

# Early Years Swimming:

Adding capital to young Australians

## Background Paper

Robyn Jorgensen



## Executive Summary

In 2007 Laurie Lawrence approached Professor Robyn Jorgensen about the possibility of an independent research study to be undertaken by Griffith University. The study would examine and ascertain the possible effects of participating in early years swimming on the development of young children. Anecdotally, those teaching within the swim industry had noted that swimmers often appear to be more confident, more physically developed, stronger in their language skills and seem to be more positively involved in learning at school than many of their same-age non-swimming peers. Over the next year or so, Lawrence and Jorgensen collaborated on the possibility of such an independent study. Funds were sought from external stakeholders but without success. At the 2009 annual ASCTA conference in Surfers Paradise, Lawrence proposed the project to the swim industry and sought donations from swim schools. To this end, swim industry sponsors across Australia, New Zealand and the US collectively pledged \$80K for each of four years to conduct the research. More recently, donations have been received from Brazil, making this a large international study.

The project design was developed by Professor Jorgensen and as the project has progressed it has been refined and expanded to incorporate emerging variables. The study is seeking to explore a number of key questions. These are:

- A) Are early swimmers ahead of their similar-aged peers? Assessed using the large-scale survey and individual child testing.
- B) What are the critical elements of the swimming schools and programs that may hinder or enhance learning? Assessed through swim school observations, profiling and audits.
- C) What does the field of early years swimming look like in Australia? A snapshot of the swim industry assessed through a survey of the field.

The fundamental approach draws on a mixture of methods. These include direct observation of lessons, parent surveys and interviews, comparisons of methods across swim schools and psychological testing of children to measure their development against recognised scales. It is from this platform that the study seeks to draw data from a large cohort of children between six months and five years of age in order to investigate our claims about the possible effects of participation in swimming lessons. Initially, large surveys were conducted using parental assessments of their child/ren against international developmental milestones. This was to assess how children in early years swimming performed against norm-referenced measures. It was hypothesized that if industry perceptions are correct, then children active in early years swimming lessons would rate significantly ahead of their same-age peers. The inherent danger in such data collection is, however, the reliance of parental reports and the “halo effect” of parental over-estimation of their child in comparison with other children. More detailed investigations into children’s skills has to be undertaken to avoid the possibility of such a bias. A representative sample of the “swimming” children are being tested. The results will be compared against large-scale studies of children in the early childhood sector.. These two (complementary) methods should confirm the hypothesis that good quality learn-to-swim instruction from an early age adds educational value or capital to children.



The quality of a swim environment plays an important role here. It is widely acknowledged in educational literature that environments and teachers are the most critical variable in enhancing student performance. But what is not known is the effect of the swim environment in this context. To this end, the study has developed two tools to assess the quality of swim environments and the pedagogies, or philosophy for teaching swimming, they adopt. As would be expected, there will be a large number views about teaching early swimmers across swim schools. To account for this, the study includes a mapping exercise of schools within the field to identify and to consider similarities and differences between them. More importantly, the study may help to identify swim environments where pedagogy impacts on improvement in learning.

As the study approaches the end of 2011, a number of activities have been undertaken including two iterations of the survey in which a total of over 4000 responses have been received; observations of over 30 schools across 4 states; and two annual reports. While no conclusive conclusions can be made until detailed child testing is undertaken, the data from the survey suggest that there is a strong possibility that children participating in early years swimming are ahead of their same-age peers. What appears to be a significant factor in the study is the swim schools. More data must be collected to understand these results and the interactions between the many factors that may be contributing to any outcomes. Final results are anticipated by mid 2013.

This study is an independent study being conducted by Griffith University. It is not seeking to confirm the intuitions of the swim industry but to use appropriate research methods to assess the hypothesis that participation in early years swimming may add various forms of capital to under-5s. The study is an international first in terms of being a four-year longitudinal study into early years swimming with some input from international sites. The outcomes are of relevance to the swim industry and may help to inform government policy.



## Index

Australians love swimming, water and the beach	4
Early Childhood: What Makes for Quality Learning Environments?	6
Benefits of Participating in Early Years Swimming	8
Intended and Unintended Learnings	9
The Need for Systematic Research on the Possible Benefits of Early Years Swimming	13
Early Years Swimming: Adding Capital to Young Australians	13
International Significance of the Research	14
Research Approach, Methodology and Data Analysis	16
Why Do We Need Such a Study?	21
Some Preliminary Findings	22
Project Team	23
Contributing Industries	24
Contact Details	25
References	26





## Australians love swimming, water and the beach

Water plays a big part in the Australian way of life. Being able to swim and teaching children to swim from an early age are important parts of the Australian outlook. Swimming is a natural activity in Australia, just as snow skiing and ensuring early ski competence are in countries with high and often dangerous snow falls. In both cases swimming or skiing are accepted as a “natural” thing to do; they become a part of the nation’s way of life and a basis for intense sporting competition from local to national levels. Doing well at the sport is a source of national pride and a road to fame for some. Leisure clubs develop as do scientific approaches to improving performance, parents can be judged on whether or not their child can swim, councils and governments can be lobbied to build better facilities, fashions in clothing and accessories develop, and so on. Swimming, skiing or whatever the activity, becomes a field where early competence is so important that parents will pay for early instruction and industry groups form to argue about “desirable standards”.

Settling in an island continent, with its capital cities close to oceans and bays, Australians took eagerly to the seaside for bathing and to the use of public baths. A field for swimming and learning to swim was first established in Sydney from the mid 1880s. The people of Sydney were close to beaches and a number of public baths. Swimming and bathing were leisure activities available to ordinary people of all ages. Sea bathing, as it was called at the time, was a popular pastime as was public interest in open-water swimming and competition at state and national levels in baths. Sydney also gained world-standard swimming attention though the Cavill family from the 1880s to the 1930s, with the introduction of freestyle or the “Australian crawl” and the butterfly stroke into international competition.

Even in these early times learning to swim was important and seen to have benefits beyond swimming itself. It was at the Cavill Baths in Sydney in 1893 that Annette Kellerman was given “swimming instruction” at the age of six to help repair a deformity in her legs. Kellerman, famous for swimming displays and the introduction of the “one piece costume”, said that in Australia at that time, “practically all children are taught to swim”.



Even from the early development of swimming the stake, or common bond, has been about love and enjoyment of water. So early swimming instruction is to both ensure water safety and an environment for future champion swimmers. As such, learn-to-swim programs can be seen in a number of ways; as a way to keep children safe from harm, as a way to improve swimming style and competitive edge and as way to improve a child's health. These outcomes have been a part of the field of swimming for well over 100 years. However, a market for learn-to-swim classes has grown, as have a range of approaches from scientific, to those developed from personal experience, to the unconventional.

The questions being asking in this research have been a long time coming in swimming circles. These questions are:

- 1) Does participation in early years swimming enhance the preschool learning and development of under-5s?
- 2) What elements of the swim environment may support or hinder the learning of under-5s? That is, what makes for quality in under-5s swimming schools?
- 3) What is the shape of the swim industry in terms of the variety of swim schools found across Australia?
- 4) Does the type of swimming instruction make a difference to these factors?

The aim of the study is to investigate whether or not participating in early years swimming has the potential to enhance learning of under-5s in areas not exclusively related to early-years growth, learning and development. With the emphasis in education agendas moving to the early years of life, this research has potential to inform policy around the provision of learning activities for the under-5s. However, while the study may (or may not) show the possible benefits of participating in early years swimming, it is also important to note some of the quality factors that may influence any positive gains for young Australians. As under 5-year-olds will first encounter swimming in an early childhood setting, this is where we have made comparisons between swimming and preschool environments in the next section.



## Early Childhood: What Makes for Quality Learning Environments?

There are few studies into the quality of early swimming environments, but there is a significant corpus of literature in this area about the qualities of learning contexts (Cassidy, Hestenes, Hegde, Hestenes, & Mims, 2005; Sylva, Siraj-Blatchford, & Taggart, 2003). A wide variety of factors have been identified in early childhood contexts that may be influential in the quality of learning outcomes. Some research focuses on the early childhood programs (Currie, 2001). In evaluating quality programs, Currie argues that two measures are usually found in studies – one to measure “structures” such as class size and teacher background and the other to measure “classroom processes” (p. 227) which include attributes such as interactions between the teacher and students, classroom layout, and the appropriateness of the activities for the children. In a comprehensive study of English preschools, it was found that the structures and practices in early childhood settings were significant in producing students who were school ready (Sylva, et al., 2006, p.76). Similarly Mashburn et al. (2008) identify these as the critical factors in ascertaining the quality of learning environments in the early childhood sector. They contend that assessments need to incorporate three main areas – the program infrastructure and environment; observations of the overall contexts of learning; and observations of the teachers’ interactions (social and emotional) with the children.

More specifically, studies of particular aspects of the early childhood settings have sought to identify the impact of particular structures or processes within these settings. One such study suggested that there was a strong relationship between the teacher’s qualifications and the possibilities of deep learning for young children (Early, et al., 2006). An even larger study by the same authors (Early, et al., 2007) argues for a strong need for professional development of teachers rather than the acquisition of formal qualifications.

Further studies have sought to assess the impact of teacher and student interactions on learning. When trying to identify the impact that Early Childhood Education (ECE) contexts have on the academic, language and social skill development of four-year olds, it was found that “the policies, program development, and professional development efforts that improve teacher-child interactions can facilitate children’s school readiness” (Mashburn, et al., 2008, p.732).

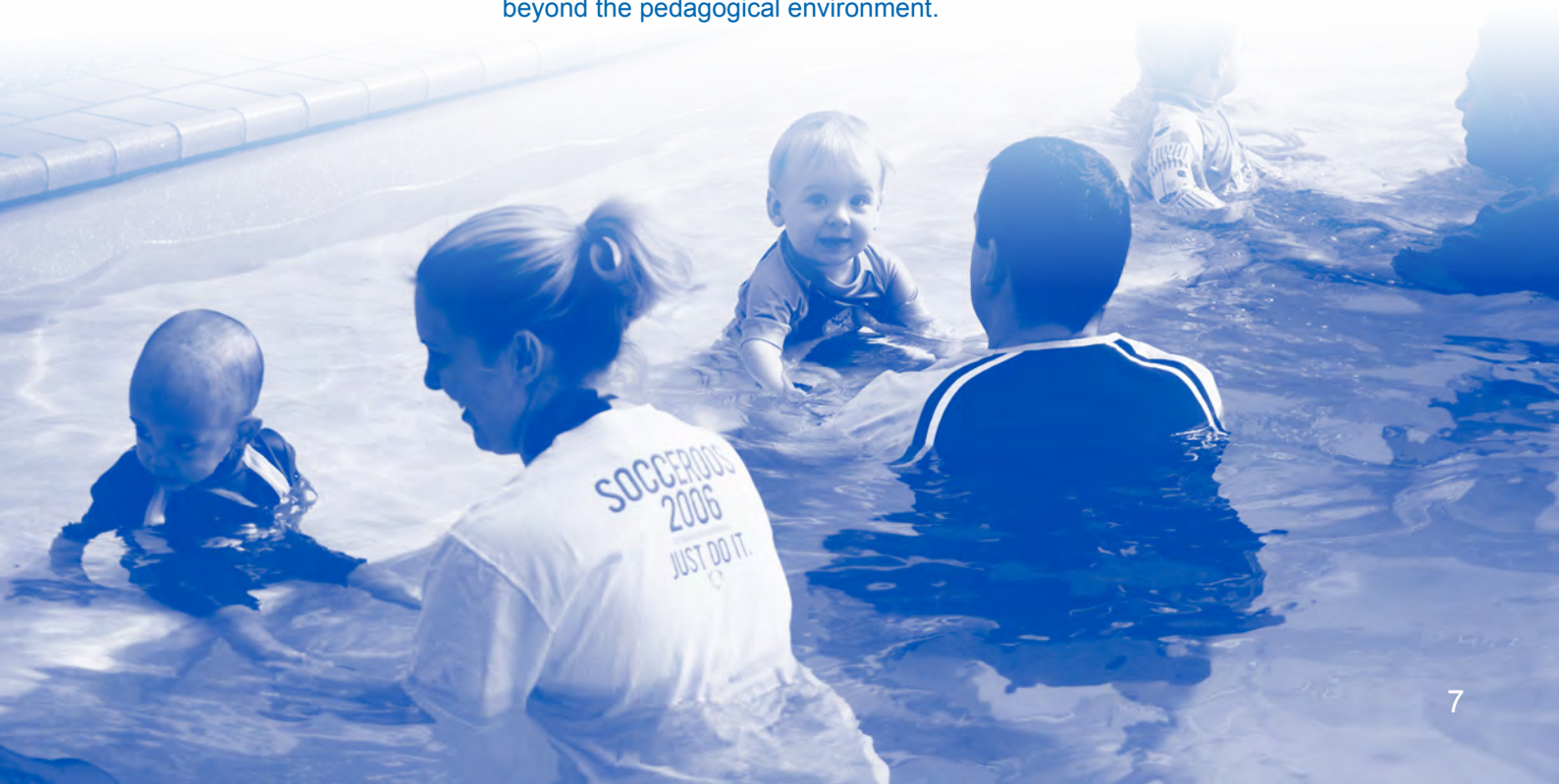
From these studies in early childhood settings, it is recognised that the context must be considered. It would seem that there are a range of key variables that may influence the outcomes for children in relation to swim school environments. Table One below provides examples of factors being studied to understand learning in swim environments.



Ethos of swim school	What is the philosophy of the school? Is the focus on safety, or development for future swim squads/Olympians?
Commercial orientation	Stand-alone pool, owner operated, large corporation, franchised, backyard enterprise
Pedagogies	Curriculum – lesson organisation, numbers of children in a class, parent participation, organisation of activities in the water, interactions between teachers and parents/ children
Programs	Structure of lessons, curriculum plans, levelling of students
Poolside structures	Overall lesson organisation, student assessment
Recruitment and training of staff	Staff selection, qualifications, probation, on-going training/ professional learning
Economics of lesson	Lesson costs, make-up policies, payment methods (up front, weekly, by the term).
Location of swim school	Swim school location, demographics of the region.
Backgrounds of families	Socio-economic and cultural backgrounds of families

**Table One: Factors that may influence outcomes for swimming**

To conclude this far, our approach has been to view learn-to-swim classes as being a type of early childhood environment. Scales have been developed to observe in the environment such factors as the curriculum; the pedagogies used by teachers within their programs; interactions between teachers, children and parents; pacing; and control. An audit tool of the swim school has also been developed to extend beyond the pedagogical environment.





## Benefits of Participating in Early Years Swimming

Many swim programs have been developed specifically for the under-5s. Some are designed to address childhood drowning through methods that build confidence and skills that give a greater chance of survival should a young child encounter water in dangerous ways. Other programs are designed to build confidence and skills in swimming. Others are about allowing children to enjoy the water environment without fear. The underlying premises for the development of a swim program influence the priorities of learning. That is, it is reasonable to anticipate that the emphasis in a swim program should influence what the ultimately child learns. The level or quality of swimming that occurs in swim schools is shaped by the curriculum, so activities could vary from survival practices to strokes that lead to further formal swimming in squads. Dog paddle, for example, in one context (such as survival schools) may be seen as a valuable technique since the emphasis is on the child being able to survive a misencounter with water. In another school where the emphasis is on stroke technique, then dog paddle may not be seen as a valued end product. Hence the philosophy of any program determines to a large degree what is seen as valued or not. However, in education it is recognised that there are two major outcomes in any learning situation. One outcome is the intended learning which, in the case of swimming, is that the child is able to swim. However, in the context of swimming, students learn much more than just the intended curriculum. In this study, the intended learnings (swimming) are strongly tied to physical development. However, the unintended learnings are a key part of this study – What else do children learn as they experience early years swimming?



## Intended and Unintended Learnings

In this project, the intended learnings are those which one expects from participating in a physical activity such as swimming. Reasonably, parents and swim teachers are expecting that after some time, the child will develop some form/s of swimming skill. This inevitably is linked to the physical skills of the child. As such the physical attributes become the primary focus of swimming lessons. However, this project also focuses on the unintended learnings. These are the skills and dispositions that swim school personnel have noticed are evident in their young swimmers after they have been swimming for some time – the improvements in language, confidence and social skills. These attributes are not taught explicitly through the curriculum and as such are not part of the intended curriculum; they become part of the unintended curriculum, that is, what is learnt in parallel with the swimming lessons.

### Intended Learnings

The intended learnings for a swim school are unequivocally about learning to swim and water safety. The curriculum, which is a reflection of the philosophy and goals of the swim school, is developed in such a way that creates opportunities for children to learn various techniques that meet the stated goals in the curriculum. Inevitably, the goals in early years swimming will correlate with the physical development of the child. For example, it would be unreasonable to expect a six-month-old to be able to stand on the edge of the pool and “fall” into the water. The child is not yet capable of standing alone even with the support of the water.

#### BUILDING PHYSICAL CAPACITIES

As a relatively new field in the swimming industry, many early years swimming programs have been formulated to cater for the physical developmental milestones of the child (Langendorfer, 1990). What is unique about the swim environment compared to many other physical education programs – such as dance, ballet, football, or gymnastics – is that the water environment offers a support for the child which is not present in other contexts. In studies with children with disabilities, it has been found that due to the support of the water, the context enables the mobility and movement of the child that is not otherwise possible. Because of this support offered by the water, early swim programs can be structured so that activities are not limited by gross motor skills that are not yet present (such as holding the head upright unaided or being able to walk unaided). The programs are designed to cater for these gross motor skills but are not limited to them. This feature is unique to this industry and is made possible in some ways by the support offered in the water environment. What is less known is the effect of participating in early years swimming on the development of gross motor skills. The support provided by the water may mean that early years swim programs hasten the development of gross motor skills.



While there have been few, if any, systematic studies conducted on able-bodied children, studies of children with disabilities have highlighted the benefits of participating in swimming programs. Studies with children with physical disabilities have shown water activities can enhance mobility and aerobic strength (Fragala-Pinkham et al., (Fragala-Pinkham, Haley, & O’Niell, 2008); (Hutzler, Chacham, Bergman, & Szeunberg, 2008)). Dellaratta (2002) reported increased gross motor development among under-fives with hypotonia. Similarly, others (Prupas, Harevey, & Benjamin, 2006) reported improvement in gross motor skills among children with autism. At a more general level, Oates (2004) reported that participation in a swimming program helped children with disabilities enhance both their motor and affective skills so as to be more confident with their sense of self. While there has been some debate over the physical capabilities of young children in the 0-2 years age range to cope with the demands of swimming, it has been reported (Zelazo & Weiss, 2006) that participation in swimming programs can hasten motor development. In their study, Zelazo and Weiss (2006) reported that there were considerable gains in the movements required for turning 180° and reaching for a wall for children aged 16-20 months, and that this may be possible due to the reduction in gravitational forces when in the pool.

Limited research has shown that for able-bodied children, early swimming can enhance some motor abilities such as balance and reaching (Sigmundsson & Hopkins, 2010) and, in neonatal babies, head holding, steady sitting, and holding items (Jun, Huang, & Dan, 2005). There has been little or no systematic research into the impact of swimming lessons on able-bodied students other than a large German study (Diem, 1980) some three decades ago. Since then, there have been considerable advances in swimming techniques and lessons. This begs askance as to whether contemporary swimming may offer enhanced potential for the social, intellectual and linguistic development of young people. Within this question, there is also the need to ask whether or not there are better pedagogies that may enhance the development of young Australians.

#### BUILDING HEALTH AND WELL-BEING

Participating in any physical activity is important for health and well being. With an obesity “epidemic” taking hold of Australian (and international) children, participating in regular physical activity is recognised as an important factor in controlling childhood obesity. Being physically active is important for health. Not only can children benefit from participating in swimming; swim schools require parents to be with the children in the very early years (e.g., 2-3 years of age).

While the benefits around health and well being are commonly recognised among the general public, there have been other benefits noted from swimming. There has been a strong push to put swimming schools into many remote communities in Australia. While they can be used as an incentive to encourage attendance in schools – such as the “No school, no pool” policy that operates in numerous communities – medical research has also noted many health benefits for young Aboriginal swimmers (Lehrmann et al., 2003). These have included a reduction in ear infections and decreases in glue ear which is very common among many Indigenous children, and a reduction in serious skin (pyoderma) complaints that plague many Indigenous communities.

## Unintended Learnings

While the physical aspects of early years swimming are a focus of the swim environment, and are part of the intended curriculum, there are possibly other areas of capacity that may be enhanced through participating in swimming. The unintended curriculum contains those forms of learning that are intrinsic to the lessons and programs that children learn as part of participating in the lessons. While these were unknown at the commencement of the study, and were based on the observations of many swim school operators, there are some possible learnings apart from the intended gross motor skills that are integral to swimming.

In framing the unintended learnings from participating in swim lessons, the study has adopted the use of the term “capital” as it allows conceptualising of “adding” something to learners. Considered in this way, using the notion of capital as the indicator of learning moves away from notions of development that have an intuitive sense of being something natural. Considering the possibilities of the swim environment to add capital to children shifts the emphasis away from a biological model to one of an active process in which the swim environment is proactive in shaping the children’s learning and adding more to them than when they commenced lessons. Unlike physical capital where the child is showing good and increasing skill techniques, which are valued within the context and overtly rewarded through the certification processes, these other forms of capital have less if any value in the swim context. However, increasingly recognised by external agencies such as governments and schools, some skills are needed by young children as they make the transition into school. In preschool and formal school, children need to have access to good language skills and other skills that are valued by schools. It is these skills that are part of the unintended curriculum of swimming lessons. When children learn these skills, they can then enter the school better prepared for this new world they are entering. It is in this non-swimming context that these skills have recognition and value and become forms of capital.

### LANGUAGE SKILLS

Through interacting with teachers and the swim environment, children may have increased opportunities to develop new words and concepts. Many of these may extend beyond what is learned in the home. The language skills can vary from new vocabulary and new sets of words, through to new ways of interacting with people. The child may have learnt how to interact with parents and family but the patterns of language used in instructional settings are very different from those in the home or other informal settings.

### SOCIAL SKILLS

Being in social groups with peers from an early age may help in social interactions and bonding with peers. This may help young children to become more social and to better understand and engage with social interactions and networking with peers. Learning to be a social person is critical for interactions in the wider society. Being able to have a go at activities, of which many are profoundly different from the non-water environment, requires confidence, trust, and some sense of adventure. The scaffolding processes of the swim environment may help young children to develop these attributes.

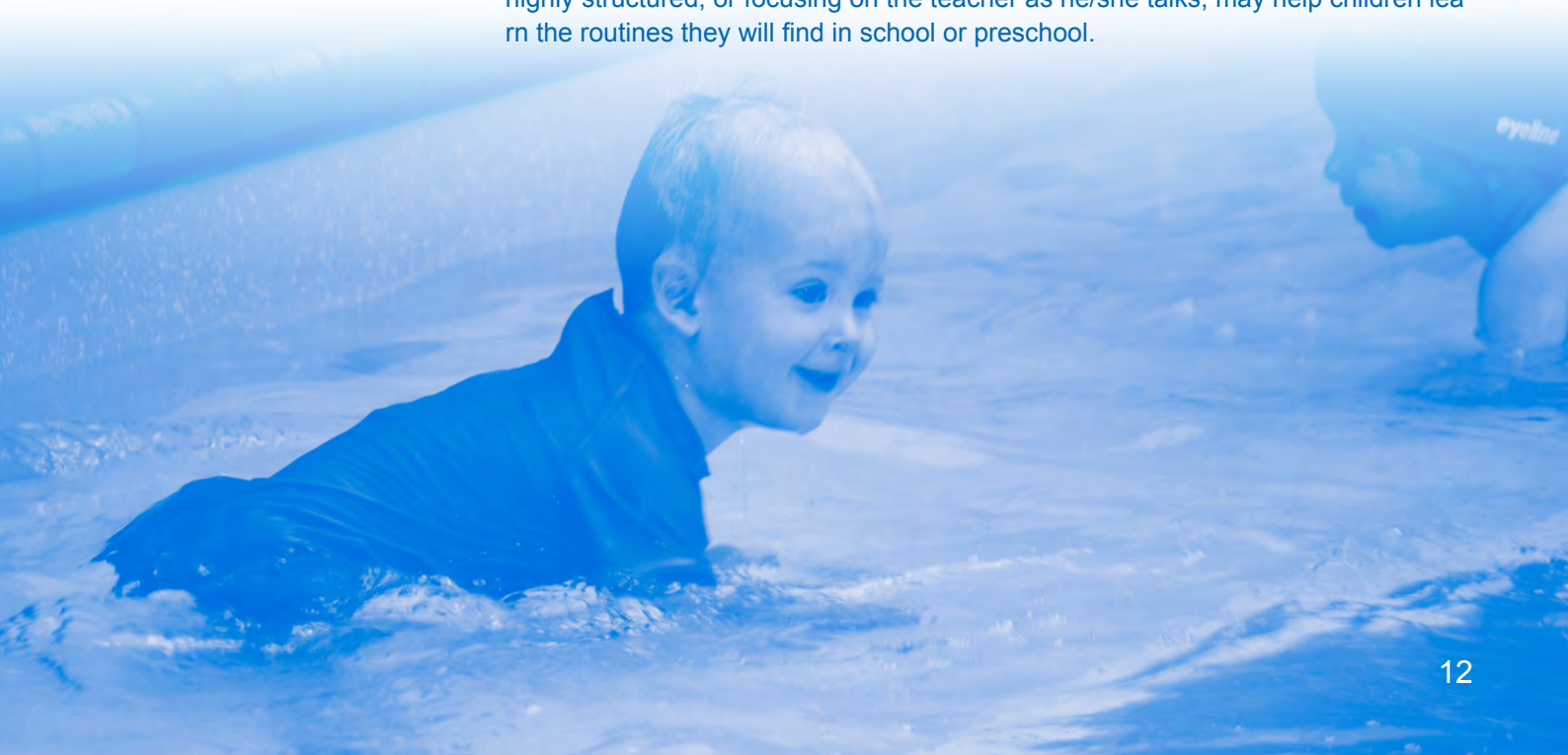


### INTELLECTUAL DISPOSITIONS

The overall participation in an instructional setting where a range of stimuli are used to promote learning may support young children's overall learning and capacity to learn. It may be difficult to imagine how swimming may enhance intellect but from observations of pools, I have noted that there is a rich repertoire of many mathematical concepts and language. But what is unique in this context is that language and concepts are very much linked – the child hears the words and these are related to physical actions. Counting actions – “one, two, three, kick” – links words to actions so that the child is able to physically and cognitively put the two together. Lessons are built around this pattern. The swim environment is also rich with a range of descriptors that are integral to mathematics such as colour, shape and size. Asking children to “pick up the big red ring” helps in the exposure to terms commonly used in early years' school mathematics. As Zevenbergen (2000; 2001) has argued in many mathematical papers related to equity and who has access to school mathematics, such terms are commonly used in middle-class families but are of restricted use in many/most disadvantaged families. As such, the swim environment offers access to aspects of mathematical language and concepts in a friendly, non-threatening environment. This is particularly relevant when other research has shown that many disadvantaged families do not participate in swim lessons (Strange, 2003). As such, swimming lessons may be of even more importance to those families not participating in swimming.

### SCHOOL SKILLS

Exposing children at an early age to instructional practices may help them to become familiar with similar practices that they will experience in more formal school-type settings such as preschools and/or schools. An environment highly focused on safety and routines to ensure that children are safe means that many processes are in place in swimming lessons. Unlike other instructional contexts, the risk for a child who is not paying attention could be profound. As such, teachers must know what children are doing at all times in the lessons. This means that there is a strong instructional imperative in early years swimming. These instructional imperatives are not found in home interactions of some familial groups. Following rules such as no running, waiting turns in a way that is safe and highly structured, or focusing on the teacher as he/she talks, may help children learn the routines they will find in school or preschool.



## The Need for Systematic Research on the Possible Benefits of Early Years Swimming

Within this context, there have been calls for systematic studies on the effects of participating in early years swimming. Adolf (2002) argues for sustained research that documents motor development as it relates to particular stages in the life cycle of young children as such changes in physical development strongly linked to maturation processes. Two decades ago, Langendorfer (1990) argued that there was enough anecdotal evidence to suggest that swim programs may enhance the development of young children, but there was little empirical evidence to show further links. Similarly, there is little evidence to suggest which are the best ways for young children to be taught how to swim (Langendorfer, 1990). While this research is dated, there have been no further, sustained and focused studies in this area.

## Early Years Swimming: Adding Capital to Young Australians

This project challenges orthodoxies that endorse the natural order of child development. The swim environment may offer possibilities that enhance this “natural” order and so challenges any notions of “naturalness” to that order. Rather than subscribing to approaches that normalise child development, the project uses a more radical approach to explain any possible differences to that order. As such, the project adopts the notion of “capital building” as a way to break with old traditions in early childhood theory regarding the ways in which children progress through childhood. Through the intended and unintended learnings made possible by the swim environment, young children may be better positioned in their preparation for formal schooling. They may be learning more than just swimming when they participate in early years swimming.





## International Significance of the Research

This is a unique project that has many significant features. While members of the swim industry have provided funding, the research is not intended to confirm the opinions of its sponsors. A range of data collection sources are used to identify and reduce for any possible effects, biases and limitations within the research design. None of the researchers are swim instructors or have any connection with the swim industry. At best, some of our children have participated in early years swimming many years prior. The study is being conducted as an empirical education study and remains at arm's length from the swim industry; a deliberate strategy endorsed by the swim industry.

This is the first longitudinal study of its kind. No study of this nature has been undertaken in Australia, or for more than three decades internationally. It is the first of its kind to be international in its data collection. The study is significant because views of teaching in the rapidly expanding baby swim market remain contested and not based on empirical research. This project uses instruments developed in the trial years to evaluate pedagogies within the industry to identify those practices of most value to the industry while providing self-assessment tools to the industry. These tools are highly innovative and significant in the swim industry, as no instruments have been developed to assess the effectiveness of swim pedagogy. In an industry that has highly conflicting views – e.g. regarding dunking a child to encourage swimming for survival v/s washing water over the face to gain familiarity with the water; or the use of floatation aids – it is significant to evaluate the effectiveness of swimming programs and pedagogy. The tools developed in this project will provide a new innovation in the evaluation of quality pedagogy in this industry.

## Importance of Valuing Adding to Young Children

If the anecdotal views of the industry are proven to be valid, the project is significant in terms of offering environments alternative to the formal school/pre-school settings to enhance the development of the nation's young people. As those who currently access the field are those with the economic capital to be able to afford lessons, a considerable part of the population may be excluded from novel ways to enhance development. The project is highly innovative by identifying this potential conflict and by having industry groups (i.e. swim schools) prepared to offer in-kind support to enable these groups of people access to swimming lessons.

## Understanding and Identifying Quality Swim Pedagogy

The pedagogical framework for analysing swim pedagogy is novel and draws upon an existing literature based on classroom pedagogy. This traditional model of pedagogy fails to address the priority of skill development that is found in swimming. The model developed for this project will have application across other fields of physical development. It will recognise that physical skill development may offer further areas of learning development and hence contribute more broadly to the debates on learning and learning environments.

## A Mapping of the Field of Swimming

There is considerable diversity across the Australian and international swim industry, and this project is a first in terms of mapping the swim industry. This comprehensive mapping will be led by Dr Bob Funnell who has considerable expertise in the use of mapping of fields in rural and urban areas and occupations. This mapping will help to identify the various components of the swim industry and to possibly identify key and salient factors that facilitate (or hinder) quality provision.

## Developing a Social Theory Framework for Understanding Value Adding

The framing of the project is both significant and innovative. The project draws significantly on the work of Bourdieu to locate the possibilities of enhanced learning within his framework of “capital”. This framing moves the focus from an innate and biological basis to show how pedagogy may enhance the learning of young under-5s. This learning becomes a form of capital that positions young learners more favourably within the transitions to school. If it is found that swimming can enhance the capital-building of under-5s, then the project has considerable potential for offering new learning environments for young Australians, particularly those from disadvantaged backgrounds who are often marginalised in the transition to school. Creating opportunities for building the linguistic, social, intellectual and physical capital of young learners better positions them in that transitioning to school. Preliminary work indicates that the swim environment may be the earliest form of instruction that young children experience outside their parents or caregivers so it is highly significant in terms of preparation for the learning environment of formal school.

Table Two (below) provides a summary of the methods being used in this study. It provides an overview of the various methods being used and how they have been and will be brought into play as the study develops.

Method	Research Activity by Years of project	2009	2010	2011	2012	2013
Survey	Parental assessment of their child/ren against international milestones	●	●	●	●	
Child observations	Observations of children in the swim school		●	●		
Parent interviews	Interviews with parents on site to develop profiles	●	●	●		
Lesson observations	A tool has been developed and refined to profile teaching practices	●	●	●	●	
Environmental audits	Tool developed to assess the swim environment			●	●	
Child testing	Testing individual children against national milestones			●	●	
Audit of the field of swim schools	Develop and test an instrument for auditing the field.			●	●	

**Table Two: Overview of the Project**



## Research Approach, Methodology and Data Analysis

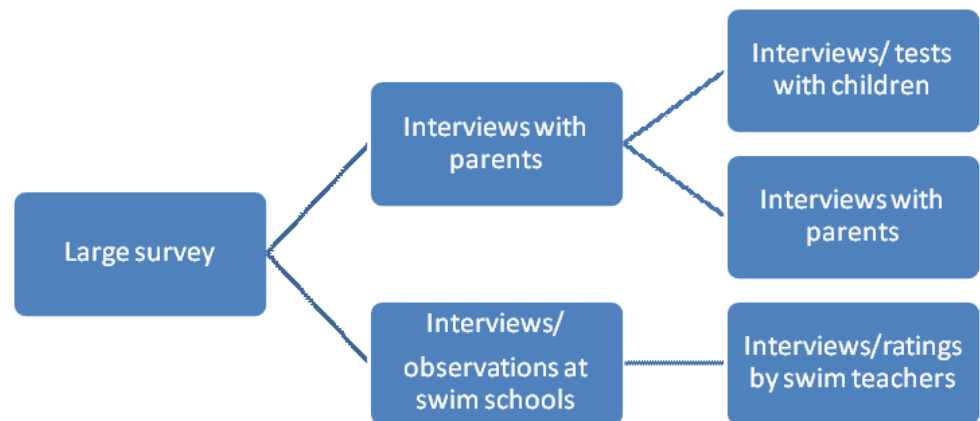
The project adopts a funnelling approach in the collection of data. This approach sees the first stage as involving large numbers of parents being surveyed. The second level involves less people but richer, more focused data collection (interviews and observations) of parents and swim schools. The third stage involves more focused testing at a very deep level of children who have been swimming for at least 1 year. Each level in the hierarchy of methods becomes much deeper and more intense so that reliable data can be collected and then collated against previous iterations. Such an approach allows for triangulation between the three key data sources and levels. The number of participants for each level is represented visually below:



**Figure 1: Numbers of participants – not to scale**

With this approach, the limitations of a previous data collection method can be overcome with data collection that is more intense, but involves fewer participants. Overall, this method gives a very large and comprehensive set of survey responses that can be qualified and verified (or not) through subsequent data collection. This gives robustness to the data and findings. Such a process also allows the research team to explore variables that may appear to be important in the previous level of data collection. For example, the analysis of the survey drew out the significance of the school variable. At level two, observations and interviews at the schools are able to explain some of the significance found in the survey.





**Figure 2: Research Model**

## Data Collection and Instrument Development

The development of data collection tools has evolved over the first two years of the project in light of learning emanating from the project. The data have indicated that there is a strong possibility that participating in early years swimming correlates with earlier achievement of developmental milestones. While the research has recognised the impact of social background on the possible outcomes of the project, what has emerged from the first two years of the project is that the swim environments are so different in nature that this is also a critical variable. This has been confirmed by the statistical analysis showing that the swim school is a variable that has a significant effect on the outcome. As such, the project has been modified to include some measures for identifying the differences across swim schools and to see how this moderates outcomes.

### SURVEY INSTRUMENT

Preliminary work had been undertaken in 2009 and 2010 to develop and refine the survey instrument. This has now been developed and operates each year during the summer swim period. It is available on-line through the Griffith University website (<http://www.griffith.edu.au/education/early-years-swimming>). It is open to any families who wish to participate provided they have children under 5 participating in early years swimming. The survey instrument is based on internationally recognised (and normalized) developmental milestones. Parents complete the survey by checking off those milestones their child is able to complete. These are then analysed to see whether or not there is a difference in the age at which children achieve milestone, based on whether or not they attend a swim school.

It is important in this study that there is a linkage between the survey input and the schools that participate in the observations. Those schools who participate in the field observations need to have an appropriate number of completed surveys so that comparisons can be made between the reports of parents and the practices of the schools.

Underpinning this research is the hypothesis that early years swimming adds capital to young children. If this is the case, then children would meet these milestones earlier than same-aged non-swimming peers. What also must be known is whether or not the capital gained through attending swim school is different from the capital provided by formal school and whether the capital gained through participating in swimming prior to school may align with the capital valued within the formal school setting.

#### DEVELOPING A PROFILE FOR THE FIELD OF EARLY YEARS SWIMMING

Swim schools across Australia, New Zealand and the USA are to complete a survey that documents key features of the schools – including such variables as the size (in terms of numbers of students, staff, sites); the pedagogies used; the ways in which curriculum is organized; the philosophy of the school; and so on. These profiles will be used to map the terrain of the swim industry.

#### OBSERVATIONAL SCHEDULES FOR LESSONS

Observational schedules have been developed in 2010 based on fieldwork conducted in that year. These were shared with the swim industry at the national conference in 2011 and feedback was sought in order to refine the schedules. The Lesson Observation Schedules focus on the quality of the teaching environment in terms of the development of the forms of capital that are foundational to the project. While the primary focus of the swim industry is the development of swimming, which is best identified as physical capital, the schedule also identifies the other forms of capital that add value to the swimming experience.

A second aspect of the study is to ascertain if children engaged in swimming instruction meet developmental milestones earlier than same-aged peers. If this is found to be the case, then questions must be asked as to what features of these swim environments influence the children's learning.

#### INTERVIEW SCHEDULES FOR PARENTS, TEACHERS AND MANAGEMENT

Interview schedules have been developed, trialled and modified in 2010. These interviews are conducted on site at the individual swim schools. We have noted that the parents and teachers strongly indicate that early years swimming is the first introduction to formal instruction. This study will identify potential learning outcomes and the factors that facilitate such outcomes.

The interviews with the parents and swim school staff are designed to:

- a) Identify the practices used by the swim school
- b) Clarify and confirm views of management with teaching staff as to the processes used at a swim school
- c) Collect views of parents about the swim school and its impact on their child's learning
- d) Collect further evidence from parents to see if their child's capital –in many forms- may be enhanced by participating in the lessons (to triangulate with the survey)



#### ONE-ON-ONE TESTING OF CHILDREN

Towards the end of 2011 and the early part of 2012, testing of children will commence using recognised tests. The tests will be recognised tests that have been norm referenced so that the research team are able to confidently claim whether or not there is any capital being added, and if there is, in what areas. At least 100 children will be tested in each of three age cohorts – 3, 4 and 5 years of age. These tests will ascertain the “developmental” age of the child to gauge whether or not the children are ahead of normal ranges for children of that age. Children between 3 and 5 will be tested as they will have been in swimming lessons for at least one year, and in many cases, even longer. The length of swimming lessons will be controlled to see if this is a key factor in any outcomes noted through the testing.

While the child is being tested by an authorized person, parents will be interviewed by a member of the research team. The survey instrument is used as the basis for this interview. This technique will be used to assess the validity of the survey instrument by comparing the parental responses with the child responses.

#### TEACHER RATINGS

Within the Australian context, a new test has been developed for preschool children against which all children will be assessed. This comprehensive test is the only large-scale assessment tool used. It will be applied to each child in the one-on-one interviews cross check against other aspects of the study .

#### APPROACH

The project employs a mixed-method approach that funnels data and acts as a triangulation between the data sources. Two key foci are running through these data collection processes. The first is to establish whether or not early swimming correlates positively with earlier appearances of developmental milestones. As it is unclear if this is solely due to swimming, a second focus is to identify the key variable that impact on the development of the various forms of capital identified in this project, namely, the demographics of the children and the quality of the pedagogies of the swim programs. These two factors may be influential in learning.

#### SAMPLE

A purposive sampling method will be used in this study to ensure that a wide range of variables are included in the study. The variables will include the length of time a child swims, when they commence, often they attend, whether or not they have access to a pool outside swim lessons, whether they participate in other physical activities (e.g. ballet, sport), and their social location. With the on-line survey, many schools across Australia, New Zealand, the United States of America and Brazil have been included in the study. All schools who have contributed financially to the study will be included in observations and interviews. However, the study also seeks to involve schools outside this sample so that a wide range of schools are included in the study. School in Queensland, New South Wales, Victoria and South Australia will be included in site visits. These states represent the differences experienced in the swim industry in terms of participation over seasons and hence are representative of the nation and international situations. From these a selected group of schools will be targeted. The resulting sample will include schools that differ according to location (urban, regional); size of school (small, medium, large); the methods used for teaching; and socio-economic distribution.

### A MODERATING VARIABLE: FAMILY BACKGROUND

The cost of swim lessons means that most of the children participating in swim lessons are from middle-class families. Thus, the research needs to be able to analyse whether any gains noted in the study were a result of social background of the families or swimming per se. To allow such an analysis, a number of swim schools have made available (at no cost to the parents) access to swimming lessons for families who would otherwise not be able to access swimming lessons due to financial reasons. Analyses will be conducted to determine whether social background influences the gains made through swimming.

Yr	Survey		Parent Interviews					Teacher Interviews					Child Observations					Pedagogy Observations				
	Aust NZ USA N=2000	Mapping	Low SES	VIC	NSW	QLD	SA	Low SES	VIC	NSW	QLD	SA	Low SES	VIC	NSW	QLD	SA	Low SES	VIC	NSW	QLD	SA
09																						
10	✓			✓	✓	✓			✓	✓	✓			✓	✓	✓			✓	✓	✓	
11	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

**Table Three: Cohorts participating in the study**

### ANALYSIS

**Level One: Survey** The survey data will be analysed by a highly trained statistician so that trends and clusters can be identified. The large sample/s will be valuable in allowing valid claims to be made regarding child development. Further, the longitudinal data will help to track changes over time and to identify if there are peak times for learning, and possibly provide other insights. A well-qualified statistician competent in working with large data sets will be employed to undertake this analysis due to the very large data set and complex range of variables.

**Level Two: Interviews** These will be entered into NVivo (QSR, 2004) and coded to explore trends in the responses. Parent interviews will be matched to survey data to ascertain whether or not there is a synergy between the survey and interview data in terms of child development. Further, these data will be analysed to identify trends and patterns in participation in swimming. Teacher interviews will be analysed to identify potential patterns in the teaching discourses used by management and staff in terms of professional synergy between the two bodies; and to identify teaching pedagogies used in the swim industry. These data will be matched with the survey data to identify whether or not particular swimming pedagogies may be influential in enhancing development.

**Level Three: Child development tests and observations** will be undertaken by qualified early childhood professionals so that they are legitimate tests of the child. Results of the two other tools will be correlated against results of these tests and the large survey to establish overall validity of the instruments, outcomes and findings.

## Why Do We Need Such a Study?

This is a highly innovative project that draws on a significant number of schools, approaches, and backgrounds. The depth of the study will produce significant findings and benefits across a number of sectors. The outcomes of this project will have significant benefit to the nation.

- ☑ **Educationally:** Without pre-empting the outcomes of the research, the preliminary data collection in 2010 indicates that there is a very strong possibility that early years swimming enhances children's achievement of a range of developmental milestones. However, the current study has been based on the performance of students whose parents can afford and access early years swimming. Thus, children's enhanced performance may be due to their middle-class background. Hence it is essential to ascertain whether or not similar gains can be made by learners from less affluent families. If it is found that early years swimming produces enhanced development, then there is considerable potential for early swimming to address the educational gaps for learners from socially and culturally diverse (and disadvantaged) backgrounds. This finding may offer innovative ways to address educational disadvantage and to provide a healthy environment for physical development and well being.
- ☑ **Early Childhood:** There is national recognition of the importance of early childhood education, particularly for young people from disadvantaged backgrounds. Building bridges between formal schooling and early childhood is a national priority (DEEWR, 2010). While most of this focus has been on formal structures (such as preschool sites), this project may offer alternative sites for building transitional practices between school and the early years.
- ☑ **Physically:** It is recognised that physical activity for young Australians is essential for well being and general fitness. Reports suggest that the physical activity of Australians has been declining so it is of national interest to find ways to increase such activity. If it is found that participation in early years swimming offers gains in physical development, then it can be concluded that participation in early swimming offers additional benefits for the health and well being of young children (and their parents who also participate in the swimming lessons).
- ☑ **Industry:** The swim industry in Australia has not undertaken systemic research into the practice of early swimming. It is currently a multi-million dollar industry that has significant appeal to the Australian public. This project will identify what, if any, benefits there are for young children who undertake swimming. This will assist in marketing the industry to stakeholders, such as parents, sponsors and government. Simultaneously, the project will develop protocols for examining "best practice" elements of early years swimming that will be available to the industry for examining and evaluating their own practice. This will help develop "best practice" across the industry in a rigorous way.



- ☑ **Pedagogically:** As the study examines the learning environment, and how it offers different learning potential to young children, the focus on pedagogy will allow some conclusions to be made as to what constitutes quality pedagogy in the swim environment. Such findings may be able to inform the early childhood sector more generally.
- ☑ **Internationally:** As the first large-scale, longitudinal study of its nature in Australia and for more than 30 years internationally, this study will be a world leader. Furthermore, since the last study of this type was completed in Germany, the baby swim industry has grown considerably but with no research basis to inform pedagogy or curriculum. This project, has potential to inform the national and international swim school industry.

## Some Preliminary Findings

While the study is not yet completed, a number of trends are beginning to emerge. However, these are shared here with a cautionary note – the remainder of the study must be completed before some surety of these outcomes can be proposed.

As of September 2011, the survey data indicates that

1. The language, physical, and intellect skills of young children who attend swim school are greater than what would be expected based on population norms. While social skills of swim-school children were not as substantially different from norms, social skills were not conceptualised as a significant component of the intended and unintended learning.
2. One of the most influential variables in the study is the swim school. This suggests that some schools may be adding more capital to their students than others. This finding means that the research team needs to study the swim schools in more detail to isolate factors that may be producing this outcome. In particular, one of the key variables that will be scrutinised is the social and geographic makeup of the areas in which these swim schools are located, as this may be a moderating variable outside the swim school per se.
3. More data and analysis needs to be undertaken before any firm conclusions can be made.



## Project Team

### Researchers



#### **Professor Robyn Jorgensen**

The project is led by Professor Robyn Jorgensen. Robyn is an internationally renowned educational researcher whose work in equity and pedagogy has been used to inform the development of this project. She has led many significant research projects and has been a lead researcher on 9 Australian Research Council grants. She has worked extensively across a wide range of settings and brings this experience to the Early Years Swim Project.



#### **Dr Bob Funnell**

Dr Funnell is a sociologist and has worked in many areas of education from preschool to post compulsory schooling. He has worked in many communities to understand complex representations of the ways in which the community or organisation works. Bob will be collecting data from schools, and developing a model to explain the field of swim schools which will be useful to understand the principles of quality swim education.



#### **Ms Patricia Funnell**

Patricia is a qualified teacher and journalist. She manages the Early Years Swim project and is the research assistant on this project. Patricia provides the day-to-day contact for the project and liaises with industry and the research team to ensure the operation of the project.

### Advisors



#### **Mr Laurie Lawrence**

Laurie Lawrence is an internationally renowned swim coach. He is the only person inducted into the sportsman's Hall of Fame twice – once in recognition for his work as a swim coach, and then for his work as an early years swim coach. He has been instrumental in developing and promoting the Kids Alive: Do the 5 campaign and has been responsible for all new parents receiving a kit for early years swimming for all babies born in Australia. He is highly committed to and influential in the baby swim industry.



#### **Mr Ross Gage**

Ross is CEO of Swim Australia and the Vice President for the International Federation of Swimming Teachers Associations. Ross is also the Director of Swim Australia (Australia's Swim School Development program) and a Board member of the Australian Swim Coaches & Teachers Association (ASCTA) for over 20 years. He is currently ASCTA Representative to the Australian Water Safety Council.

## Project Sponsors

The research is possible due to the industry contributions made to the project. These have been collated through Swim Australia and then passed on to Griffith University. Any organisation is welcome to contribute to the research – either as a once-off or in an on-going capacity. Since commencing this project a number of organisations have contributed (as listed below). Our thanks go to the following swim schools and organisations that have contributed financially to the project:

- Swim Australia
- Carlile Swimming
- Paul Sadler Swimland
- Australian Swimming Coaches & Teachers Association
- Laurie Lawrence Swim Schools
- King Swim
- Swimming Australia Ltd
- Vorgee
- State Swim (SA)
- Aquatic Achievers
- Swim Coaches And Teachers Of New Zealand Inc (NZSCTA)
- Westside Swimming
- Rackley Family Swim Schools
- Justin Norris Swim Academy
- Nunawading's Just Swimming
- Hills Swimming
- Academy Swim Club (USA)
- La Petite Baleen (USA)
- Seadragonz
- SWIMKids, USA
- Swim City (Hutt City, NZ)
- Sydenham Street Swimming/ Van Dyk's Swimming
- Shawn's Swim School
- Instituto De Natacao Infantil (Brazil)
- Lorrimar Family Swim Schools
- Jackson's Swim School
- Pat Taylor Swim School



## Contact Details

Web: [www.griffith.edu.au/education/early-years-swimming/](http://www.griffith.edu.au/education/early-years-swimming/)

Email: [earlyyearsswimming@griffith.edu.au](mailto:earlyyearsswimming@griffith.edu.au)

Phone: 07 3735 5854

Fax: 07 3735 6992

Research Coordinator:

Project leader:

**Ms Patricia Funnell**

Griffith Institute for Educational Research

Mail: M10 5.05

Griffith University

176 Messines Ridge Road

Mt Gravatt, QLD 4122

Email: [p.funnell@griffith.edu.au](mailto:p.funnell@griffith.edu.au)

Phone: 07 3735 5854

**Professor Robyn Jorgensen**

Griffith Institute for Educational Research

Mail: M10 4.06

Griffith University

176 Messines Ridge Rd

Mt Gravatt, QLD 4122

Email: [r.jorgensen@griffith.edu.au](mailto:r.jorgensen@griffith.edu.au)

Phone: 07 3735 5876



## References

- Adolph, K. E. (2002). Babies' steps make giant strides toward a science of development *Infant Behavior and Development*, 25(1), 86-90
- Cassidy, D. J., Hestenes, L. L., Hegde, A., Hestenes, S., & Mims, S. (2005). Measurement of quality in preschool child care classrooms: An exploratory and confirmatory factor analysis of the early childhood environment rating scale-revised. *Early Childhood Research Quarterly*, 20(3), 345-360.
- Currie, J. (2001). Early childhood education programs. *Journal of Economic Perspectives*, 15(2), 213-238.
- Dellaratta, C. (2002). *Effects of a group aquatic program on gross motor development, water orientation and swimming skills in children with hypotonia*. Qunniapiac, Hamden.
- Early, D. M., Bryanta, D. M., Pianta, R. C., Clifford, R. M., Burchinal, M. R., Ritchie, S., et al. (2006). Are teachers' education, major, and credentials related to classroom quality and children's academic gains in pre-kindergarten? *Early Childhood Research Quarterly*, 21(2), 174-195
- Early, D. M., Maxwell, K. L., Burchinal, M., Alva, S., Bender, R. H., Bryant, D., et al. (2007). Teachers' Education, Classroom Quality, and Young Children's Academic Skills: Results From Seven Studies of Preschool Programs. *Child Development*, 78(2), 558-580.
- Fragala-Pinkham, M., Haley, S., & O'Niell, M. (2008). Group aquatic aerobic exercise for children with disabilities. *Developmental Medicine and Child Neurology*, 50(11), 822-827.
- Hutzler, Y., Chacham, A., Bergman, U., & Szeunberg, A. (2008). Effects of movement and swimming program on vital capacity and water orientation skills of children with cerebral palsy. *Developmental Medicine and Child Neurology*, 40(30), 176-181.
- Jun, D., Huang, L., & Dan, Z. (2005). The effects of infant swimming on the passage of the meconium. *Journal of Nursing Science*, on line.
- Langendorfer, S. J. (1990). Contemporary Trends in Infant/Preschool Aquatics-- Into the 1990s and Beyond. *Journal of Physical Education, Recreation & Dance*, 61(5), 36.
- Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., et al. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development*, 79(3), 732-749.
- Oates, M. C. (2004). *Does a recreational swimming program improve the self-esteem of children and adolescents with physical disabilities: Possible underlying mechanisms*. Memorial University of Newfoundland.
- Prupas, A., Harevey, W. J., & Benjamin, J. (2006). Early intervention aquatics: A program for children with autism and their families. *Journal of Physical Education, Recreation & Dance*, 77(2), 46-51.

QSR. (2004). NVivo 2.0. Doncaster, Australia.

Sigmundsson, H., & Hopkins, B. (2010). Baby swimming: exploring the effects of early intervention on subsequent motor abilities. *Child: Care, Health and development*, 36(3), 428-430.

Sylva, K., Siraj-Blatchford, I., & Taggart, B. (2003). *Assessing quality in the early years: early childhood environment rating ...* By London: Trentham Publishing Company.

Sylva, K., Siraj-Blatchford, I., Taggart, B., Sammons, P., Melhuish, E., Elliot, K., et al. (2006). Capturing quality in early childhood through environmental rating scales. *Early Childhood Research Quarterly*, 21(1), 76-92.

Zelazo, P. R., & Weiss, M. J. (2006). Infant swimming behaviors: Cognitive control and the influence of experience. *Journal of Cognition and Development* 7(1), 1-25.

Zevenbergen, R. (2000). "Cracking the Code" of Mathematics: School success as a function of linguistic, social and cultural background. In J. Boaler (Ed.), *Multiple Perspectives on Mathematics Teaching and Learning*. New York: JAI/Ablex.

Zevenbergen, R. (2001). Language, social class and underachievement in mathematics. In P. Gates (Ed.), *Issues in teaching mathematics* (pp. 38-50). London: Routledge/Falmer.