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Training in Traffic Safety Culture Based on Risk Factor Analysis for Urban Road Accident Prevention: Case Study Rio Verde – Brazil

Magaly Pazzian Romão[1], Paulo do Vale[2], Guilherme Rodrigues de Sousa[3], and Anabela dos Santos Aleixo Simões[4]

[1]FATEC, Jaú, Brazil
[2]Prefeitura Municipal de Rio Verde Rio Verde, Brazil
[3]UNESP – FEB, Bauru, Brazil
[4]Lusófona, Lisboa, Portugal

ABSTRACT

This study will address a sample that will cover the entire population of the Rio Verde, Goiás State - Brazil. Such action is important so that in an objective way it is possible to assess advances and weaknesses of the municipality, allowing an important public management tool to be developed, and providing the population with a simple way to follow the development of the place where they chose to live. Under this perspective and aiming at contributing to a technologically and culturally more developed society, a new project has been setup. The project aims at reducing the differences among generations in terms of knowledge, skills, and behaviors, towards a safety culture. Thus, educational sessions covering three main axes (Health, Environment and Safety) is being setup addressing the targeted groups that are segmented by age and educational level. The project starts with the behavior analysis of the selected groups throughout the city, aiming at developing the necessary material to achieve the long-awaited resilience in the future.

Keywords: Traffic safety, Risk factors, Safety culture, Education, Behavior adaption

INTRODUCTION

In the 21st century society, which is revealing itself as the knowledge society, Information Technology and Education, the new challenges impose new perspectives for the new generations and for all those who want to be qualified in the current labor market, which is constantly evolving. It is also an era in which it is admitted, at first, that every citizen has a minimum of digital knowledge, regardless of age. All this rapid development that we try to keep up with keeping some update leads us to frustration when we become aware that we lack the previous support, because all this is new to the generations who left school for a long time. In this scenario, the education system cannot continue to form a workforce for stable jobs; on the contrary, it is necessary to train creative individuals, adapted to the rapid change of society at large.

This requires a permanent availability to continue learning, value knowledge and new skills.

However, social and economic differences, especially in developing countries, are enormous, and this puts the population in a position of not having the minimum to survive, let more worry about critical awareness formation. Issues such as the great population growth of these regions, the need for food, energy, the impact of the pandemic on health and finally the climate changes and the most diverse phenomena that have been repeated in all corners of the planet earth, need to be addressed with the population in order to generate a process of awareness of the existence of risks and their factors. In this scenario, understanding traffic accident, not only as a phenomenon, more as a cause resulting from the attitude of a population that can be educated to perceive the risk factors to which they are subjected, can be a good start to also understand the risk factors in traffic and adopt preventive measures to avoid them.

Finally, through a perspective of contributing to a technologically and culturally more developed society, the project targets the development of a Safety Culture addressing the population from a town in the State of Goiás, aiming at providing basic knowledge in three important axes: Health, Environment and safety. The addressed topics are expected to improve their attitudes and behaviors regarding Safety issues, developing relevant knowledge and preparedness to anticipate, avoid, manage and, eventually, take risks in the variety of living contexts: home and neighborhood, working domain, and transport in its different modes, including walking. The targeted Safety Culture is being expressed in the most decisions in face of uncertainty and choice difficulties.

The Project

The Project aims at providing citizens with conditions for safer behavior. Within the addressed town, accident rates, and cases of infection illnesses with different roots, particularly the lack of preventive education, represent a major concern. Such situations rely on behavioral issues, representing the triggers for the project, which is being developed in three main axes: Health, Environment, and Safety.

The Health Axis

Oriented towards the protection of health in itself and those who depend on themselves in the household and still or no longer have the capacity to decision in the most varied situations. From hygiene to food, through medical follow-up and follow-up of vaccination plans, there are several situations that require learning and awareness of risks as forms of health protection.

The Environment Axis

Oriented towards its protection and preservation following practices that will allow to control and mitigate some effects of lack of care at the level of the environment. We understand the environment as the environment built both in urban and rural.

The Safety Axis

Oriented to the awareness of risks and ways of identifying them in any context: at home, on the street, at school, in transport, at work, in any place where each one seeks to identify the actions that are appropriate to each situation and those that may contain risks to their own lives. This axis aims at the development of appropriate behavior in the most varied situations, i.e. developing a safety culture that will promote appropriate decisions and behaviors in each situation depending on the identified risks.

The work is being carried out in weekly sessions with voluntary and free participation for all citizens aged 16 years or older in order to promote a little more equality and the development of a more humanized society, in which human work is seen as the individual or collective contribution to the common good, under safety conditions and under control of any risks, i.e. in humanized conditions, promoting health, safety and preserving the environment.

Thus, it is intended to contribute to the learning of knowledge, concepts, principles, rules and techniques that facilitate the integration of society, but especially of young people and adults in a demanding labor market in which they must be prepared for: (1) a permanent lifelong learning, adapting their activity to technological development; (2) their education and training should stimulate creativity and critical thinking as resources to anticipate, adapt, react, create and improve in the context in which they operate. According to UNESCO (1998), "... Education systems face the challenge of preparing students or trainees to properly carry out their mission in a changing world and respond to the needs a nd requirements of 21st century society, which is revealing itself to be the knowledge, information technology and education society."

Within these perspectives, we understand that the concerns of the City of Rio Verde regarding the realization of actions whose main objective is to promote a culture of safety in a differentiated way, that is, offering this population awareness tools so that it establishes criteria for risk identification, whether at home, in the home environment, as well as when planning a trip and verifying climatic phenomena, even the disposal of garbage and the correct use of medicines, and finally the safe behavior in traffic, may lead us to achieve in the future the long-dreamed resilience in the population.

OBJECTIVES

The main objective to identify risk factors and promote a culture of safety, based on 3 fundamental axes:

- Safety
- Health
- Environment

Secondary and no less important objectives, reduce the accident as a whole and reduce traffic accidents, making the city in question more humanized.

METHODOLOGY

Expecting to cover the different groups of the population, regular sessions are being prepared focusing on pre-defined subjects to be addressed by means of day-to-day projects that is being developed during 3 or 4 sessions each one. An intelligent learning approach will stimulate critical thinking and creativity by means of organized discussions moderated by the selected teacher (or trainer).

Focus Groups (FG) were set up to identify the participants' opinions, feelings, believes, motivations and experience regarding different risk factors. Participants in the FGs sessions were identified among schoolteachers and professional trainers. Based on the FG results, the selected participants will follow a training process targeting the sessions leadership, according to the defined contents, and the materials prepared by the project coordinators. Thus, the sessions is being planned, the contents and materials is being tested by the project coordinators, and the experimental part of the project will start.

At the end of the first semester, an evaluation is being carried out by means of a questionnaire to each group: participants and session trainers. Both questionnaires address their global satisfaction level, together with their opinion about the importance of the developed contents, their preferences for the addressed subjects, and their expectations and preferences for the second semester, which is being prepared taking the questionnaire results into account.

As a final event for the first year of the project, an international seminar is being held with the participation of invited speakers, both project coordinators, and a group of selected participants.

THEORETICAL REFERENCE

Safety Culture

Ward et al. (2010), when studying the influence of a safety culture in the United States, considered that traffic safety culture seemed to be an intuitive and powerful concept to explain the demographic differences observed at the regional and international level regarding the risks of accidents, as well as the propensity to commit high-risk acts. Since it is possible to define and apply this concept to a social and behavioral theory, it may be possible to develop a new paradigm for traffic safety interventions.

A culture-based approach is complementary, but fundamentally different in the form and philosophy of traditional safety traffic interventions, including engineering, surveillance and education, as it proposes to address the origin of risky behaviors. If we consider a culture that tolerates or engages in risk, for example by resisting security interventions, it will propagate risky behavior and impede traffic security policy.

If we accept that there is sufficient evidence that an endogenous variable (originated by internal factors) such as the traffic safety culture can significantly influence the risk behaviors and the resulting accident rates, a definition for this construction that is applicable in the development of effective traffic safety interventions (WARD et al., 2010).

The authors consider that the elements present in the safety culture would be basically three:

- Cognition (values, beliefs, expectations, attitudes, decisions) is an important facet of the culture that guides and motivates behaviors based on culture itself. Aspects of cognition within a culture include: (1) the virtues that are valued by society, (2) beliefs about normal behaviors within society, (3) expectations for violations of normative behaviors; (4) attitudes towards their own behaviors; and (5) the collective influence of cognitive factors on the individual's decision-making process.
- Behavior, referring to actions to qualify for group members or represent group members.
- Artifacts that would be the symbols, expressions and tools of a culture, including laws that dictate cultural compliance.

RISK FACTORS

Human Error

- An error is defined as the failure of a planned sequence to achieve the objectives defined when this failure cannot be attributed to chance. In this perspective, individuals seek to achieve a defined goal, but two situations can occur:
- Actions are not carried out as planned.
- The planned actions are not the correct ones.

Human error can have several different forms and origins. For your better understanding, the generic designation of unsafe acts is being used to differentiate the various types and their genesis. It is known that an unsafe act, whether intentional or not, is directly related to most accidents. These, however, are the consequence of several interactive factors, since the unsafe act that caused the accident represents the end of a chain of factors that determined the dangerous situation.

To better understand human error, let us report to reason (1990). On a first level, a distinction is made between intentional and unintentional unsafe acts, establishing a separation, according to the taxonomy proposed by Reason, 1990.

Unintentional unsafe acts, which are in reality what is commonly called errors, are classified by Reason (1990) into three basic types of error: failures, lapses and errors themselves. The differences between these types of errors are in the cognitive mechanisms that originate them.

Thus, failures are usually committed by lack of attention (distraction and inattention) while lapses result from forgetfulness, i.e., memory failures. The errors themselves may be related to the application of rules (poor application of an appropriate rule or application of an inappropriate rule) or to the resolution of problems in non-routine situations in which the individual has to think of a solution while performing the task (example: a driver decides to speed up when the appropriate action would be to reduce or brake).

Intentional unsafe acts include infractions and some intentional errors. These are consciously committed and result from the disparity between prior intent and expected consequences.

An infraction is defined as intentional disregard for contextual rules and established regulations, which can lead to conflict situations. The difference between an intentional error and a transgression is that in the first case no rule was transgressed, but there was only one wrong decision based on risky routine practice. The infringements relate to behaviors that are devises of established rules and procedures, and can be classified into two categories:

- **The usual infractions (routine practices),** which are committed so regularly that they become automatic and are often tolerated. Some of these offences result from inadequate procedures that make it difficult to achieve the defined objectives, through which individuals try to create easier and more effective procedures. These routines should be identified in order to improve procedures, thus cancelling the interest of the infringement.
- **Exceptional or situational offences,** which do not reflect typical behavior or are predictable, usually occur in unusual situations and are facilitated by lack of supervision or inadequacy of the environment. In the context of driving vehicles, some exceptional offences are caused by time pressures and accentuated by traffic conditions and also by lack of supervision.

It is known that the human being is fallible and that errors are the inevitable consequence of inadequate conditions that reside in the system in which the individual operates. In this perspective, errors should not be seen as negative aspects of behavior, to the extent that we can learn from them if they are properly investigated and understood their origin.

As unintended actions, errors are usually induced by factors of involvement, such as omission of information or signaling. Making the road environment tolerant of error should be a priority objective in a road safety policy. At the same time, intentional unsafe acts must be prevented, and supervisory authorities should be consistent and strict in the requirement to comply with the law. Inadequate supervision or lack of consistency in the application of punitive measures would be an invitation to infringement.

A better understanding of the diversity of human behavior and some knowledge about the internal and external factors that condition performance may constitute the path to a significant change in behaviors in cities and highways.

Romão (2015), identified 07 risk factors associated with the behavior of drivers in a sample of drivers from the State of São Paulo and identified the following unsafe acts: (1) Low level of fitness; (2) Infringement; (3) Distraction/Inattention; (4) Aggressive driving; (5) Low awareness of the situation; (6) Stress; (7) Behavioral Adaptation.

These factors, according to ROMÃO (2015) should be represent the priority topics to be worked on in future campaigns, and or educational processes, as well as identified the need for investment in infrastructure and training of drivers, training, education and finally more focused actions could lead to the formation of critical awareness of these same drivers related to these acts practiced.

CONCLUSION

Road accident is a serious problem in the world and currently, about 1.3 million people die each year due to traffic accidents and approximately 50 million suffer some kind of injury – many with physical, mental and/or psychological sequelae that prevent a normal life. (FERRAZ et al, 2012).

Romão (2015) associates' reduction of accidentality through the identification of risk factors, which would allow educational actions, whether campaigns, formal education and others in a more objective way and highlights the need for constant evaluation of the results obtained in order to adjust methods and reduce costs.

Considering a project of this size, with the proposition of applying itself to a considerable part of the population, which is of the order of 250,000 inhabitants (IBGE,2022), is being at least a great challenge but above all a hope to be able not only to raise critical awareness of this population, but to change the focus of public management, which should think concomitantly to improve the infrastructure of cities, but also to promote more effective educational actions in order to prepare the population to experience this urban environment and be aware of the risks inherent to it.

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