

# Combining Safe System Principles and Road Safety Education in Schools: An Opportunity for improved demand on road system operators and a broader understanding of risk and safety.

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## Abstract

Road safety education in schools offers many opportunities for improving road safety. This is a rare opportunity to present a coherent, developing message across years to children and adolescents as their understanding evolves, consistent with best practice early prevention principles. However, in many instances road safety education has suffered from a number of limitations: unsystematic content development, ad hoc delivery, delivery by (well-meaning) presenters with little education experience or understanding of students' learning needs, and content which is distinctly old paradigm, focussed only on changing the behaviour of the student audience as road users. The present paper draws on evidence of successful learning of road safety messages (as shown in school leaver quizzes) and safe system principles, to recommend features of road safety education which increase its chances of success. Safe system principles herald a new road safety paradigm in which the system operators hold the major responsibility for road safety, with an onus to accept that people will make mistakes, and thus that crashes will occur; and an onus to provide a system in which people are not exposed to physical forces beyond those which the human body can withstand, in a crash. Road safety education has not yet adopted this paradigm. Evidence based practice supports the following features of road safety education: it is part of the school curriculum, rather than irregular events; it includes content for every year of school; it does not include driver training; it is taught by professional school teachers with extra training in road safety so as not to perpetuate the social myths and risk misjudgements which pervade road safety; it includes teaching safe system principles as well as personal responsibility, in order to create understanding and demand for a safer system, the ultimate solution to the road safety problem.

**Key words:** safe system principles, road safety education, best practice education, road safety management

## 1. Introduction

This paper brings together the value of the safe systems approach to road safety, and possible role of road safety education in promoting understanding of, and demand for, safe systems by the community. Thus, the background evidence and logic behind the safe systems approach and the evidence in relation to road safety education are each briefly considered below. The paper also provides a selective review of relevant evidence for the effects of school based road safety education. On this evidence base, practical recommendations are made with the aim of maximising the road safety benefits and minimising the real risk of road safety harm from road safety education in schools.

## 2. The Safe Systems approach to road safety

The safe systems approach to road safety has been successfully adopted in a number of countries, beginning with Sweden (see Mooren et al, 2011). Early statements of the requirement that the transport system be made safe rather than the road users be rendered mistake free, came from the Sweden, USA, and Australia (e.g., Job et al, 1989). These principles were first formally adopted in Sweden and the Netherlands (see Tingvall, 1998), and later in Australia and other countries. Based on the success of the principles in these countries, they are now in broad and increasing use: they are endorsed by Commission for Global Road Safety (2008), and form the explicit basis of the *Australian National Road Safety Strategy 2011-2020* (Australian Transport Council, 2011), the *New Zealand Road Safety Strategy: Safe Journeys* (Minsitry of Transport, 2010), and the *Global Plan for the Decade of Action for Road Safety 2011-2020* (WHO, 2011). A strong statement of these principles (adopted from the National Road Safety Council [Australia], 2012) is outlined below.

The radical departure from traditional and even evidence-based approaches to road safety is that the safe system demands adapting the road transport environment to the limits of the person rather than attempting to adapt the person to the limits of the road environment. The safe system principles are:

1. Human Fallibility: People will make mistakes; we will not solve the road safety problem simply by improving road users.
2. Human Frailty: Humans have a limited tolerance to violent force, beyond which serious injury or death occurs.
3. System Accountability: Ultimate responsibility for safe transport rests with the system designers and operators.
4. Biomechanical limits: System designers and operators must supply a system which forgives to a level which avoids forces beyond human tolerance, in the event of a crash.
5. Moral demand: People should not die or suffer serious injury on our roads.

The safe system approach aims to develop a road transport system that accommodates human error and physical frailty. It accepts that human error is inevitable and thus that crashes are inevitable, but does not accept that death and serious injury are inevitable consequences of these crashes. In a safe system, the roads, road sides, vehicles, and speeds combine to limit the kinetic energy to which people could be exposed in a crash to a level which is tolerable by the human body without causing death or serious injury.

A key limiting factor in safe system adoption is that the principles require a strong commitment of policy and resources by governments (road agencies). However, the community may lack understanding of the principles and often, with many consistent stories from media, see road safety as a matter of personal responsibility. In many instances the safe system approach may be actively resisted with suggestions that we are being wrapped in cotton wool or living in a “nanny state” (for example, see the website: *Welcome to the Nanny State...*, 2012), or F1 race car driver, Mark Webber’s counter-productive suggestion that Australia’s road rules are creating a nanny state (Millar & Rood, 2010). Thus, in most countries there is no strong political impetus to adopting a safe system approach. One means of addressing this problem is to provide more effective education of the community in safe systems principles.

## 3. Road Safety Education in Schools

In most developed countries, school students receive road safety education. However, it is typically extremely difficult to provide clear evidence of a road safety value of these

programs, for several reasons. First, often there is no specific objective which can be assessed. Second, the content may be unsystematic and vary widely from school to school with no quality control process, such that there is no uniform delivery to be evaluated. Third, the aims of these programs of education may be for long term reductions in risk taking as adolescent and adult road users, which requires evaluation over many years after the education program. The latter feature brings many challenges: tracking who did or did not receive the program; the lack of a control group not provided the program is unlikely given the political need for such programs to be available to all; and the confounding of long term before to after comparisons with many other road safety improvements.

This results in the paradoxical situation that, like driver training, the community, schools, trainers, and politicians express a great faith in education as a mechanism for improving road safety despite the dearth of evidence for positive road safety outcomes, in support of this faith (with the exceptions noted below). Road safety experts, who must function on an evidence-base, are faced with a key decision. Should we rally against road safety education in schools or accept that it will continue to occur? The latter position has the advantage of allowing road safety experts into the development of the education content and materials, perhaps providing for an (imperfect) evidence base for what is taught. The present paper assumes that road safety education will continue, and that our most effective role as road safety practitioners is to aim to influence the content and process of this education, to improve safety. Furthermore, there is some evidence pointing to likely successes of such education.

There is evidence that young children can be taught to cross roads more safely (Oxley et al., 2008). Thus, while a number of authorities recommend that children below the age of 10 should be supervised by an adult in crossing the road, benefits appear to occur from training children to cross the road. These programs can be evaluated given the immediate outcomes being sought, compared with the long term effects hoped for in terms of attitudes change as drivers.

In the absence of feasible road safety outcome evaluations of longer term effects, a nonetheless useful point of evidence may be to determine whether or not student recall the road safety messages they receive at the point of leaving school. Questionnaires to students after leaving school in New South Wales (NSW) show that the road safety messages are recalled and well understood (Meehan, 2009). The road safety education program in NSW which produced these sound results has road safety as part of the curriculum in every year of school, and is based on a model of provision of teaching materials to school teachers. The school teachers who know and understand the learning needs of their students are the presenters rather than well-meaning but untrained presenters.

Studies of the road safety consequences of driver training have shown that no road safety benefits arise (for a summary of a most extensive review by the highly reputable Cochrane Library, see Ker et al, 2008). More specifically, the most rigorous studies of school based driver education identify the lack of road safety gains (or even road safety harm) from school based driver training, as repeatedly confirmed in relevant reviews (Butler, 1982; Roberts & Kwan, 2008). The suggestive evidence for harm of driver training in schools is most likely to be due to the added dis-benefit of encouraging an earlier start to a driving career, based on the evidence that, independent of the effects of experience, younger drivers have more serious crashes.

An account of the broad failure of car handling skills based driver training to yield road safety benefits may be apparent with more careful consideration of the contributors to serious crashes. The majority of fatalities in Australia can be attributed to the three big killers: speed, alcohol, and non-use of seat belts (see Australian Transport Council, 2011), and similar

patterns of crash causality are common in many countries. These are not skill factors- rather the choice to speed, or drive after drinking or not wear a seat belt are risk-taking issues, not car handling skill issues (Job, 1999). Thus, skills training is not addressing the key contributors to fatalities. In addition, increases in car handling skill may increase overconfidence, a key contributor to risk-taking (Job, 1999; and see Weinstein & Nicholich, 1993).

There is extensive evidence that risk perception is an important element of road safety, and that we systematically misperceive risk and our own abilities. Optimism bias (the delusion that we will have a better life than our peers) is a pervasive psychological effect, which includes our belief that we are less likely to have a serious crash than others and that we are better drivers than average (Jonah & Dawson, 1987; for a study of Australian drivers see Job, 1990). Research into how to reverse this optimistic bias (over-confidence) about our driving has revealed messages which appear in trials to significantly reduce this effect (Hatfield & Job, 2000), which may be a useful addition to school based information on road use.

#### **4. Recommendations**

This brief, selective review of relevant evidence suggests three key recommendations regarding school based education for road safety.

1. Road safety should be part of the school curriculum to allow a consistent coherent, developing message across years to children and adolescents as their understanding evolves, consistent with best practice early prevention principles.
2. Road safety education is best taught by the teachers who understand the learning needs of their students.
3. Inclusion of coverage of risk perception, optimism bias or over-confidence, and the researched messages which help to reduce this psychological delusion may help reduce the risk-taking of young drivers.
4. The evidence indicates that driver training in schools is most likely to cause harm to road safety and thus driver training should not be offered as part of any school program.
5. The inclusion of Safe System Principles in school programs on road safety will increase community understanding of road safety, judgement of risk of roads, and demand on governments to effectively address the risks of the assets they operate. Furthermore, the juxtaposition of personal responsibility and societal (or system) responsibility is a valuable discussion arising from this content for other learning areas and social responsibility, which may be applied more broadly to other areas of risk (in schools settings, OH&S, swimming pools and beaches, gun control, etc.).
6. While long term evaluations are not feasible, evaluations of intermediate outcomes such as message recall and attitude change provide useful information for revision of programs.

#### **Disclaimer**

The views expressed in this paper are those of the authors, and do not necessarily represent the views of their organisations.

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