

Road Safety Education in Schools. Can we measure its success?

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Background

Road traffic injuries constitute a major public health problem in Malaysia and in 2004 it was the third major cause of deaths for males and seventh for females. To address this the Malaysian Government established the Road Safety Department under the Ministry of Transport in 2004 as a one stop agency to coordinate, monitor and implement road safety programmes.

A 5-year Action Plan was adopted by the Malaysian Government and the nine strategies within it address road safety issues covering education, enforcement, engineering and environmental issues. Central to this 5 year plan is the achievement of key targets set for year 2010 to make Malaysia on par with world best practices in road safety.

The first strategy is to : Enhance and Sustain Educational and Psychological Measures in Road Safety

Education is foundation, platform and catalyst, that supports all programmes to bring about the desired changes in road safety behaviour, skills and attitude.¹

The key objective for Road Safety Education is to make drivers and other road users risk-averse and equipped with the appropriate knowledge and kills.

Road users should be trained to self regulate their behaviour based on inherent risks in the road and traffic environment.²

According to the Malaysian Government, *road safety education is a life-long process, but it should begin with the young in school, tailoring its message to the audience to teach safe traffic habits from primary school to secondary school, so that safety becomes ingrained as part of the culture and practice of our children. The aim here is to inculcate in children and parents an understanding of the dangers within the traffic environment and how to practice safety as pedestrians and road users.³*

A systematic development and roll out of Road Safety Education in Malaysian National schools was commenced in 2007. By the end of 2010 every primary aged child in Malaysia should have received a minimum of 8 lessons of road safety education at every year of primary schooling. The training and delivery of RSE in secondary schools will commence in 2011.

¹ Road Safety Plan of Malaysia 2006-2010. Malaysian Road Safety Department. 2006

² ibid p.15

³ ibid p.17

Rolling out the program in Malaysia has been a huge undertaking as it involves:

- 7655 primary schools with all 6 year levels involved (ie. Every student)
- 2189 Secondary schools, (Forms 1, 2 and 4)
- the number of students in Malaysian Nationals schools are:
 - 3,111, 948 at primary school
 - 2,304, 976 at secondary school
- a minimum of 1 Bahasa teacher at each year level in every school is being trained to teach RSE.
- To the end of 2009 - 23 thousand primary teachers have been through the training program, and in 2010 another 23,000 will be trained

Will this investment by the Malaysian government bring a positive outcome?

Criticism of Road Safety Education in Schools

Around the world there are many critics of Road Safety Education programs being delivered in schools. Here are some examples of what some people say.

Christie (2002) asserts that from a public health perspective, road safety education and training seem to be largely ineffective as there is little evidence to suggest that they contribute to reduced risk, injury or fatality among those targeted.

In some cases, education and training programs may also do more harm than good. They also represent a diversion of funds, resources and attention away from better-based and more effective countermeasures. (Christie, 2002).⁴

Christie goes further to say that educational programs targeting general injury prevention in primary school aged children in the USA have produced increased knowledge about risks and risk avoidance in the target group, but no evidence that behaviour or injury risk was modified. He quotes:

...⁵extensive literature reviews by the UK-based Cochrane Collaboration (2000) found few health promotion/education programs that successfully modified behaviour or reduced risk in child or adult populations. The same review found no evidence that education or information campaigns alone reduced workplace injuries in occupational settings - the reviewers concluded that legislation and enforcement were more effective (Cochrane Collaboration, 2000).

In a case-control study, Carlin, Taylor & Nolan (1998)⁶ reported that Bike Ed did not lead to reduced bicycle-related injury in the years following training. They also concluded that completion of Bike Ed may create over- confidence and increased exposure-to-risk for children who complete bicycle education programs. This is similar to the adverse outcomes reported for some novice driver training programs.

An extensive review of pedestrian education and training in developed and developing countries showed that it can change observed road crossing behaviour, but its ability to reduce the risk of pedestrian injury in road traffic crashes is largely unknown (Duperrex, Bunn & Roberts, 2002)⁷. Duperrex et al (2002) concluded that there is a lack of good evidence that pedestrian safety education is effective, and that trials of effectiveness have been conducted in affluent, developed countries and not in low or middle income countries where the majority of pedestrian deaths and injuries occur.

There are opinions is that no single educational program has demonstrated sufficient impact on the majority of students to merit endorsement and widespread dissemination. Road safety education programs have modest and limited benefits, and that "even after training, young children remain at substantial risk for pedestrian injuries" (Klassen et al (2000) cited in Schrieber et al (2002).

⁴ Christie, R. (2002) Road Safety Education and Training from a Public Health Perspective. Paper presented at the road Safety Research, Policing and Education conference. Perth.

⁵ Cochrane Collaboration and the Campbell Collaboration (2000). Evidence from systematic reviews of research relevant to implementing the 'wider public health' agenda. NHS Centre for Reviews and Dissemination August 2000.

⁶ Carlin, J., Taylor, P. & Nolan, T. (1998). School based bicycle education and bicycle injuries in children: a case control study. *Injury prevention*. 4 22-27.

⁷ Duperrex, O., Bunn, F. & Roberts, I. (2002) Safety education of pedestrians for injury prevention: a systematic review of randomised controlled trials *British Medical Journal*, 324, 1129

This is largely the case because for pedestrians, and particularly child pedestrians, the margin of error is so small. A consequence of this is to abandon any attempt to educate or train children in street crossing, and in its place make roadway changes and enforce pro-pedestrian laws.

Although some health educators and psychologists acknowledge that classroom education has not been particularly successful in improving pedestrian safety behaviour among young children they recognise that skills training has some merit - particularly at the roadside. Schrieber and Vegega (2002)⁸, report that crashes between child pedestrians and motor vehicles decline after classroom education, but the degree of pedestrian behavioural change was not large. By comparison, correct behaviours for certain road crossing skills had increased up to 40%-70% among children exposed to skill training interventions in the United Kingdom and to 30% -50% of lower elementary children exposed to such training in the United States.

Are criticisms of Road Safety Education in schools fair? Perhaps.

The stated objectives of RSE programs are often not specific and can be over ambitious with the claim to be able to reduce death and injury among children. However, traffic crashes involving children are relatively infrequent events, and evaluations based on a reduction in death and injuries require a lot of data over a long time. This data collection period often exceeds the length of time of the funded study. For researchers (and cynics) where there is 'no proof or evidence there is no success. The converse could also be true and where there is no proof or evidence to the contrary there is no failure.

Additionally, it would be rare that RSE is delivered in isolation from any other influences or interventions. To claim RSE is the answer to injury prevention is a grand claim, and diminishes the effect of other interventions.

Those RSE programs that have been evaluated rarely use injury and/or crash reduction as outcome measures, more typically acceptance, popularity and/or improvements in knowledge and skill are the criterion measures (RosPA, 2001⁹ Duperrex, Bunn & Roberts, 2002¹⁰; O'Neill & Mohan, 2002¹¹; Christie, 2002¹²). According to Christie, while improvement in knowledge and skill are acceptable measures to establish educational effectiveness, this is inadequate for the evaluation of road safety or public health value where demonstration of reductions in risk, injury and/or severity need to be established to accept a program as effective.

However, it is difficult to measure the effectiveness of RSE as the long-term focus of prevention education programs does not fit the short-term requirement for political priorities. (Hawe 2002, Toumbourou 2002¹³). (In the case of Malaysia the RSE program in schools will take more than two terms of parliament to even implement.) With annual budgets that usually can't be rolled over, and with fixed terms for governments, short-term outcomes need to be shown for any investment before the end of their election term or the end of the financial year. Modifying human behaviours, which is the focus of road safety education, takes a long time. Without evidence that it works, then it is reasonable for some to conclude that it doesn't.

Seen time and time again when a spectacular crash occurs and the tragedy is kept in the press for days, a quick fix is implemented - traffic lights, better crossing facilities or whatever. Public opinion often requires, and gets, immediate responses to immediate problems, so the engineering or enforcement response is seen as the visible and preferred priority. Where community awareness is lacking it may be difficult to link investment in childhood and adolescence with the 'downstream' social problems that prevention investment aims to reduce (Toumbourou 2002 p.7). There is growing evidence that early intervention pays economic, social and health benefits in the long term, but there are few studies in RSE that show this. RSE is not and cannot be a quick fix.

⁸ Schrieber R, and Vegega M. (2002) Education versus environmental countermeasures. Is it really an either-or proposition? *Injury Prevention*. 2002. 8: 10-11

⁹ Royal Society for the Prevention of Accidents (RoSPA). (2002) (www.rospace.org.au).

¹⁰ Duperrex, O., Bunn, F. & Roberts, I. (2002) Safety education of pedestrians for injury prevention: a systematic review of randomised controlled trials *British Medical Journal*, 324, 1129

¹¹ O'Neill, B. & Mohan, D. (2002). Reducing motor vehicle crash deaths and injuries in newly motorising countries *British Medical Journal*. 324, 1142-1145

¹² Christie, R. (2002). The effectiveness of driver training as a road safety measure: popular views, assumptions and scientific evaluation. Keynote address in Proceedings of Developing Safer Drivers and Riders

¹³ Toumbourou, JW. (2002) Drug prevention strategies: A developmental settings approach. *Drug Info Clearing House* Number 2. September 2002.

Are the criticisms of RSE unfair. Definitely

Perhaps the purpose and contribution that road safety education can make is not well understood by its critics. The aim of road safety education is to deliver developmentally appropriate education that prepares children and young people to become safe and independent road users. It raises their knowledge and provides some skills to use the system provided by the engineers and planners. It helps them to problem solve, so that when an unusual situation arises they can address it in a safe way.

Haddon, back in 1981, stated that reliance on any one approach to address the road injury problem is not useful or effective. What will work best is using a number of interventions or prevention strategies over different time frames and from each of the different fields - education, engineering, enforcement and emergency services. In each field there needs to be strategies that work in the short term, medium term and the long term.

Even if we had the most perfect road system or the most forgiving environment that separates different kinds of traffic and minimizes conflict, we would still have to educate roads users about how it works, their role as a pedestrian, cyclist, motorcyclist, driver or public transport user, and the skills, and knowledge required to be safer. No matter how well the road environment is engineered the following facts will always remain the same:

- no-one is born knowing how to use the system
- the transport system and road environment that children inherit will still be complex and inherently dangerous
- the skills individuals need to manage even the perfect traffic environment would still be perceptual and motor skills and it takes years to reach competency in these skills
- there are some social, cultural, emotional and lifestyle factors over which the individual has little control or when they have choices they do so in an unsafe and anti-social way
- there will always be a need for modeling, supervision and training of children by parents and others, as they are the first points of contact between the child and the road environment.

Through public education campaigns, we would also need to inform the travelling public about the penalties of misuse - including the financial, physical, social and emotional consequences.

Engineering and Enforcement interventions often have a single purpose and are easily measured for success or failure. The interventions from these realms are usually fixed, physical, visible - measurable. School based RSE interventions address multiple risk factors over different time frames and we can't easily test or measure its application success or effectiveness because teachers have a duty of care to keep children safe. We can't stand road side and measure how many children choose and use a crossing facility safely, because we could be exposing them to unnecessary dangers to prove something works or doesn't. Would we ever throw a child into a torrent to see if their swimming lessons were effective, or set fire to a house to see if children remember and use the fire drills they were taught?

Is the lack of evidence about the effectiveness of RSE an evaluation failure, a program failure, a teaching problem, or an exposure issue?

Very few schools have time available to put a sound RSE program into their curriculum where children get the opportunity to develop high order thinking skills. This is not the fault of RSE but a system constraint not easily dealt with. The exposure to RSE in schools is usually insufficient to make a real difference for some learners. To increase the exposure would need the removal of an existing subject or extension to the length of the school day - both unpopular options. The RSE programs that are offered are often very compromised due to not only time constraints - but also suffer from the fact that there is no professional body behind it - such as for Language, Mathematics and Science teaching, for example. As a result there are no teachers in the system anywhere that has as one of the teaching methods RSE and this makes the quality of teaching sometimes not as good as it could be.

Do children get the chance to be able to be critical and logical as a result of their RSE or do they just get to colour, paint, simulate? Does their RSE program allow them to predict, make inferences and generalizations, interpret, analyse, problem solve, plan, make decisions, safely judge gaps etc. A short exposure - say 30 minutes a week for 8 weeks, or a brushstroke of RSE education cross curricula probably isn't going to move the child to achieve higher order skills related to the cognitive, psychomotor, social and affective domains that are required for safety.

It may not be that RSE in schools is not effective but the program that is being delivered in schools has not taken into account how children learn and what is needed and appropriate and what constitutes success. The RSE program delivered may be busy work (colouring, pasting, fill the word gap, etc), or another subject (road crash statistics are mathematics, not RSE) dressed up to look like RSE without any application to the real world of road safety. Such learning never brings to the child the right end point where they can actually apply what they have learned in school to the roadside. We are too quick to judge the effectiveness of RSE when other subjects can probably come under the same criticism - do all children leave school with good literacy and numeracy skills? Should we delete these subjects from the school curriculum because not all children learn to read and write and calculate and count - Can we also make the same assertion of 'unsuccessful and ineffective' to the engineering and enforcement fields - afterall, there are people still being killed and seriously injured on our roads and there are still people who disobey traffic laws.

Some things that are taught in schools are not needed for many years. Everybody has an 'aha' moment when they draw upon, and apply, early learnings from their classroom days - deliberate or reflex - but it turns out to be useful and lifesaving. Think of fire drills - how can you ever say they are worthwhile or effective when you can get through life never needing to use it - or CPR training. Have evaluators of RSE given enough time for it to be deemed effective or ineffective?

In the early years it would be difficult to measure the effectiveness of this educational approach, because much of the workload associated with using the road is taken up by the accompanying adult. But children can be conduits to learning for adults - take the seatbelt programs in Malaysia as an example. Children learn about the use of restraints in their classroom and are quick to remind their parents about this when getting into a vehicle. Have any of the RSE evaluations measured the vicarious impact of a RSE program?

The measures used to determine the effectiveness of Road Safety Education programs are not, (and should not be), the same as the measures for engineering or enforcement initiatives. They are not directly comparable. The nature and application of learning means that the effect of an educational program may in some cases be immediate and in others, long term. We need to measure learning and application of learning - and apply educational assessment and evaluation techniques. We need to take into account that children learn in different ways and at different rates. We also need to take into account the potential negating effect of parents/caregivers and their behaviors and attitudes. Measures of the effectiveness of road safety education programs need to use a combination of qualitative and quantitative measures drawn from across the fields of education, health, enforcement and engineering. Then the following question needs to be asked - if you can't immediately and simply count it does it mean it hasn't worked?

In the case of road safety outcomes, there may be a number of concurrent engineering and enforcement initiatives and education programs that contribute to the outcome. It is the synergy between a number of approaches or safety initiatives that reduces the risk exposure of children and young people and keeps road users safer. Remove one initiative, and the outcome may be quite negative. There is also the added constraint that to be effective, each approach may require different time periods between the intervention or program and the expected change in the population's health and injury rates.

And there are some very good examples of initiatives in and around schools that are making a measurable positive difference. For example, a UK program, (Kerbcraft), and a Victorian (Australia) program, (Safe Routes To School), that demonstrate statistically significant results in creating skills in children (Kerbcraft) and in reducing death and injury crashes by 18% (Safe Routes to School).

Measuring and counting in Malaysia

A university in Malaysia has been tasked with measuring the effectiveness of the Road Safety Education program in Malaysian Schools.

The primary objective of the evaluation is to determine the effectiveness of the Road Safety Education Program in Malaysian schools.

Following are some challenges identified by the author. In raising the challenges, it is not intended to be a criticism of the evaluation methodology nor of the university's conduct of the evaluation. This is a large project with lots of confounders and the task of evaluation is not an enviable one.

Brief details of the RSE Program.

A smart partnership between the Ministry of Transport and Ministry of Education has seen a private consultant develop a RSE program for delivery in the Bahasa Malaysia subject. The consultant, among other things:

- identified best practice in RSE through literature reviews and reviews of programs and initiatives from around the world
- analyzed crash and injury data to identify the problem facing children and young people on the roads in Malaysia
- examined the teaching and learning priorities outlined the Bahasa Malaysia Garis Panduan (Guidelines)
- explored the preferred pedagogy in classrooms with large numbers of students
- collaborated with the Ministry of Education about the intended program and how to implement it in schools.

Challenges : The Malaysian curriculum is teacher centered and didactic as opposed to student centered. This creates a challenge when wanting to use problem based learning techniques in the RSE program.

The emphasis is on the teaching of Bahasa Malaysia (BM) precisely rather than on RSE, and it is tested through exams. Teachers want the answer to everything with no acceptance that there is no one answer for everything.

One teacher at every school in every year level is trained to deliver the RSE theme through BM.

Challenges : The number of teachers required to be trained within the budget means that large numbers of teachers (100+ in a session sometimes) limited the flexibility, creativity and style of training.

Evaluation of RSE

Simultaneously there are three evaluation studies taking place over a 5 year period:

1. RSE Knowledge
2. Practice Observation
3. Health Outcomes.

Data has been collected from a sample of 240 schools and a comparison/matching sample of schools has been selected.

The program is delivered for a minimum of 30 minutes each week for 8 weeks. There is some flexibility on when the program commences.

Challenges : How do the evaluators have a comparison sample when all schools are being treated with the program? Do you withhold the program from the comparison schools, and what are the ethics of this if the trend shows that the RSE program is showing some positive results?

All states in Malaysia have Road Safety Departments and other key stakeholders who want to make a positive impact of road trauma reductions. How can the evaluators know about all the programs and initiatives being provided in the community and how they impact on the teaching and learning of RSE in schools. For example: do the schools where there are Traffic Wardens or active Road Safety Clubs have greater success with RSE in the curriculum than those who have neither of these but have a reduced speed zone around schools or a Safe Routes to School Program?

What are the essential curriculum and/or co-curricula initiatives that ensure success?

The minimum exposure children have to the RSE program in Malaysia is 240 minutes (4 hours). Can anybody learn anything well in that time? There is enough material provided to teachers for 32 hours of teaching time. Is there anyway of knowing what number of teaching hours is needed to optimize effectiveness?

The teachers delivering RSE are trained Bahasa Teachers, who are often language purists. They do not wish to compromise the teaching and learning of the language, (and nor should they), and sometimes this means they only pay lip service to the RSE element. How does an evaluation account for differences in commitment and competence in the teaching of RSE?

Having RSE in BM means that every child gets it every year - rather than choosing another subject where it later becomes an elective. Is BM the best subject through which to teach RSE? Would it be more effective in a subject that was less examinable?

Evaluating RSE Knowledge

Children's knowledge is tested using a survey. The questions forming the survey are largely drawn from the Student Activity Book.

Challenges : If a child does not answer the question correctly is it a program failure, a teaching problem, a learning problem or a problem with the evaluation tool?

If questions in the survey are simple repetitions from the activity book - are the evaluators testing knowledge (fact and recall) or are they testing understanding?

If a child was absent on the RSE day, how is this recorded for evaluation purposes and what is done about it?

Evaluating Practice Observation

Trained observers are positioned at school entry and exits points at the start of the school day. Keep in mind that the program is being rolled out over time, with 2007 being for year 1 students and Year 2 students in 2008. This staggered start has created a challenge for observers as it is difficult to differentiate between children at different year levels. Children at the different year levels were issued with coloured caps to wear to school on the observation days.

Challenges : Do children behave differently when issued with a coloured cap, and what information was given out in regards to this?

Do children aged 7 and 8 years old have autonomy over how they behave and travel to and from school? Is the influence of the program greater than the instructions given by parents and caregivers? If told by their parent to do something that is dangerous - cross here, run across, travel alone - and they obey, is it a failure of the RSE program or a system/culture failure?

If the school does not have child friendly or safe surrounds then how can a centralized and quite inflexible RSE program (due to the demand to examine the content) cater for regional problems. How can teachers be trained to localize content when examinations are centralized? How could this issue be considered in an evaluation?

Evaluating Health Outcomes.

Despite best intentions and concerted efforts it is difficult for the evaluation team to access reliable health and injury data. In-situ crash data collected by police is not detailed enough to differentiate school aged children's involvement in crashes and the contributing factors to the crash. What part did the child play in the crash? Nor is there any capacity at the moment to make links between crash involvement and participation in the RSE program.

Health and injury data is sketchy in non urban areas of Malaysia.

Conclusion:

The initiative to have every child in Malaysia comprehensively and systematically exposed to Road Safety Education in school is to be applauded. It is an exceptional commitment by the Malaysian Government to its people. Not only is there a large investment in school based education, but also a substantial investment in public education through multimedia and community based road safety programs. Road Safety in Malaysia is a very high priority.

The Malaysian government has a vision that with systematic and continuous learning of road safety education the next generation of drivers, road builders, engineers, town planners, funders etc. will understand the importance of prioritizing and addressing road safety.

There are lots of challenges associated with the development, implementation and evaluation of RSE in Malaysia, and many other jurisdictions are keenly watching the impact associated with this investment. But can we in the road safety field afford to stand back and watch what happens with such a long term intervention as the RSE program in Malaysia when children are continuing to be killed and injured on the roads at unacceptable levels in low and middle income countries. Can we afford to do nothing?

Before the end of this paper I want you to imagine the following two scenarios.

1. There is a chronic illness killing children and young people around the world. The medical profession recognizes all the symptoms and can predict how and how fast the disease will progress. There is a particular vaccine that is showing success with some children. Trouble is, not all children respond to the vaccine. The medical profession decides not to give the vaccine to any children because there is no evidence that it will work for every child
2. There is an International Literacy Education conference and they are discussing the different methods of teaching children to read. There are many preferred ways to teach - but none of them guarantee that every child will be able to read well. A convincing expert outside the education field says there is no need for children to learn to read as he has invented talking books. So reading as a learning activity is removed from the school curriculum and the library is stocked with talking books.

Ethical? Logical? Sensible? Yet similar parallels can be drawn with the two scenarios above and road safety education in schools.

The demand for good road safety initiatives that can help keep children safer is strong. Effective road safety education will make a difference for some.

On the back of the World report on child injury prevention¹⁴ perhaps it is time to determine what is an effective Road Safety Education Program in and around schools and what evidence is needed to confidently say it works. Perhaps Educators should be tasked with this.

Like every other subject in schools and every other initiative around educational setting we can measure the success of RSE, we just need to apply the right measures and take a few professional and considered risks.

¹⁴ World Health Organization 2008