

Sheet 1:

Educational activities and methods of evaluation

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Sheet 2: Road safety measures

In the prevention of road accidents, traditionally road safety measures are grouped under the three E's. These are Engineering, Enforcement and Education.

- Engineering comprises all the measures concerning the road infrastructure.
- Enforcement includes all the measures that are directed at deterring road users from violating the traffic rules.
- The E of education, finally, stands for all measures that are related to instruction of new skills like driver training, but it is also used for means to inform road users about new developments and to convince them of the positive aspects of safe behaviour. Like publicity campaigns, for example.

In general it can be concluded from the literature that there is convincing evidence of the safety effects of a lot of measures related to Engineering and Enforcement.

Little is known however, about the effectiveness of traffic education, that is their contribution to the prevention of accidents.

Sheet 3: Why is so little known about the effectiveness of education

This state of affairs raises the following questions:

- Don't we develop **good** educational programs ?
- Is there a problem implementing good programs?
- Are we not successful in carrying out good evaluation studies?

In this presentation I will shed some light on the answers to these questions. The evidence to be presented is partly based on Dutch findings which I expect not to be entirely different from findings elsewhere.

Sheet 4: How to develop a good educational program

What qualities must a good educational program possess in order to be effective as a preventive measure?

Many factors are of influence. In this presentation it is not possible to focus on all of them.

Therefore I will only discuss those which are of particular importance to traffic safety education, namely:

- the selection of the safety problems that can **not** be solved by educational interventions because education is not a miracle cure (or panacea)
- the choice of criteria for successful training, and whether accidents is usable as a criteria for effectiveness
- the identification of the target group
- the analysis of the behavioural determinants, in order to identify
- the educational objectives.

Sheet 5 : Education is no miracle cure

Educational measures work on a particular class of problems. But before addressing those, I will turn first to the class of problems for which education does not work.

A finding frequently quoted in accident research, is the role of human error in accidents. It is estimated that about 90% of all accidents is caused by human behaviour, and in particular errors made by car drivers.

Often this finding is used to conclude that the prevention of these accidents happening, should be by changing human behaviour. This however is untrue. Most advances in road safety are made not because we have all become far safer drivers than our fathers and mothers were, but because of the fact that management of traffic streams have improved by better engineering.

I would like to illustrate this point by showing you an example of a traffic situation that is too complicated to handle. This example comes from Britain, but I am certain that any one of you could find a situation in your own country that is of overwhelming complexity.

Sheet 6: Imagine

Imagine that you're driving through Great Britain and you already feel a bit insecure because of the left hand driving. And to make matters worse, you have only had your driving licence for three weeks.

You start wondering what will happen now? They didn't show you this sign during your driving lessons.....

Sheet 7: This happens next

A few hundred meters further you're suddenly in the next situation!!!
The magic roundabout !

Sheet 8: This is the complete picture

See also the next picture....

Sheet 9: Man the measure of all things

In the Netherlands we have shown that it is more effective to adjust the infrastructure to the limited capabilities of the road user in such a way that the task of road users becomes less complex (and consequently fewer errors are made), and that relative speed differences are reduced. The latter ensures that if an error is made, collisions only happen at low speeds, reducing the casualty risk.

So the bottom line is: you cannot overcome weaknesses in road system design by educating road users.

Sheet 10: Accidents as criteria

First of all, the behaviour that we want to change or train, needs to be related to safety. For educational programs it is not necessary to demonstrate effects at an accident level, as long as a positive relationship between the relevant behaviour and accident risk is proven.

Such relationships have been shown for drink-driving, speeding and red light violations. This implies that with respect to driving under the influence of alcohol and the effectiveness of training programs a change in the frequency of drink-driving is sufficient evidence for a preventive effect on accidents.

For example: In the 60-ies of the previous century a large study on the risks of drink-driving was conducted in the US. In this study it was demonstrated that drivers with an alcohol level higher than 0.5 BAC had higher accident risks. At lower levels there was no increase in risk with the exception of the risk for young, inexperienced drivers.

More complicated is the case of novice drivers. We know about their high accident risk and inexperience. Educational interventions such as driver training, have shown positive results on safe behaviour, but we, however, have never been able to demonstrate a positive effect of driver instruction in accident studies.

Sheet 11: Identification of the target group

In developing an educational program, the selection of the target group is an important aspect. From a safety point of view it should be established that the educational program is applied to a group who is at risk: They show a high accident involvement at present, or an increased risk in future.

Traditionally with respect to drink-driving we tend to focus on the novice driver.

That is also what we did. But in addition to that we did also a study on a more unusual target group: pupils under 16 years of age in secondary education.

We focussed on this group because it was shown that their attitude towards drink-driving was already formed under the age of 18. Moreover, lifestyle studies showed a sharp increase of alcohol use by youngsters under 16. At a very young age they got used to alcohol and going out. And last but not least, a sharp increase was seen of fatal accidents by moped riders and cyclists under 21 who were under the influence.

Sheet 12: which behaviour can be modified

I will now turn to the question about which behaviour can best be changed by education and how do these changes come about?

First of all, education works best for "new" behaviour, that is a person does not know how to do the task. In traffic safety this is the case when a person uses new modes of transport, for example novice drivers, children learning to ride a bicycle.

Also education is very effective for communicating "new" relevant information necessary for road users to know, for example on a revision of traffic rules.

More difficult it becomes in the situation in which we want to convince people of better alternatives. Road users have already strong and well established beliefs. And these are very hard to change.

To use education in order to change strong habits is almost a lost cause. These are hard to change.

To conclude, education is best for influencing reasoned and new behaviour.

Sheet 13: Understanding the determinants (eg seatbelt wearing)

Reasoned behaviour is the result of a cluster of underlying beliefs, skills, attitudes, intentions etc. And the behaviour is not yet a habit. It is believed that in order to change reasoned behaviour by educational measures, the "cause" of the problem behaviour needs to be detected. In other words, we should understand its determinants.

Take the example of seat belt wearing. Is it that people are unaware of the problem (you will suffer serious injuries even at low speeds) , is it that they have a poor understanding, believe in a falsehood (I do not wear safety belt, as in case of an accident I might not be able to free myself)? Etc.

Important in selecting the target group is the finding that once risk behaviour has become a routine, changing that behaviour by education is very problematic. This implies that we should also focus on behaviour that is "new" and not yet a routine.

Sheet 14

An example of such a problem is the use of alcohol by under 16s. Alcohol in traffic is only considered a real problem when youngsters start driving motor cars, so from the age of 18 onwards. As a result, most information about drink-driving is given during driver education. However, interview studies show us that youngsters begin to drink in amounts that most likely made them intoxicated, and ride a bicycle at the same time, at a much younger age.

Moreover, it has also become apparent that these youngsters did not know about the risk of accidents. Even if they knew about the risk, they stated that because of group pressure, they could not resist. The peer group is so important at this stage of their emotional and social development, that it overrides all personal behavioural intentions.

And last but not least, they were exposed to examples of drink-driving by adults, especially their parents.

It was concluded that an effective educational intervention, not only had to deal with their lack of knowledge, but also had to improve competencies of youngsters to deal with group pressures and to exert pressure on others. These were the educational objectives.

Sheet 15: educational objectives

Educational objectives form the bridges between problem, treatment and results. They describe the goals to be achieved in terms of skills, knowledge, motivations etc. They are the necessary standards to evaluate the program with. It is the necessary component of any educational program.

Sheet 16: to summarize

To summarize: for a high quality education program you have to

- Identify safety problem
- Relate human behaviour to accident risk
- Identify target group
- Study the determinants of the problem behaviour
- Describe educational objectives

Sheet 17: The implementation of programs

The development of the educational program is a time and money consuming effort. But just a good educational program on its own, is not a key to success. In the Netherlands we have many well developed programmes, but also a lot of examples in which the program failed because of poor implementation. This is especially the case for school based education. Many actors are involved, different layers of decision makers, each with their own responsibilities. In the past this has caused that programs that were planned on a long term, ended up with a short term implementation. Or that an intensive intervention did result in just a few classhours.

Up to now we have not studied the effectiveness of different implementation strategies. Some actors believe that implementation problems are central to low effectiveness of educational programs.

Sheet 18: To evaluate education

In order to learn about the effects of educational measures, evaluation studies are a necessity. The evaluation design for educational measures is not really different from the design in any other field. For instance, to allow a generalisation of results, a proper sampling method should be used. This can be endangered by self selection bias and selective mortality or fall out.

Self selection bias is a threat to the generalizability of the results. This is especially the case in voluntary participation. Only those persons may participate in the study that have already a positive safety attitude- behaviour.

A second threat is selective mortality or fall out. In any study, subjects will leave the experiment. That is no problem if this happens at random. It is a problem when it is related to the topic of the experiment.

In order to demonstrate a causal relationship between measure and effect and to exclude alternative explanations, a pre- and post test is needed, as well as a comparison with a control group. The latter is really important in evaluating educational measures, because time can be an important feature. In particular when young children are involved, they mature over time. The validity of the data may be threatened by the so-called Hawthorne effect: people are sometimes performing better because they know that they are being observed. Or their knowledge and understanding is increasing because of repeatedly completing questionnaires.

And last, we should measure short term effects as well as long term effects. An effect that has been found on the short term might fade away after a while. Or, conversely, the effects materialize only after a long time.

Sheet 19: Conclusion

I started my presentation by raising three questions. To sum up, I will answer them now.

- Don't we develop **good** educational programs ?
Sometimes yes, sometimes no. There is a lot of understanding on how to develop good programs. Because of restricted resources, however, this knowledge and understanding is not always employed.
- Is there a problem implementing good programs?

We do believe yes. Most energy is spend in developing a program and unsufficiently attention is being paid to the next step, organisation of the implementation. A lot of unsuccessfull programs demonstrate that one should not underestimate this bottle neck.

- Are we not succesful in carrying out good evaluation studies?

Once the two previous conditions have been fulfilled, and the educational objectives have been well defined, the evaluation will not pose too many problems.