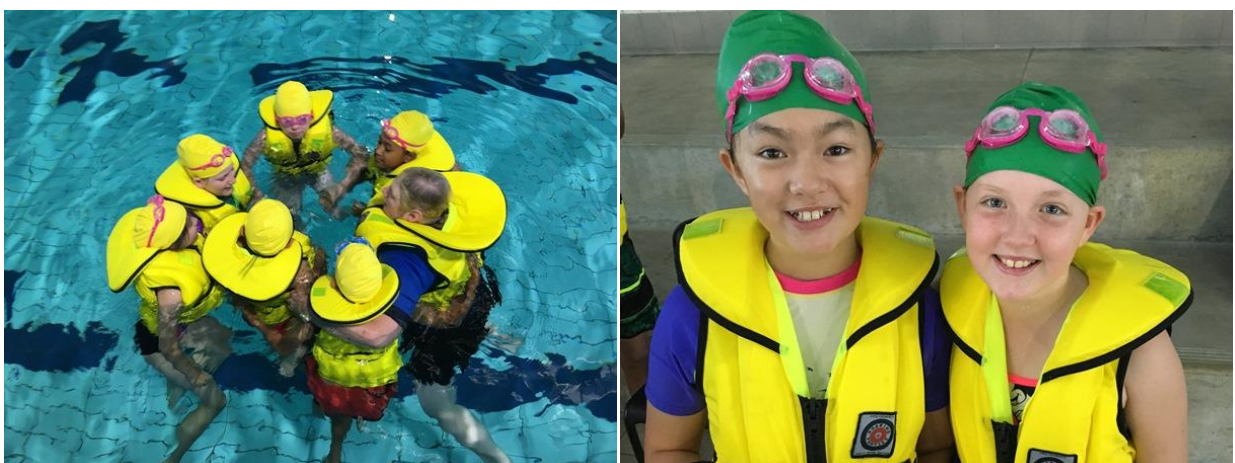
Swim teachers completed a questionnaire which comprised closed-ended questions to indicate their level of satisfaction with the BSSSP, including challenges encountered, a rating of the suitability of the content; and open-ended questions to provide specific feedback. In addition, LSV conducted an interview with the swim school manager and a focus group with four swim teachers to evaluate program content, administration, feasibility and other impacts. Finally, LSV interviewed the school Principal and a leading teacher to gain insight into the BSSSP in terms of impacts on students, logistical and administrative considerations and feasibility from a school perspective.

Cost analysis

A cost per student for participation was determined by calculating the cost of program delivery (including staff costs), supervision, bus transport (one-way and return), breakfast and resources. For comparison with the regional Before School Swimming and Water Safety Program pilot, comparable travel distances were also included, noting that the bus company charged the same rate for a 5km and 10km trip. Comparison of per-student costs with other school-based 'learn to swim' programs was calculated by collecting quotes on the per-student cost of programs from nine metropolitan and regional swim schools and organisations including, YMCA, Belgravia Leisure, Council-run swim schools and private 'learn to swim' schools, for a comparable school program of 10 x 45 minute lessons. The mean cost per student was used to provide a cost comparison with the BSSSP.

Statistical analysis

All data was entered and cleaned for statistical rigour. Any student who had not completed both pre- and post-testing was excluded from the test score data. Descriptive statistics, calculated using IBM SPSS statistics software, were performed to determine achievement of learning outcomes.



Results

Overall, 117 Year 5 and 6 students participated in the BSSSP, with 111 completing the program. Reasons for students not completing all sessions included illness and/or holidays. A total of 102 students completed the pre- and post-program skill testing and of these, 95 completed the pre-program questionnaire. Where relevant, this section reports on these 102 and/or 95 students. Ninety-five completed the pre-program questionnaire and 87 completed the post-program questionnaire. Of those students who chose not to participate, reasons included: interest level, fear, lack of parental support, holidays, illness and school camp.

Qualitative feedback was provided by 37 parents, 13 swim teachers (including 4 who participated in the focus group session), the facility's swim school manager, and the school Principal and a teacher who attended a number of the lessons.

Program overview

There was overwhelming support for the BSSSP from all perspectives. The school, all 13 swim teachers and 34 (91.9%) parents said they would recommend the program to others. Box 3 highlights the perspectives of each group with regards to their participation.

Box 3 Perspectives on participation in the Before School Survival Swimming Program

| Student perspectives | Parent perspectives |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Students provided positive feedback, enjoying the variety of water safety activities and learning new skills such as survival swimming and rescue techniques. These activities <i>'were fun and put us in a situation that could happen in real life'</i>. Less experienced students also enjoyed learning to float, scull and tread water. The connection formed with the swim teachers facilitated their positive experience.</p> <ul style="list-style-type: none"> <i>'I love how everyone tries to do something that they haven't tried before'.</i> <i>'I managed to reach my twelve lap achievement because of the new swimming stroke I learnt called survival stroke. Every time I got tired I used the special stroke and now I'm very happy'.</i> <i>'The teachers are very encouraging and make learning swimming fun and enjoyable'.</i> | <p>Despite the early mornings and some logistical hurdles, overall, parent feedback indicated that the program provided a tremendous benefit to their children.</p> <ul style="list-style-type: none"> <i>'These lessons should be provided to all primary aged students for free. [They] will save lives and make children aware of water safety'.</i> <i>'I feel safer knowing my child has done these lessons and she feels more confident'.</i> <i>'We enjoyed the program and the goals associated with it. Helping children understand and enhance their swimming abilities is an important life skill. Thank you for taking the trouble to organise this'.</i> <i>'She said she was more confident while swimming in deep water'.</i> |
| Facility perspectives | School perspectives |
| <p>All 13 swim teachers would recommend the BSSSP to other aquatic facilities, for reasons including:</p> <ul style="list-style-type: none"> provision of survival swimming skills to cope in risky situations in and around water, that they may otherwise not learn; an opportunity for all children regardless of their background; morning lesson time is when the pool is quiet and outside the crowded school day; the suitable program content; and strong support from LSV. | <p>The school felt their participation was invaluable, particularly as <i>'not a lot of kids get exposed to swimming lessons and so ... it was too good an opportunity to pass up'</i>. Keys to success included delivering a well-organised and important program, parent buy-in, school support and the provision of a bus each way.</p> <ul style="list-style-type: none"> <i>'I think [the students'] confidence built enormously from day one to day ten'.</i> <i>'It was an amazing program and the results speak for themselves'.</i> <i>'It was really successful; I don't think it could have gone any better'.</i> |

Practical survival swimming skills and knowledge

Statistical comparison of pre- and post-program knowledge and skills tests demonstrated that all students (n=102) made improvements across all learning outcomes.

Outcome 1: Knowledge associated with safety in and around water

The questionnaire asked students to respond True, False or Unsure to nine water safety questions. Whilst the average correct response rate per student increased marginally from 6.7 to 7.6 out of 9, they demonstrated substantial improvements in their knowledge that freestyle is not the best stroke to do over a long distance (92.5% increase), that they should not jump straight into the water (without any rescue items) if they see someone in trouble and aim to tow them to safety (26.9% increase) and they should not panic if they get into difficulty (25.9% increase) (Table 2). Students already possessed good knowledge of a number of themes, including safe entries and lifejackets.

Table 2 Correct response rate to water safety questions (% correct responses to True or False questions)

| Statement* | Pre-program | Post-program |
|----------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|
| | (n=95) | (n=87) |
| | % | % |
| It's ok for children to swim on their own as long as they are good swimmers. | 66.3 | 80.5 |
| A safe place to swim at the beach is between the red and yellow flags. | 81.1 | 95.3 |
| Diving straight into the water without checking the conditions can be dangerous. | 93.8 | 94.2 |
| Murky brown water may hold hidden dangers such as underwater currents. | 83.3 | 93.0 |
| You should panic if you get into difficulty in the water and hope that someone sees you. | 67.4 | 84.9 |
| A rip is a strong water current of water that can carry a person away from the beach and out to sea. | 85.3 | 91.8 |
| If you see someone in trouble in the water you should jump straight in (without any rescue items) and try to tow them to safety. | 74.2 | 94.2 |
| Freestyle is the best stroke to do over a long distance if you have to swim with your clothes on. | 32.0 | 61.6 |
| You should always wear a lifejacket when on a small boat, a jet ski, or in a kayak. | 97.9 | 96.5 |

*Note: Question wording in the survey was such that for some questions, a positive response was correct ("true") while for others, a negative response was correct ("false"). Table 2 provides the percentage of correct responses.

Outcome 2: Float, scull and tread water continuously for 1 minute

The proportion of students that could float, scull or tread water for 1 minute or more and therefore met Outcome 2 increased considerably from 70.3% pre-program to 84.3% post-program (Figure 1). Skills testing revealed even greater change in the proportion of students who could float, scull or tread water for 2 minutes or more, increasing from 62.4% to 80.4%.

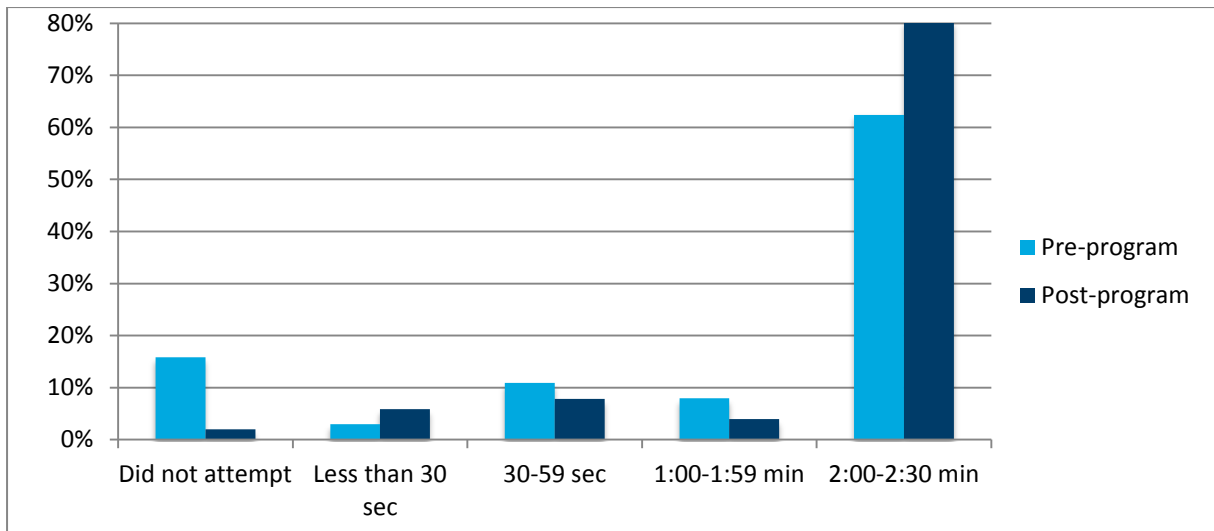


Figure 1 Maximum time able to float, scull or tread water, pre- and post-program (n= 102)

Outcome 3: Swim continuously for 50m on front and/or back

The proportion of students who swam 50 metres or more continuously and thus achieved Outcome 3 increased from 66.7% to 90.2% pre- and post-program respectively (Figure 2). The proportion that achieved the maximum distance of 300m almost doubled from 24.5% to 48.0%. A change was observed regarding whether children performed this swim on their front or back, with the proportion that swam on their back almost doubling, from 36.3% to 65.7%, which may account for increased distance.

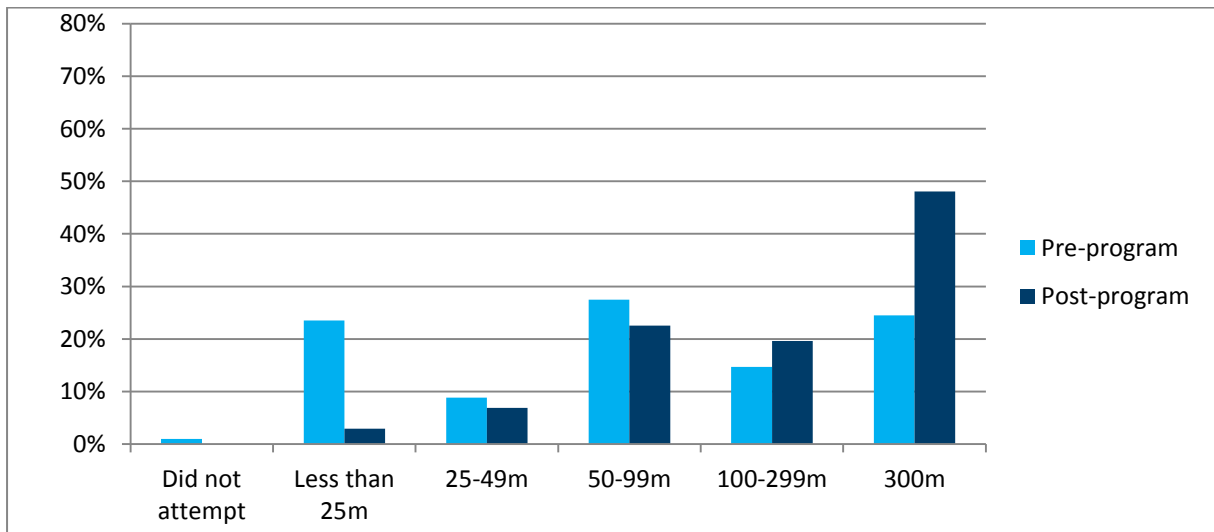


Figure 2 Maximum swim distance, pre- and post-program (n= 102)

Outcome 4: A talk, reach and throw rescue

Table 3 presents the improvements students demonstrated in their knowledge of, and ability to execute, three dry rescue techniques. Each rescue technique was successfully demonstrated by the majority of students in class: 95.7% could successfully perform a talk rescue, 97.4% a reach rescue and 96.6% a throw rescue.

There were considerable increases in students' knowledge of rescue techniques including the first action to take when executing a reach rescue (42.8% increase) and to use a throw rescue to help a person in trouble in the water if they

'I enjoyed doing rescues and lifejacket activities the most because they were fun and put us in a situation that could happen in real life. I have learned a lot of things throughout the program. I didn't previously know about survival strokes which I do now. I think they are important skills to learn'.

- Student

are 'just a bit too far away to reach with a pole or noodle' (33.8%). Solid increases were also observed in students' ability to correctly identify appropriate objects to use in specific rescue contexts.

Table 3 Change in student knowledge and skills in rescue techniques

| Rescue type | Statement | Knowledge (questionnaire responses) | | Skill (teacher assessment) |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------|-----------------------------------------|
| | | Pre-program (n=95) | Post- program (n=87) | Demonstration of skill in-class (n=117) |
| Talk | A person should not enter the water to rescue someone. | 74.2% | 94.2% | 95.7% |
| Reach | The first action to take when performing a reach rescue is to lie down on the ground and reach out with an object for the swimmer to hold. | 30.0% | 72.8% | 97.4% |
| | Suitable rescue objects for a reach rescue: | | | |
| | Noodle | 76.8% | 96.6% | |
| | Pole | 86.5% | 95.7% | |
| Throw | To use a throw rescue to help a person in trouble in the water if they are 'just a bit too far away to reach with a pole or noodle' | 56.3% | 90.1% | 96.6% |
| | Suitable rescue objects for a throw rescue: | | | |
| | Ball | 49.4% | | |
| | Rescue ring | 88.1% | | |
| | Esky | 19.5% | | |

Outcome 5: A survival sequence

Due to safety requirements, the survival sequence was not assessed in the pre-program tests. However, elements of the survival sequence were assessed in pre-program testing without clothes. In addition to the swim and float (discussed above) students also performed a safe exit. The majority (98.0%) successfully completed this skill attired in swimwear in the pre-program test wearing street clothing and a similar proportion (96.1%) in the post-program test.

Post-program testing included a test of students' ability to perform a full survival sequence (refer methodology). Due to the limited time available to complete testing, four students did not attempt the survival sequence. Of the 98 students who did attempt the survival sequence, 77.6% successfully executed all five elements, achieving Outcome 5 (Table 4). The most difficult element was the 25m swim whilst clothed.

'I managed to reach my twelve lap achievement because of the new swimming stroke I learnt called survival stroke. Every time I got tired I used the special stroke and now I'm very happy'.

- Student

Table 4 Completion of survival sequence at post-testing – All students and students identified as non-swimmers – All students and students identified as non-swimmers

| Element of survival sequence | Skill completion rate | |
|----------------------------------------------|-----------------------|--------------|
| | All students | Non-swimmers |
| | % | % |
| Recover from a fall in entry | 94.7 | 68.8 |
| Rotate onto back | 94.7 | 68.8 |
| Float, scull or tread water for 1 min | 92.6 | 56.3 |
| Swim 25m | 85.3 | 56.3 |
| Safe exit | 97.9 | 81.3 |
| All five skills | 77.6 | 50.0 |

Outcome 6: Basic emergency response skills (DRSA)

Although swim teachers found 92.3% of students capable of performing the first steps of basic emergency response (DRSA, or, ‘Danger’, ‘Response’, ‘Send for help’, ‘check Airways’) in-class, the post-program questionnaire identified knowledge gaps in linking the steps together. Whilst 92.8% of students knew the recovery position for an unconscious person, they did not perform well in listing the steps in the correct order (DRSA). Whilst the correct response rate increased from 3.3% to 29.6%, many still confused the order of ‘Send for help’ with ‘check Airways’ in the post-program questionnaire.



Impact on non-swimmers

Sixteen students were identified as non-swimmers before beginning the program. These students would not enter the water to try floating/sculling/treading water and would either not swim at all, or could not swim one length of the pool (25m). Whilst the actual distance they swam was not directly measured, assessors noted that many of these students could not swim to the backstroke flags (5m) and required one-on-one assistance from a swim teacher in the water at the time of testing.

They demonstrated very good attendance, with 12 attending all ten lessons, 3 attending nine lessons and 1 attending eight. Fifteen completed the pre-program questionnaire and 12 completed the post-program questionnaire. The questionnaire identified improvement in confidence around water throughout the BSSSP. Initially, 81.3% felt unsafe or very unsafe about swimming in a public swimming pool where they could not touch the bottom, which decreased to 33.3% post-program. The same proportion initially felt unsafe or very unsafe about swimming on their back in open water (e.g. ocean, river, lake), also decreasing to 33.3% post-program.

Water safety knowledge

The average correct response rate to the water safety questions increased from 5.9 to 7.6 out of 9, demonstrating a considerable improvement in water safety knowledge. The most dramatic improvements were in students' knowledge that they should not panic if they get into difficulty (66.7% increase from 6 to 10 students reporting this correctly) and that children should never swim on their own, even if they are good swimmers (100.0% increase from 4 to 8 students reporting this correctly). Non-swimmers already possessed good knowledge of a number of themes, including dangers associated with diving in without checking conditions (92.9%) and what a rip current is (85.7%).

Floating, swimming and survival sequence

As a result of the BSSSP, 43.8% of non-swimmers who would not attempt to float, scull or tread water pre-program were able to float, scull or tread water for at least 1 minute post-program, including 37.5% who floated between 2:00 to 2:30 minutes (Figure 3). There were similarly impressive increases in the distance students could swim, with 56.3% swimming at least 50m, including 25% who swam between 100-300m (Figure 4). Eight (50.5%) non-swimmers were able to successfully complete each stage of a survival sequence whilst clothed (Table 3). The most difficult element was the float/scull/tread water for 1 minute and the 25m swim.

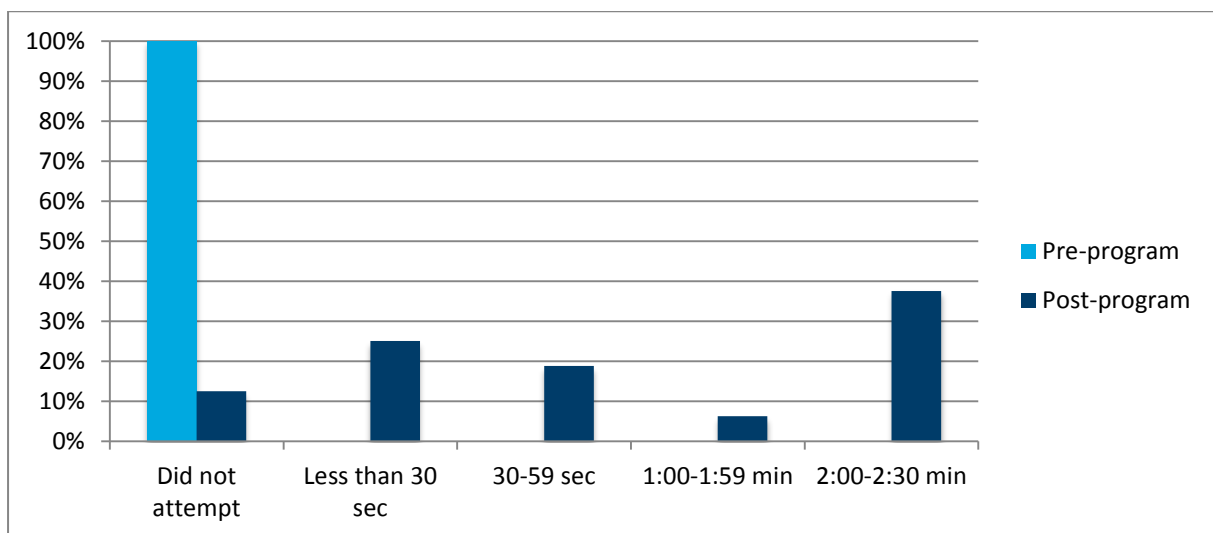


Figure 3 Maximum time non-swimmers could float, scull or tread water, pre- and post-program (n=16)

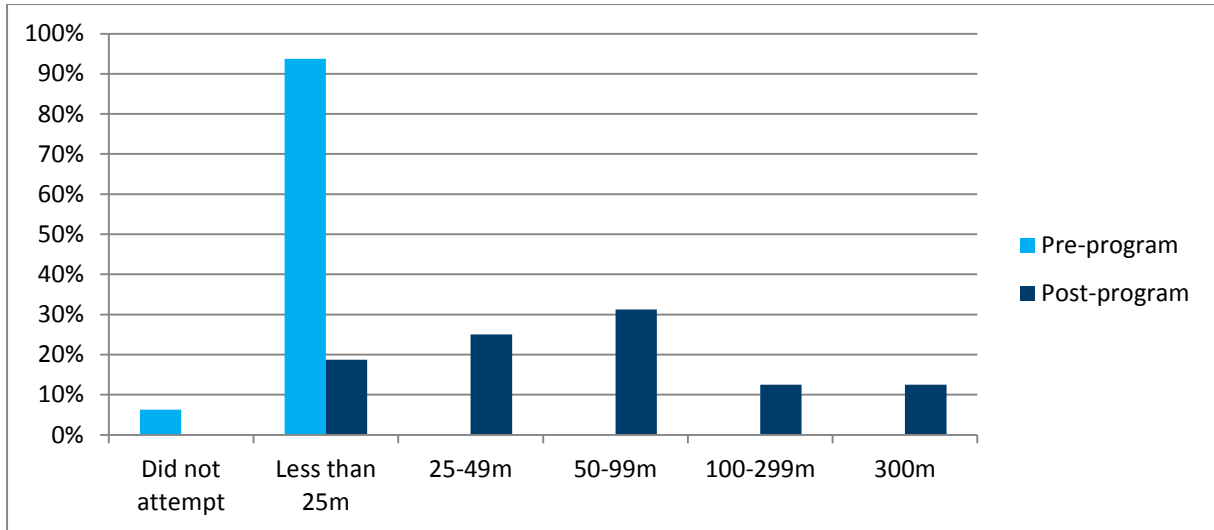


Figure 4 Maximum distance non-swimmers could swim, pre- and post-program (n=16)

The observed improvements in the non-swimmers were a highlight for many involved in the BSSSP. Box 4 provides examples of the sentiment of the students themselves, and those who witnessed their growth.

Box 4 Perspectives on non-swimmers’ participation in the Before School Survival Swimming Program

| Student perspectives | Parent perspectives |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • <i>‘I love how all of the teachers help you be a good swimmer and improve. They’re also supportive.’</i> • <i>‘I love how we got to improve on survival stuff. Thank you for everything you did for me!’</i> • <i>‘Today I learnt how to swim all by myself’.</i> • <i>‘Thank you for teaching me to swim’.</i> • <i>‘I never thought I could float for two and a half minutes by myself in the deep end. Thanks’.</i> | <ul style="list-style-type: none"> • <i>‘My daughter feels more confident in water, she starts floating on her back. She enjoys the lessons. The program is extremely useful. Thank you!’</i> • <i>‘The lifesaving program is great! I would recommend it to everyone who wants to learn how to swim and get extra information about safety rules while swimming’.</i> • <i>‘Every day she would tell us about what she did and she was very excited about it. This was a fantastic result as she did not want to attend and we had to convince her to go’.</i> • <i>‘She loved [the program], especially being able to see her own progress. Thanks for the opportunity’.</i> |
| Facility perspectives | School perspectives |
| <p>The swim teachers observed that the non-swimmers and lower level swimmers demonstrated the greatest growth. From not leaving the wall or putting their heads under, to behaving confidently and with a sense of fun in the water, their immense, rapid development was undeniable.</p> <ul style="list-style-type: none"> • <i>‘Seeing their confidence grow between the beginning and the end where they were all happy.’</i> | <ul style="list-style-type: none"> • <i>‘Some of the improvement was phenomenal...a couple of kids improved out of sight as far as being able to save their lives in the water’</i> • <i>‘Hugely positive impact on non-swimmers, immense progress in just two weeks’.</i> |

Student engagement

Despite the early mornings, the overall sentiment was that students were engaged in the BSSSP and enjoyed the lessons, and students took pride in their improved skills and knowledge. One student, for example, felt *'I have learned a lot of things throughout the program. I didn't previously know about survival strokes, which I do now'* and *'I never thought I could float for two and a half minutes by myself in the deep end'*. After lesson 9 one non-swimmer felt *'sad because tomorrow will be the last day and I love swimming so much'*. Others were particularly engaged by the water safety elements and how to respond if they witnessed someone in trouble, with one student recalling they *'learned a lot more about safety at the beach'*.

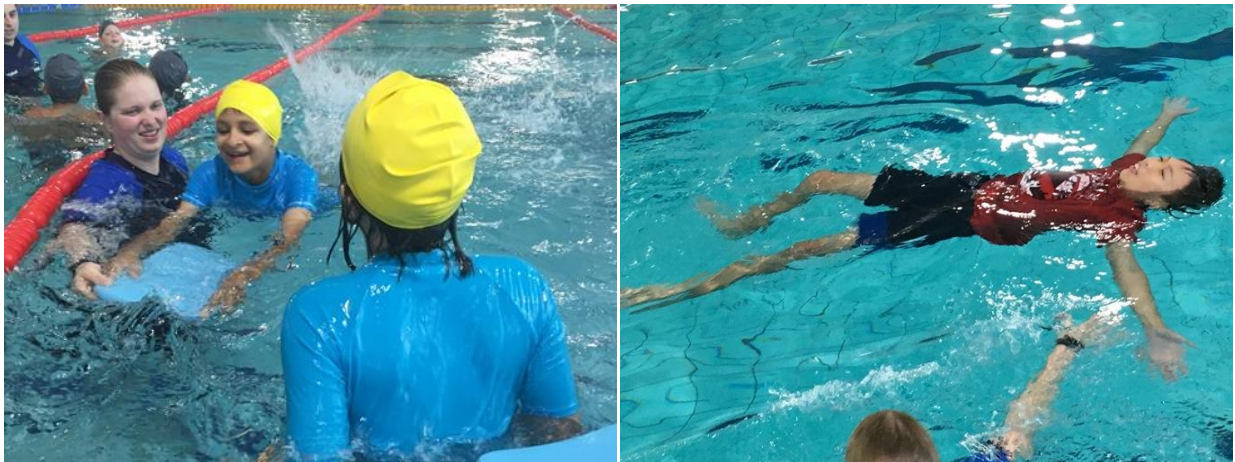
Parents reinforced the children's engagement with the BSSSP by providing positive feedback overall, including the examples provided in Box 5.

Box 5 Parent perspectives on student engagement in the Before School Survival Swimming Program

Parent perspectives

- *'Every day he was so happy. He told me everything he did during the swim class'*
- *'My son had negative experiences with swimming [in the past] and was apprehensive about coming to this. However, a couple of days into the program and he started enjoying it and looking forward to it'*.
- *'My daughter loves the swimming lessons. She was scared of the water before and didn't want anyone to teach her how to swim. Now she is improving her skills'*.
- *'My son was far more willing to get ready in the morning than he usually is on a school day. He really enjoyed the program'*.

School teachers reported that a number of participating students were tired after day two; however on days three and four there was an attitude and energy shift whereby students were enjoying the lessons and more attentive than usual in class. The interviewed school teacher felt the morning exercise contributed to improved mental and physical health for the students.



Content

Swim teachers provided positive feedback on all aspects of the BSSSP, including suitability of content, program format, logistical considerations and the level of improvement observed among participating students. They rated most elements of the BSSSP as either good or very good, particularly the before school lesson time (92.0%), the 10-lesson length (84.0%) and the lesson content (92.0%) (Figure 5).

Sentiment was that the content was largely suitable for students with lower abilities and that extension activities should be incorporated into lesson plans. They indicated that the assessment criteria were suitable for Year 5 and 6 students (Figure 6). They suggested allocating more time to teaching and practising basic emergency response scenarios.

Twelve (92.3%) swim teachers would participate again for reasons including, witnessing the students' 'growth in skills, knowledge and confidence and enjoyment of the water' and due to 'a very positive atmosphere'. One swim teacher, 'found it very rewarding to see them learn new skills and improve their swimming by the end of the program'.

Swim teachers and the school agreed that classroom-based activities should be developed to complement the BSSSP. These should be designed to consolidate themes covered in the lessons and also for use in the classroom for students who don't participate in the program so that all students in a class can learn elements of water safety, whether or not they participate in a BSSSP.

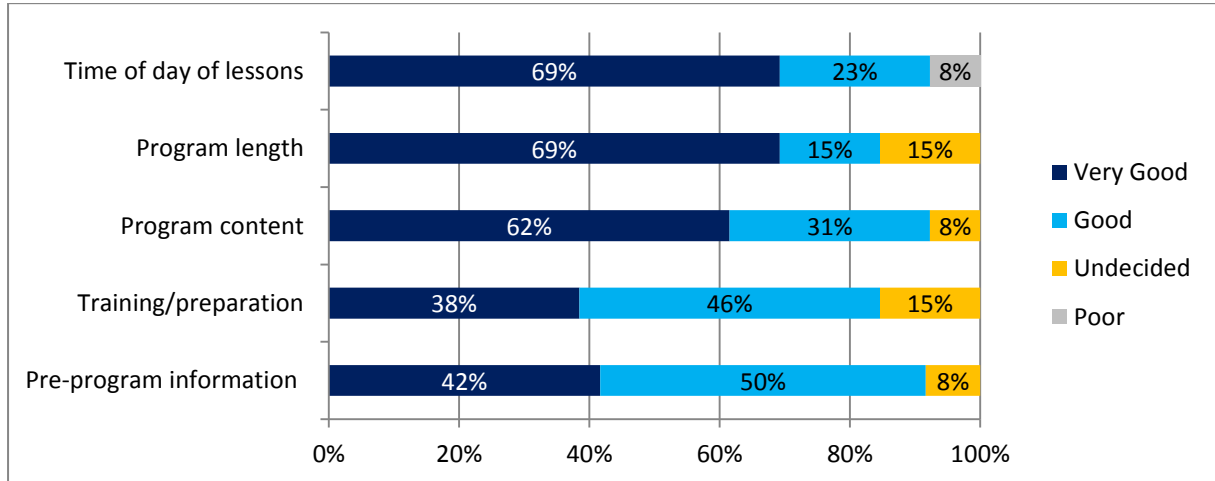


Figure 5 Swim teacher ratings of program elements (n= 13)

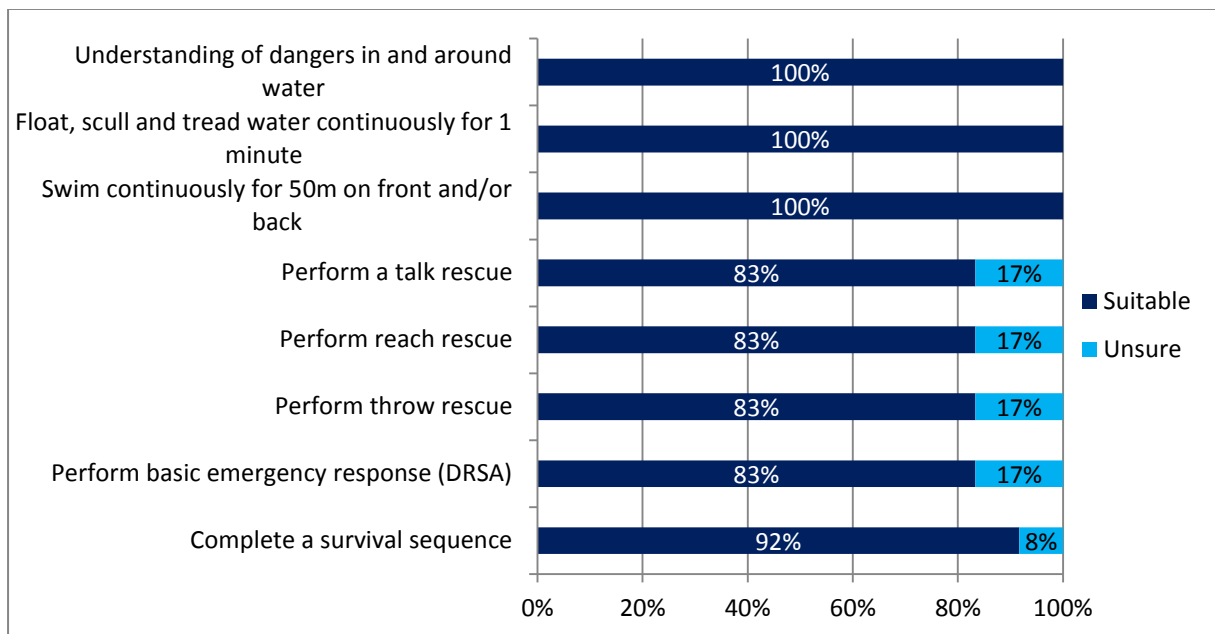


Figure 6 Swim teacher indications of suitability of learning outcome criteria for Year 5 & 6 students (n=13)

Finally, 92.3% of swim teachers rated the workload as either manageable (38.5%) or very manageable (53.8%) because they found the lesson plans to be appropriate, effective and detailed. One said, the 'program was very well organised'; the 'lesson plan was excellent as it was straight forward and basic to understand so the kids wouldn't get too overloaded'; 'the lessons for each day were well thought out in view of water safety and knowledge of survival strokes'.

A school teacher who observed the majority of the BSSSP felt the small group sizes improved the value students gleaned and that the students enjoyed this program over traditional school swimming lessons because of the lifesaving elements and the *'have-a-go, low-pressure environment'*.

Recommended improvements to program

Swim teachers and school teachers made the following suggestions to improve the BSSSP in terms of content, training and resources:

- Provide extension activities for the more advanced students, particularly in the first five lessons;
- Improve teacher training in basic emergency response;
- Increase the proportion of time allocated to achievement of Outcome 6: Basic emergency response;
- Provide a range of scenarios, games and activities appropriate for different levels and for each learning outcome; and
- Schools would benefit from pre-program classroom activities to engage students in the topic and prepare them for the program, as well as activities for students who do not participate.

Logistical considerations

Logistically, the pilot program differed from a typical school swimming program in that it was before school, meaning a change to normal morning routines and the need for families to arrange transport to lessons. This impacted on all stakeholders; however they quickly adjusted to the routine. The majority of families successfully modified their routine and the facility, swim teachers and the school made adjustments to ensure the BSSSP ran smoothly. Further details on the logistical factors and how they impacted on each group are provided below.

Time of day

Parents commonly rated the time of day (before school) as either very good (29.7%) or good (43.2%); however 21.6% were undecided and 5.4% rated the time as poor. Nevertheless, 31.6% found the early start time difficult, as well as the duration (daily for two school weeks) (26.3%). Whilst some parents found morning lessons *'so much more convenient'*, and children to be *'far more willing to get ready in the morning than he usually is on a school day'*, others felt it was more difficult. For example, one parent said *'it was hard for her to wake up every morning and she used to get tired'*. The early start may be more manageable if it was once per week over ten weeks rather than over ten consecutive school days. The level of difficulty compared to a standard 'learn to swim' program during the day was not assessed.

According to the school, the achievements far outweighed the barriers and they felt, *'[the parents] would all do it again and were very positive about the impact [the BSSSP] had'*. Furthermore, the before school timing did not interfere with the crowded school curriculum. From the facility point of view, 8:00-9:00 AM was during a quiet programming time for the facility (between aqua aerobics and infant swim lessons), and therefore ideal.

Family routine

A number of families found the early start time challenging, particularly because it disrupted routines, impacted on other siblings and left students tired by the end of the week. However, parents recognised the benefit of the BSSSP and while there *'was a challenge with my work in the morning and his normal routine changed yet we swung into a new routine quickly'* and, despite the early starts, another parents said their child *'enjoyed the experience and did not complain about waking up early'*.

Transport

The majority of students were dropped off at the facility by their parent/guardian (58.3%), followed by bus transport (25.0%) and shared drop off with another family (16.7%). Most parents rated transport to/from the facility as very good (66.7%) or good (27.8%); and for those that did not utilise the free bus, a lack of transport to the venue made it difficult to attend the BSSSP for 28.9% of parents.

From a school perspective, without the provision of the bus from the school to the facility the BSSSP would not have been possible, and the program's impact was greater due to the provision of transport in both directions to cater for those who would otherwise miss out.

Facility

Parents typically rated elements of the facility as good or very good, including the venue (82.9% and 17.1% very good and good, respectively); the swim teachers (50.0% very good and 47.1% good); and the pre-program information (45.9% very good and 45.9% good).

Provision of swim teachers

From a facility perspective, sourcing teachers to participate in the early morning program was challenging. At times, *'it was difficult to always have teachers turn up and stressful when we were understaffed, however we always found a way'* to accommodate for everyone safely.

School supervision

From a school perspective, the BSSSP was challenging logistically, but with support from the team at PARC and LSV it was manageable. They felt it *'was really well run'* as a result of *'the professionalism, contact and communication'* of the staff. A significant issue was organising a roster for teacher supervision at the facility each morning; however this was managed.

For those non-participating students, school teachers reported the classroom would be disrupted at times in the morning due to the absence of a complete cohort. These disruptions included: teachers being unable to move forward with the classroom curriculum; and combining class groups to cover for the teachers providing supervision on the BSSSP. To compensate, water safety activities were incorporated into the school curriculum to maximise engagement.

Cost evaluation

Cost per student

The total cost per student to participate in a 10-lesson program varied from \$134 to \$248 (or \$13.40 - \$24.80 per lesson) based on two factors: the need for transport one-way (facility to school) or two-way (school to facility and return), and the ability of the school to provide a school teacher for supervision in-kind or at an additional cost (Figure 7). A cost per student comparison with the regional program demonstrated a slightly higher cost in the metropolitan program for one-way transport and in-kind supervision as a result of higher transport costs and the provision of Casual Relief Teachers. This variation ranged from \$7.00 per student with one-way transport and in-kind supervision, to \$66.00 with return transport and paid supervision. An additional comparison with the current cost of school-based learn to swim programs in Victoria estimated the delivery cost per student of the BSSSP to be higher by between \$18.00 (\$1.80 per lesson) with one-way transport and in-kind supervision, to \$19.00 (\$1.90 per lesson) with return transport and paid supervision.

| | Metropolitan school (within 5km of the facility) | | Regional school (within 5km of the facility) | | Other metropolitan school swim programs* (within 5km of the facility) | | |
|-------------|-----------------------------------------------------|---------|-------------------------------------------------|---------|-----------------------------------------------------------------------------|---------|-------|
| | Transport | | Transport | | Transport | | |
| | One-way | Two-way | One-way | Two-way | One-way | Two-way | |
| Supervision | In-kind | \$134 | \$177 | \$127 | \$140 | \$116 | \$158 |
| | Paid | \$205 | \$248 | \$168 | \$182 | \$187 | \$229 |

* Transport costs for the BSSSP were used to estimate the cost of other metropolitan school programs

Figure 7 Cost per student estimates of 10-lesson Before School Survival Swimming Program and comparison with other school swimming programs

Feedback from the bus company indicated it would be more cost efficient to operate the swimming programs during school hours as their school/charter businesses are largely built around combining a school run with charters in the middle. When the charters such as sport encroach into the school run

time, this typically triggers the requirement to increase the capital cost as an extra vehicle which is not cross subsidised by a school run, is required for the charter.

Willingness to pay

Willingness to pay for the full 10-lesson BSSSP varied substantially from between \$10 to \$30 per student (parents' willingness) to \$90-100 (swim teachers' estimate of appropriate cost) as evidenced by:

- Parents were asked what they would be willing to pay for each lesson. Most were willing to pay \$1-\$3 (42.4%), followed by \$4-\$5 (24.2%) and \$9-\$10 (21.2%).
- Swim teachers felt \$9-\$10 would be an appropriate cost per student charge for each lesson (45.5%), followed by an even spread across the remaining options of \$1-\$3, \$4-\$5 and \$6-\$8 (18.2%).

By comparison, parents in the regional pilot program were mostly willing to pay \$4-\$5 (39%), followed by \$9-\$10 (29%) and \$6-\$8 (13%) per lesson.

In summary, these observations demonstrate the need to subsidise the cost per student for this 10-lesson program (\$134 to \$248). This cost is substantially greater than what the majority of parents would be willing to pay (\$10-\$30); a difference of approximately \$124-\$218. This supports the need for funding to subsidise these programs.

To further support need for subsidies, a number of parents, swim teachers and school teachers stressed that such programs need to be either very cheap or at no cost to enable access for all, particularly those arguably most in need of survival swimming education (i.e. low socio-economic status and CALD families). The school stressed that cost is a major inhibiting factor for families in the area and without funding the BSSSP would not reach those most in need.



Discussion and Recommendations

Similar to the regional pilot conducted in 2015, the Before School Survival Swimming Program enhanced the personal resilience of participating students by increasing their survival swimming skills. In addition, valuable lifelong personal survival skills were acquired, and students became more confident in the water, including learning skills and techniques to assist others in danger around aquatic environments whilst avoiding harm to themselves.

Program effectiveness to achieve survival swimming outcomes

There was overwhelming support for the BSSSP from all stakeholders in terms of providing access for all students, delivering engaging, relevant and valuable content, and the outstanding level to which the cohort achieved the majority of the learning outcomes. This was also a result of effective partnerships between LSV, Federation University Australia, PARC and the school along with careful planning and organisation. Students and their families' demonstrated commitment to the BSSSP through high attendance, and this in turn contributed to the marked improvements observed across most areas and the increased confidence to recreate in, on, or around aquatic environments.

The high level of achievement of the learning outcomes demonstrates that the BSSSP developed key survival swimming skills among students, which will contribute to their capacity to recreate safely and confidently in, on, or around the water. The improvement, particularly in students' competency to float, scull and tread water, swim using any technique, and perform a survival sequence may be a result of a lessened emphasis on the stroke technique focus of some 'learn to swim' programs and greater focus on the minimum skills needed to survive an unexpected entry into deep water such as body orientation, any action to keep the head above water for 30 to 90 seconds, and swimming in any manner in a controlled direction for 10 to 50 metres (RLSSC, 2016) (). This improvement was likely to be further influenced by an increase in confidence in the water. The change was exemplified by the fact the majority of students could perform a survival sequence whilst clothed, placing them in good stead to be able to recover from an unexpected entry into water and move to a point of safety. Their ability to recognise the most appropriate dry rescue for a given scenario and to perform it safely and effectively, will empower them to help someone in need without placing themselves in danger.

Specific attention is required to improve achievement of Outcome 6: Basic emergency response. This should include: provision of specific pre-program training on basic emergency response theory; skills for swim teachers and dedicating more lesson time to achieving this outcome. An alternative option would be to look at the scope to deliver some theory components in the school class setting to maximise the application of skills and integration of theory to practice when at the aquatic setting.

Overall sentiment was that delivering lessons before school was suitable and should be considered in the implementation of a survival swimming program. Furthermore, the program's success would be diminished if free transport was not provided as it enabled access for students who could otherwise not attend (e.g. work commitments, other siblings' needs, lack of alternative transport options, lower commitment or interest in swimming). Combining transport into any before school program will be critical to its success.

Impact on non-swimmers

The observed improvement and positive impact of the BSSSP on those classified as non-swimmers was particularly impressive. In order to develop any survival swimming skills, they first overcame their fear of water. The marked improvements they made were complemented by the sense of pride and achievement they demonstrated and by their increased confidence and enjoyment of the water. The fact that over half of these students were able to complete a full survival sequence (including a 1 minute float) whilst fully clothed just ten lessons after they would not let go of the pool edge and attempt to float is testament to the effectiveness of the BSSSP structure and the specific skills it taught. In its current format the BSSSP has demonstrated its suitability for improving the survival swimming skills among those with limited experience of aquatics.

Variation in accessibility between metropolitan and regional participants

This evaluation found the running costs of the BSSSP were marginally greater in metropolitan Melbourne than regional Victoria. Additionally, parents in the metropolitan pilot were less willing to pay for their child to participate in such a program. The difference in cost is largely a result of higher

relative transport costs over fairly short distances in metropolitan Melbourne. Again, there is a recognised need to provide access to survival swimming for as many children as possible, and particularly those from low socio-economic and CALD backgrounds and such a program therefore requires subsidisation.

Cost-effectiveness and feasibility of the program model

In order to prevent drowning, every Australian child should have basic swimming and water safety skills and knowledge. Fortunately, the acquisition on survival swimming skills can occur in less time and at a lower cost to traditional strokes focussed ‘learn to swim’ programs (RLSSC, 2016). The rapid development observed among the students in this pilot program demonstrates the benefits the BSSSP can have on equipping students with survival swimming skills in a short period.

There exists a disparity between the cost per student and the willingness of families to pay for lessons. Despite adding to the overall operational cost of the BSSSP, the bus was an invaluable factor for providing access to all students, including those who may need lessons the most. Therefore avenues of providing subsidies for transport are particularly recommended. Targeting one-way transport in metropolitan Melbourne and seeking in-kind supervision from school teachers each lesson is the most cost effective method of program delivery. Depending on the bus company’s business model, transport costs may be lower if the program is delivered during school hours; however this then cuts into the already busy curriculum, a significant issue highlighted previously (Birch and Matthews, 2013).

The importance of providing access to survival swimming education to Victorian students must not be undervalued. The results suggest students have learned valuable skills that may one day save their life or that of another, within a short time frame, at marginally greater cost to a standard school swimming program. This program should therefore be considered for state-wide delivery.

Recommendations

The recommendations listed below are based on the evaluation of the metropolitan Before School Survival Swimming Program pilot.

1. To improve the resilience of the Victorian community, delivery of practical survival swimming skills should be mandated in the school curriculum. This is supported by the Victorian Coroner’s recommendation ‘that swimming and water safety education should be a compulsory skill taught within the primary school curriculum to all Victorian children’.
2. Conduct an education and aquatic industry consultation to review the school survival swimming program, and establish a working group with key stakeholders for refinement. The program should be made readily accessible for all Victorian schools and aquatic facilities, and this may include development of a specific resource portal, i.e. website, with current and evidence-based best practice survival swimming resources for schools and facilities.
3. Identify scope to develop classroom resources, aligned to the Victorian curriculum, that will both complement and enhance the theoretical learning of risk identification, behaviour modification and basic survival swimming skills. Resources should also utilise technology solutions, such as digital game-based learning and virtual reality to ensure sustainability and student engagement, i.e. equipment and technology that simulates movement and immersion. Incorporating these into the classroom setting maximises the application of skills and integration of theory to practice when in an aquatic setting. These activities will provide theory for all students, including those who do not participate in a practical program.
4. Identify scope to develop recognition of prior learning models to upskill and deliver accredited training for school teachers. This will increase the number of qualified teachers of swimming and water safety in Victorian schools, ensuring the long-term sustainability and cost effectiveness of school survival swimming programs, particularly in regional and remote areas.
5. Develop and deliver targeted survival swimming professional development sessions for swim teachers and school teachers, focusing on the importance of survival swimming and upskilling in teaching basic emergency response.
6. Investigate the percentage of improvement for a group that engages in a combination of school based aquatic education in conjunction with a before school swimming program to determine the best way to maximise the learning outcomes. Undertake a retention study to investigate the amount of survival swimming and water safety knowledge that is retained both short and longer term from undertaking an intensive before school survival swimming program.

7. Consider at what age this program would best be subsidised, especially if the only way to deliver school survival swimming programs is with funding. If this is the case, knowing when the outcomes will be maximised is essential.

It is valuable to reinforce the following recommendations, which come out of the evaluation of the Before School Swimming and Water Safety Program conducted in a regional Victorian setting (Birch *et al.*, 2015).

8. Develop and implement an online student swimming competency database to track student swimming capability state-wide, and provide a platform to continuously monitor and evaluate any interventions and identify best practice delivery models.
9. Investigate the feasibility of incorporating the BSSSP into existing outside school hours care (OSHC) programs.
10. Prioritise participation of students from low socio-economic and CALD backgrounds and improve promotion of the BSSSP to encourage students of all abilities and backgrounds to participate. This includes highlighting the unique content of the survival swimming program, which focuses on skills to prepare a child for emergency scenarios in water as well as unexpected entry into water.



Conclusions

The pilot study evaluation of the Before School Survival Swimming Program demonstrated positive outcomes in regards to swimming and water safety skills and knowledge and provided increased understanding of the feasibility of running this survival swimming program in Victoria. As part of the project, over 100 students from Years 5 and 6 of a primary school located in the Frankston City local government area were taught essential survival swimming skills and knowledge as part of a 10 day intensive program. Results indicated improvements in the following areas: survival swimming including water safety knowledge; confidence and enjoyment of aquatic environments; and the ability to respond appropriately to aquatic emergencies. As a result of the program, it is believed that these students have been empowered to recreate safely in, on and around the water.

The strong support from all stakeholders was a key component associated with the success of the program and needs to be considered as a factor for wider roll-out of this program. For example, the program would not have been possible without the support from the aquatic facility and school; the commitment of swim teachers; the coordination and management by LSV; and funding support from the Victorian Government. In order to ensure successful implementation and school engagement with the program state-wide, the cost of transport must be addressed. Further, to ensure this survival swimming program reaches children in areas of greatest need, consideration regarding program subsidisation is required. Finally, further research associated with the longer term benefits of an intensive program, including retention of knowledge and skills would assist in development of best practice survival swimming programs.

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