

MODERNIZING THE PROFESSIONAL CAPABILITIES OF DRIVING INSTRUCTORS AND TRAFFIC SAFETY TEACHERS

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Abstract

The effective traffic safety training is a long process; it starts from very young age and continues throughout life. This is not only a process of acquiring knowledge and skills, but also a matter of social importance. Pedagogical forms of education depend on the position of a man in society, respectively, on abilities to percept the environment. The recent investigations of traffic accidents show, that the young drivers generally have poorer than average self-reflection skills. It is therefore important to foster self-reflection skills and attitudes from an early age, especially in matters that relate to road and driving safety.

All of staff that have career in traffic safety training (mainly instructors for driving and traffic safety teachers) in Europe have their responsibility for decreasing the traffic accidents and incidents by polishing their skills. They work under variety conditions, specific National Laws and Regulations, but the features of their target groups are one and the same. In order to meet the new challenges put by EU Commission they need to have common vision about traffic safety training in Europe, to know what traffic safety means for different age groups, to know what is the best practice of their colleagues, including curricula, methods, training materials, and to be aware their work is very important for traffic safety.

Aim of this paper is to present an approach for non-formal instructors for driving and traffic safety teachers training for modernizing their professional capabilities with students form 0 to 30 years old.

The investigations and main results are based on the theoretical investigation for hierarchical level of behavior, made by Hatakka for instructors for driving training. The students are divided in four age groups: pre-school children (0-6 years), schoolchildren (7-12 years), teenagers (13-17 years) and young

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adults (18-30 years). For each age group a curriculum is developed according to common EU rules and the Hattakas' investigations. An example for curricula on teenagers' traffic safety training is presented the paper.

Key Words

Traffic Safety, Instructors for Driving, Traffic Safety teachers, continues training

Introduction

According to the White Paper, "European Transport Policy for 2010: Time to decide", 40,000 lives are lost in road accidents every year in the EU. An additional 1.7 million people get injured in those accidents. This translates into an estimated cost (indirect and direct) of €160 billion each year. Thus, EU Parliament passed a resolution in 2006 to halve the number of traffic deaths by 2010. Their report calls for coordination, research, awareness campaigns and exchanges of best practices.

Similarly, Framework Programme 7 recognizes the need for drastic changes in surface transport and calls after, for example, greener and safer transport systems. In addition to all the technical and logistical development in the area, the level of persons' behavior takes one of the key places for traffic safety in daily lives.

The recent investigations of traffic accidents show, that the young drivers generally have poorer than average self-reflection skills. It is therefore important to foster self-reflection skills and attitudes from an early age, especially in matters that relate to road and driving safety.

Normally, the driving instructors are professionals that take care about basic driving skills and driving behavior and it is going during their regular training courses for a short time (a few weeks or months) with a student. The instructors pass regularly continues training courses for updating their professional skills according their National low. Other traffic behavior skills are presented before various age groups by traffic safety teachers at kindergartens, at schools during their regular or out-of class activities. Most of them are drivers; they have common pedagogical skills to work with specific group and usually they passed a short pedagogy course on traffic safety.

All instructors for driving and traffic safety teachers in Europe have their responsibility for decreasing of traffic accidents and incidents by quality of their carrier. They work under variety conditions, specific National Laws and Regulations, but the features of their target groups are the same. In order to meet the new challenges put by EU Commission they need to have common vision about traffic safety training in Europe, to know what traffic safety means for different age groups, to know what is the best practice of their colleagues, including curricula, methods, training materials, and to be aware their work is very important for traffic safety.

Aim of this paper is to present an approach for non-formal instructors for driving and traffic safety teachers training for modernizing their professional capabilities with students from 0 to 30 years old.

Theoretical basis of Traffic Safety Education

This approach is based on theoretical investigation made for instructors for driving training (Hatakka, 2002). The following table is a representation of the model as it could be altered to more generally description the skills and knowledge required from all traffic participants.

The idea of this model is that the higher hierarchical levels consist of conscious and subconscious choices that affect a person's behavior in traffic. The highest-level factors, such as one's lifestyle choices relating to traffic (car hobby, sports bicycling, jogging) affect the lower level functions in the model. For example, a young male who builds his identity around his moped hobby and seeks the acceptance of his peer group, will choose his driving routes and traffic behavior as set by the reference group (other young male moped drivers). He will do that even though he could modify his vehicle to go faster than

the legislated speed limit for that type of vehicle. So, the peer and social pressure affects of behavior of an individual traffic participant.

Teaching Principles.

When the training of traffic safety issues is structured into study modules, it gives a chance to focus on specific issues for each course. These modules can then be taught to students in an increasing order of difficulty; starting from basic traffic safety issues and moving onto the training of higher-level meta-cognitive and self-regulatory skills. It is evident that different age groups require different kinds of focus inside the learning modules; small children are less capable of self-regulation than young adults usually are. Therefore, the specific learning assignments and group exercises for these learner groups will be very different.

Here are presented Goals for Traffic Safety Education (GTSE) matrix (Adapted from the Goals for Driving Education in Hatakka (2002)):

- **Goals for life and skills for living: Knowledge** of the effects of lifestyle, age, values, group norms and pressure etc. on behavior in and out of traffic and the **skills** to control them.
- **Goals and context of travel (particular route, trip): Knowledge** of factors that affect a trip, such as the goals of the trip, choice of route, social pressure on decisions, importance of trip etc. as well as the **skill** to see alternatives to the choices.
- **Management of traffic situations: Knowledge and skills** related to traffic rules, signaling and safety measures, recognition of traffic conditions etc.

- **Tactile/manual control: Basic skills and knowledge** of the handling of a vehicle / shoes and their characteristics (anti-skid properties etc.).

Traffic safety curricula

Traffic safety curricula with four different implementation plans are in a process of development in the framework of European project LLP-LdV-TOI-07-FI-160810 "Modernising the Professional Capabilities of Driving Instructors – Future Facilitators of Lifelong Traffic Safety Learning". The students are divided in four age groups: pre-school children (0-6 years), schoolchildren (7-12 years), teenagers (13-17 years) and young adults (18-30 years). For each age group a curriculum is developed according to common EU rules and the hierarchical level of behavior according to Table 1. The first group - pre-school children includes children that have not yet entered the official school system and will receive their traffic safety education from their parents, community and in day-care centers. The second group - schoolchildren - refers to an age group that has entered the education system, but is not yet allowed to drive a moped or other motored vehicles on public roads. In essence, they will move around by walking, on a bicycle, by being a passenger in their caretakers' car or by using public transportation systems. The third group - teenagers - is young children who are allowed to start riding motored vehicles such as mopeds or tractors on public roads. The fourth group - young adults - refers to those who have received their driver's license and participate in traffic in their everyday lives, but are not yet hindered by the physically detrimental effects of old age.

By option, the curricula are recommended and they give common conceptions about advanced features for driving and traffic safety training. The exactly numbers of lessons depends

on the National regulations that every Instructor/Teacher has. An example of curricula created for teenagers (third age group) traffic safety training is presented below.

An example for curricula Implementation

A detailed investigation of different kind of training of this age group was carried out (Traffic Law etc.) . The most specific features of training in this age are:

- Students get more self-dependant, they go into the streets alone, take part in the traffic as pedestrians, bicyclists, they study in school and out of school lessons (theoretic and practice) advance rules for Traffic safety behavior.
- Students obligatory obtain science knowledge by studding subjects like Physics, Mathematics, Psychology in High School System, where they study Natural phenomena about topics, related to traffic safety, for example, speed, acceleration, power, speed of stopping, reaction etc..
- Students (aged 16 and 17) can study the Traffic Law and obtain practical skills for riding of moppet by courses, in which they obtain driving license "M" if they successful pass the final exam.

These formal trainings are very different and any of them has strictly organization and methodic recommendations. They enlighten a good practice for traffic behavior from specific point of view and all together contribute for higher transport culture. For example, when students master traffic rules, they usually study that the vehicle should move with safety (reasonable) speed that means the driver have be possible to control the vehicle. That us very important obligation, the high speed is one of the main reason for traffic incidents and accidents. A science based answer gives Physics by investigation of Natural

phenomena as friction, speed and inertia. It is usual phenomena as acceleration (and suspensory), speed and distance (including distance of stopping) to be mastered in Mathematics and speed of human responding of a signal is studied in Psychology.

Besides these formal activities out-of-class are applicable to increase the traffic behavior skills and education of students, like:

- Competitions on Traffic Safety in sports clubs and schools where in artificially organized traffic where students present abilities to manage the traffic situation and that is one of criteria for evaluation; getting ready for competitions students master their abilities for real life.
- Organization of voluntary student's patrols at school from senior students with a teacher as leader with aims to help juniors to cross streets and to monitor the traffic around the school; during implementation (including preparation as instructive) of these kind activities students create a serious attitude to traffic mater that is supposed to exist when they get drivers.
- Medias for preventive activities to increase traffic safety; nowadays the Medias (newspapers, local and National broadcastings – radio and TV) surround our life and some kind has influence over people behavior. In this sense is reasonable a good driving practice to be visualized and explained as good practice to be followed by students to increase their safety; for example, the use of helmets to prevent serious head injury.

On the base explained forms of education, the followed modules are defined:

MODULES 1.

FUNDAMENTAL THEORETICAL KNOWLEDGE

This module gives basic knowledge and skills related to traffic rules, signaling and safety measures etc. like:

- Common knowledge for available in traffic vehicles and roads as the main stress is put on used vehicles by teenagers, dangerous when they are used in traffic together with other vehicles and how to decrease consequences from traffic accidents.
- Knowledge for traffic management and signals for regulation as the stress is put on mutual connection of traffic safety and strictly consideration of signalization.
- Knowledge for safety participation in traffic: here the content from the Traffic Law is thematically considered with traffic safety. Typical examples for traffic accidents from practice are investigated.

MODULE 2

RESPONSIBILITIES AND CREATION OF TRAFFIC SAFETY BEHAVIOR

The basic themes here are: Safety riding, controls the risk and duration of running. Tiredness, attention and distraction; Alcohol and drugs influence to driver behavior; Tolerant behavior and traffic safety, rules for tolerant behavior. Aggression as a style of driving; Traffic conflicts. Emergency help; civil traffic behavior; obtaining vehicle/moped and following responsibilities.

MODULE 3

APPLICABLE KNOWLEDGE AND SKILLS FOR TRAFFIC STRATEGIES

This module gives knowledge and skills for management of traffic situations. Basic areas of study are: Strategies for

highway and rural riding; Strategies for participation with the rest drivers. Safety and defensive riding; Strategies for riding in emergency conditions – bad weather conditions, limited and diminished visibility.

MODULE 4

BIKING/RIDING A MOPED

This is a practical module and gives skills for tactile/manual control. After this practice students have to balance the bike/moped along a straight line and to change direction, to pass through obstacles and restraints. The practice is organized on a polygon but imitation of bad weather conditions is implemented by pouring on a section by water, passing on a not good fixed board. Practical skills for technical maintenance of a bicycle/moped, emergency medical assistance on the road are mastered as well.

MODULE 5

SCHOOL, DOMESTIC, LOCAL, REGIONAL, NATIONAL AND EUROPEAN LEVELS FOR IMPACT ON TRAFFIC SAFETY.

Here are presented basic fields of education and skills for living by out-of-school forms, like:

- Media (newspapers, local and National broadcastings – radio and TV) and family surrounding for increasing traffic safety and preventing usage by teenagers.
- Students' patrols for safety traffic observation around the school and its influence on teenagers' traffic safety.
- Competitions organizing on subject "The youth and traffic safety" – local, regional, National, European levels.

Training content

Typical training materials and tools will help teachers and instructors in order to master their abilities.

There are many tools for use by instructors and teachers. The basic tool is the National Traffic Law and Regulation of its application, which is specific for every country including created for e-learning use. Training materials in the way of articles, dedicated on important mater in traffic safety are important in order to help teacher to organize their lessons and master their skills in the field. A typical example is the speed, which is used in Mathematics to describe different parameters of a movement, but in the same time, it is one of the common parameters of driving. Attracting the student attention on real problems in traffic the teacher will implement simultaneously their professional obligations and will contribute for students' preparation for real life. These training materials will help the "old" drivers to increase their knowledge as well.

There are different National limitations of speeds for urban and country driving. However, the driver should always take in account the concrete road conditions, so to be able to escape traffic accident. It means the driver should appreciate the visibility, passing pedestrians, weather conditions etc.

The usual situation in practice is: a driver run a car and suddenly remarks an hurdle in front of the car. The reasons can be to high speed, distract attention from the road etc. The sequels depend on the speed of driving.

What is going on when the driver brakes in an emergency? First of all the dynamic behavior of a car depends on the interaction between tires and road surface. In is used so-called coefficient of adhesion [10] and it is maximum when slipping is missing. The basic parameters of the car under uniform emergency stop

on horizontal surface are: $a = y \cdot g$; $V = a \cdot t_B$; $L_B = \frac{1}{2} \cdot a \cdot t_B^2$, where a is deceleration, y - coefficient of adhesion, g - acceleration of gravity, V - velocity in the moment of press the pedal to stop the car, t_B - duration of braking, L_B - passed length for braking. Speed of the car V_{Bi} will decrease in the process of

braking and after time t_{Bi} it will be $V_{Bi} = V - \sqrt{2y \cdot g \cdot L_{Bi}}$

where L_{Bi} is the distance passed from beginning of brake (

$L_{Bi} = \frac{1}{2} \cdot a \cdot t_{Bi}^2 = \frac{1}{2} y \cdot g \cdot t_{Bi}^2$). The entire duration t of

stoppage can be accepted: $t = t_R + t_B$, where t_R is duration for human wake up to the situation. During this time the car is

moving by velocity V and pass length $L_R = V \cdot t_R$. The entire

length of stoppage is $L = L_R + L_B$.

Coefficient of cohesion depends on the condition of the tires and the road surface. The maximum value is from 0,7 to 1 when tires contacts with dry asphalt. Increasing of temperature, availability of rain or snow decrease it to 0,4 - 0,5 and to 0,1 - 0,3 if ice and snow.

If a hurdle (or a pedestrian) is available in front of the car on distance L_H , so $L_H < L$ the car will hit the hurdle by speed

$V_H = V - \sqrt{2y \cdot g \cdot (L_H - L_R)}$. If $L_H \leq L_R$ the car will hit the

hurdle without braking and $V_H = V$. The details of shock and sequels depend on concrete conditions but statistics can help for conclusions of mathematical problems.

- Reaction time: when the emergency is expected - about 0,4 s; if it is not expected - about 1 s and more; if the driver is angry, distracted, tired, etc. - for more than 2 s.
- Hit at a hurdle: it is equivalent of the impact of free fall of car from a height: 10 meters - at a speed of 50 km/h; 22 meters - at a speed of 75 km/h; 40 meters - at a speed of 100 km/h.
- Impact at pedestrian: the probability for fatal outcome depends on the speed and if the speed is 30 km/h - the risk of fatal injury is low; if 50 km/h - 50% die from pedestrians; if 70 km/h - 100% of pedestrians get killed.

These data can be implemented in the mathematical problems, so students to make conclusions how should drive in concrete conditions. It is obviously, after many times repeating of different variants students will have lifelong memories and that will reflect to their traffic behavior. Because these kind of training materials will be put in web for free access drivers will use them to improve their theoretical knowledge and driving skills.

Conclusion

The effective traffic safety training is a long process; it starts from very young age and continues throughout life. This is not only a process of acquiring knowledge and skills, but also a matter of social importance. Pedagogical forms of education depend on the position of a man in society, respectively, on abilities of perception of the environment. Combination of different forms of training will improve the fundamental training of participants in traffic and as result will contribute to reduce traffic accidents and incidents.

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