

INVESTMENT IN SAFETY REEDUCATION OF DRIVERS - METHODOLOGY, HUMAN RESOURCES, EFFECTIVENESS

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Abstract

A pilot project „Investment in Safety. Reeducation of drivers - methodology, human resources, effectiveness” was conducted between November 2007 and April 2008. The project was a joint task of National Road Safety Council, Polish Educational Group "Educativ" and chosen Regional Drivers' Examination Centres. Methodological support was provided by Motor Transport Institute. The aim of the project was road safety improvement by increasing competences and abilities of employees of Regional Drivers' Examination Centres responsible for reeducation courses for drivers violating traffic laws. Fifty two participants were engaged in the project - psychologists, policemen and organizers of the courses for traffic law violators. A series of trainings consisted of conference meetings and regional workshops. Participants obtained a certificate by passing the final test. The exam was organized in an online form and in that aspect it was an experiment. Each participant received a disposable login in order to access an examination program located on an indicated web page. Admission to the exam was possible anytime within two particular days. Test consisted of 50 randomly selected questions arranged in a three-choice format with one, two or three correct answers. Time for each question was limited. Analysis confirms usefulness of network instruments in knowledge verification, especially in the presence of territorially dispersed participants of training courses. Statistical data about user choices and answering time were gathered, showing correlation of answers and making possible detailed analysis of questions and feedback-driven future training improvement.

Keywords: road safety, education, drivers' reeducation, remote test, statistical feedback

1. Introduction

A pilot project „Investment in Safety. Reeducation of drivers - methodology, human resources, effectiveness” was conducted between November 2007 and April 2008. The aim of the undertaking was the improvement of road safety by increasing competences and abilities of employees of Regional Drivers' Examination Centres responsible for reeducation courses for drivers violating traffic laws. The project corresponds to Objective 1 Priority 1.3 of National Road Safety Program GAMBIT 2005 - „Improving the system for driver training and examination”.

The project was a joint task of National Road Safety Council, Polish Educational Group "Educativ" and twenty four Regional Drivers' Examination Centres¹, with a methodological

¹ Regional Drivers' Examination Centre in Katowice, Częstochowa, Opole, Kraków, Wałbrzych, Zielona Góra, Leszno, Kalisz, Poznań, Konin, Kielce, Lublin, Włocławek, Toruń, Bydgoszcz, Elbląg, Olsztyn, Łomża, Suwałki, Warszawa, Radom, Płock, Siedlce, Ciechanów.

support of Motor Transport Institute. The operational supervision was maintained by the experts from Ministry of Infrastructure. Training materials were developed by a team of specialists in the field of traffic psychology, road safety and education methodology.

Fifty two participants were engaged in the project, lecturers - psychologists and policemen - and organizers of the classes for traffic law violators. In order to complete the whole course and obtain the certificate, participants had to take part in a series of trainings and pass the final exam.

2. A series of trainings

A series of trainings consisted of conference meetings, regional workshops and placement classes.

The programme of the first conference included the following topics:

- „The role and the responsibility of the lecturer of the courses for traffic law violators”,
- „The programme of the courses for traffic law violators”,
- „Methodology of adult education, eristic and the elements of knowledge on social influence”,
- „Modern teaching aids”,
- „Self-education and sources of information”.

Participants evaluated the conference meeting regarding the fulfilment of expectations and the adequacy to the professional needs of participants. The assessment was as follows:

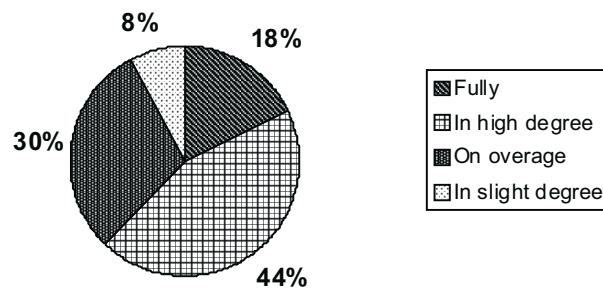


Fig. 1. Did the conference fulfil your expectations?

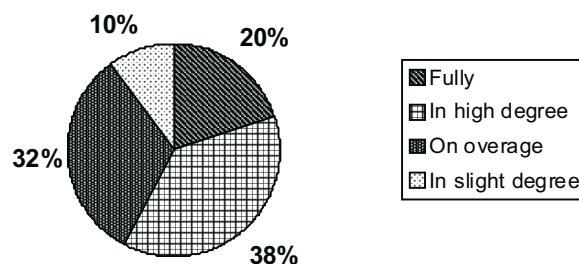


Fig. 2. Was the conference program adequate to your professional needs?

During regional workshops, participants practised their abilities for leading a group work and for overcoming a group resistance. They discussed the efficiency of the courses for traffic law violators as well as possible actions to improve such effectiveness. During discussions, participants - as main of the problems that limit their work - highlighted the lack of explicitly defined principles regarding the program and organizational issues concerned with the courses for

traffic law violators. Consequently, they often do not have the influence on number of students in a group (which frequently is too large for conducting efficient training) or inadequate conditions in a classroom. As a result, some postulates to the Ministry of Infrastructure have been prepared.

Participants evaluated workshops regarding the fulfilment of expectations and the adequacy to the professional needs of participants. The assessment was as follows:

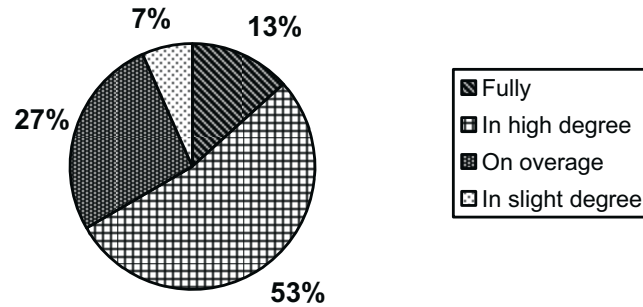


Fig. 3. Did workshops fulfil your expectations?

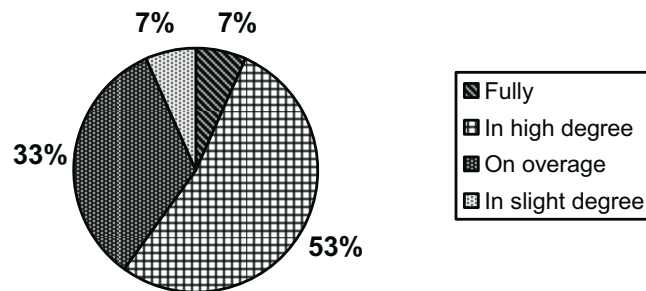


Fig. 4. Was the workshop program adequate to your professional needs?

Placement classes were devoted to a practical application of the knowledge and abilities gained during the lectures and the workshops and took place in each Regional Drivers’ Examination Centre separately. During the meetings, experts observed the courses for traffic law violators in order to assess a work of lecturers and organizers. Large discrepancies in conditions of the courses between the Centres have been noted what indicates a necessity of standardization of the trainings on national level.

Each participant of the project received a feedback and had a possibility to discuss his or her strengths and weaknesses. Additionally, participants carried out a self-assessment by completing a questionnaire in which they highlighted a need for improving their professional abilities.

3. The test

The exam concerned knowledge from the field of traffic psychology, traffic law, education methodology, training organization and road safety system. Due to the geographic dispersion of participants, the test was designed to be Internet based, allowing users to access it in suitable time and place. Because of that requirement the test had to satisfy many conditions regarding technology and security.

3.1. Technology requirements

The test had to be suitable for use on slow (telephone or GSM/GPRS modem) and non-dependable connections (Internet in general and wireless in particular). It was designed so that the amount of downloaded content would be less than 600kB. During the test the amount of data to be downloaded was less than 20kB and uploaded data was less than 2kB. Because of the nature of wireless connections, both download of questions and uploading of answers had possibility of retransmission, and both were checked for corruption by the use of hash functions. Low amounts of data served additionally as a guarantee against unlikely event of server overload. Due to many possible client configurations, the only protocol used was HTTP to exclude problems related to firewalls and content filters. The authors received only one report of participant being unable to take the test and it was found to happen because of very restrictive security policy, blocking download of any application; the participant was able to take the test on a different machine.

The application itself was designed to be as simple as possible and self-explanatory, which was confirmed later by statistical data, described below. It had very low requirements on the host machine, both in the memory and processing power. The application has been made to adapt to screen size and resolution, e.g. for old monitors or small sub-notebook screens. Even though there was no disabled persons among the participants, questions and answers were shown in large high-contrast fonts, preventing problems stemming from bad vision or old and blurry CRT screens. Additionally, a minimum time of answering a question was set to two seconds to prevent double-clicking the "next question" button. No minimum time for a question was set during the correction phase, allowing for fast searching.

3.2. Security requirements

The test was made available only to people authorized by a disposable (one use only) logins, that were distributed beforehand to participants. After successful downloading of encrypted questions verified by hash-check of decoded content, the login was marked as used, preventing any further use. The participants were also checked during the test by the use of additional simple personal questions.

The server was also tested by the application against unlikely event of counterfeit by using nonce (random generated one-time value) question-response check. Due to large amount of time available to users and main application being downloadable, the test was secured using checksums, SHA-1 hashing and encrypting of all the data. No data in plain text were sent.

No personal data that could identify the participant was transmitted during the test, and no private data were kept on the server at any time.

3.3. The test

The test contained 50 main questions of multiple choice with 2 additional simple personal questions for verification reasons. Participants had 60 seconds for every main question, 20 seconds for verification question and 10 minutes of correction time, where they could recheck any and all main questions they wanted. User could advance to the next question at will, before 60 seconds passed. Question was considered to be answered correctly if all correct answers were selected and no wrong answers were selected. To pass the test, the participant had to answer correctly a minimum number of all questions and additionally a minimum number of questions from each of the five application fields.

Questions were automatically selected from a larger database divided into five application fields and 10 questions from each field were selected and presented in random order, mixing the questions from different fields. Due to the structure of some answers, it was decided to keep answers for a question always in the same order.

After completing the test and sending the answers to the server, the participant was shown the number of questions answered correctly, both total and from five application fields, along with the

information whether he or she passed the test or not. Out of 52 participants, 49 (94%) passed the test.

3.4. Feedback

During the test, statistical data were gathered for use in feedback-driven improvement of future tests of the kind. Information gathered were:

- date and time of the test, both from server and user points of view. It was found that in some cases user time (clock) was significantly different (two weeks) from the server time. Additionally, it was checked whether time of taking the exam made any visible difference on the results, both because of time of day (morning/evening) or communication between participants (whether later results were better than first ones). No dependences of the kind were found,
- answers selected by the user, both after the first phase and after the correction phase. While, of course, only the final answers were considered for passing the exam, it allowed for checking whether users changed their answers. It turned out that less than 2% of all answers were changed, and of these 50% were changed from wrong to correct, 22% were changed from correct to wrong and 28% were changed from wrong to wrong. Based on this information, usefulness of the correction phase is questionable,
- time used for each question, both during the main phase and correction phase. It allowed to check how much of the time per question was used on average during the main phase (21 s out of 60 s) and how much of the correction time was used on average (227 s out of 600 s).

3.5. Analysis

The data mentioned above allows for more complex analysis, too. The authors checked whether there was a relationship between time used for a question and correctness of the answers and found that, on average, correct answers took 23 s, while 32 s were used for wrong answers. The authors checked as well whether first question (s) presented to the users were more often wrong or took more time to complete and found no visible difference (Fig. 5), confirming that the simplistic application design was user-friendly indeed.

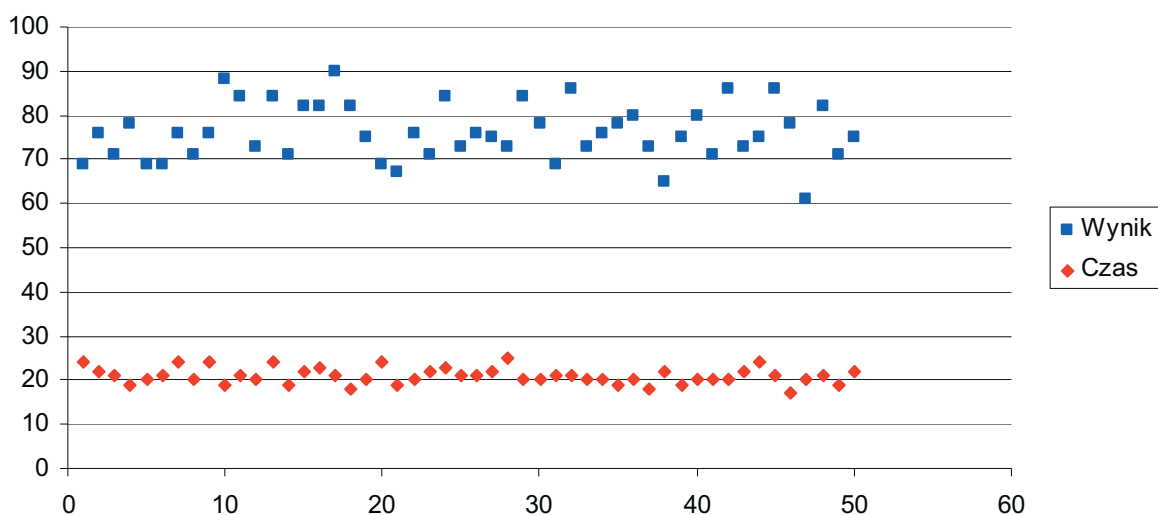


Fig. 5. Dependence of answering time and percent of correct answers on question number from user point of view

The most important part of the analysis is an automatic report concerning the difficulty of questions. The questions are sorted by percentage of correct answers, showing questions where

most mistakes were made; they suggest that either the problem was not emphasized enough during the training or the question itself is not phrased properly. Most time consuming questions are also listed, suggesting that users had to think more before answering them - this may mean that the question and/or answers are too long or too complicated. A list of the most difficult answers is also available, pointing not only to correct and not selected ones, but to wrong and selected ones, too; they may be badly phrased, confusing participants. Finally, for each question on the list there is a set of possible combinations of answers with percentage of answers given, showing whether the answers for the hardest questions were random at nature - suggesting lack of knowledge - or that users often chose one bad answer - suggesting a mistake in training or too confusing answer.

An important part of the analysis was checking for dependence of percent of correct answers on combined length of question and answers (Fig. 6), because before the test it was suggested that short, concise questions and answers are preferred due to being more precise and focusing on the subject. That assumption was found to be false. Most of the data show noticeable correlation between longer questions and better results, suggesting that longer memory context had big influence on answers. There was one obvious outlier, long and seemingly easy question about driver's motives that are obviously different from educator's motives, causing most test participants to select opposite answers, correct from their point of view. Trend line excluding the outlier is shown in grey. As the points form a few lines or groups on the graph, it was checked whether they belong to same or different fields, in other words, whether questions from one field were noticeably easier than others. This was found to be mostly false, as questions from different application fields, marked on Fig. 6 with different symbols, are mixed throughout the graph and in all groups and lines. However, law (triangles) and organisation (squares) fields had somewhat higher number of easy questions, and psychology (circles) had, on average, shorter questions.

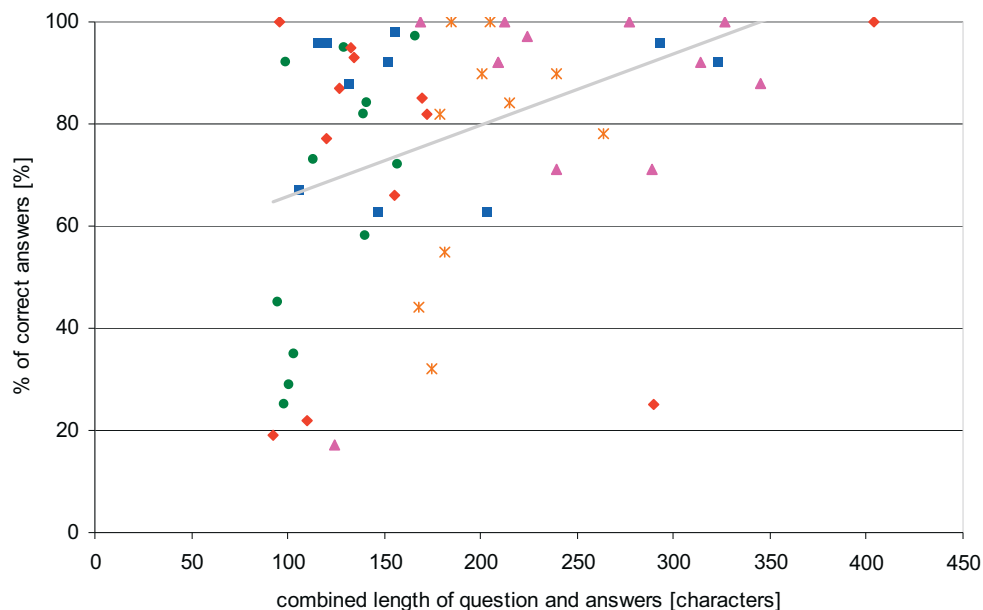


Fig. 6. Dependence of percent of correct answers on combined length of question and answers

4. Conclusion

Series of trainings displayed a necessity for an exchange of experiences of human resources responsible for a system of drivers' reeducation, as well as a need for the improvement of the system itself. Additionally, analysis confirms usefulness of network instruments in knowledge verification, especially in the presence of territorially dispersed participants of training courses.

Authors consider the following changes for the test when it will be conducted in the future:

- The correction phase will be most likely removed, as it turns out that changes increased the number of correct answers by less than 0.6%.
- Some questions and a few answers will be rephrased and expanded for clarity.

References

- [1] Regulation of the Minister of Internal Affairs of 20 December 2002 regarding proceedings towards drivers violating traffic law (Journal of Laws No. 236, item 1998).

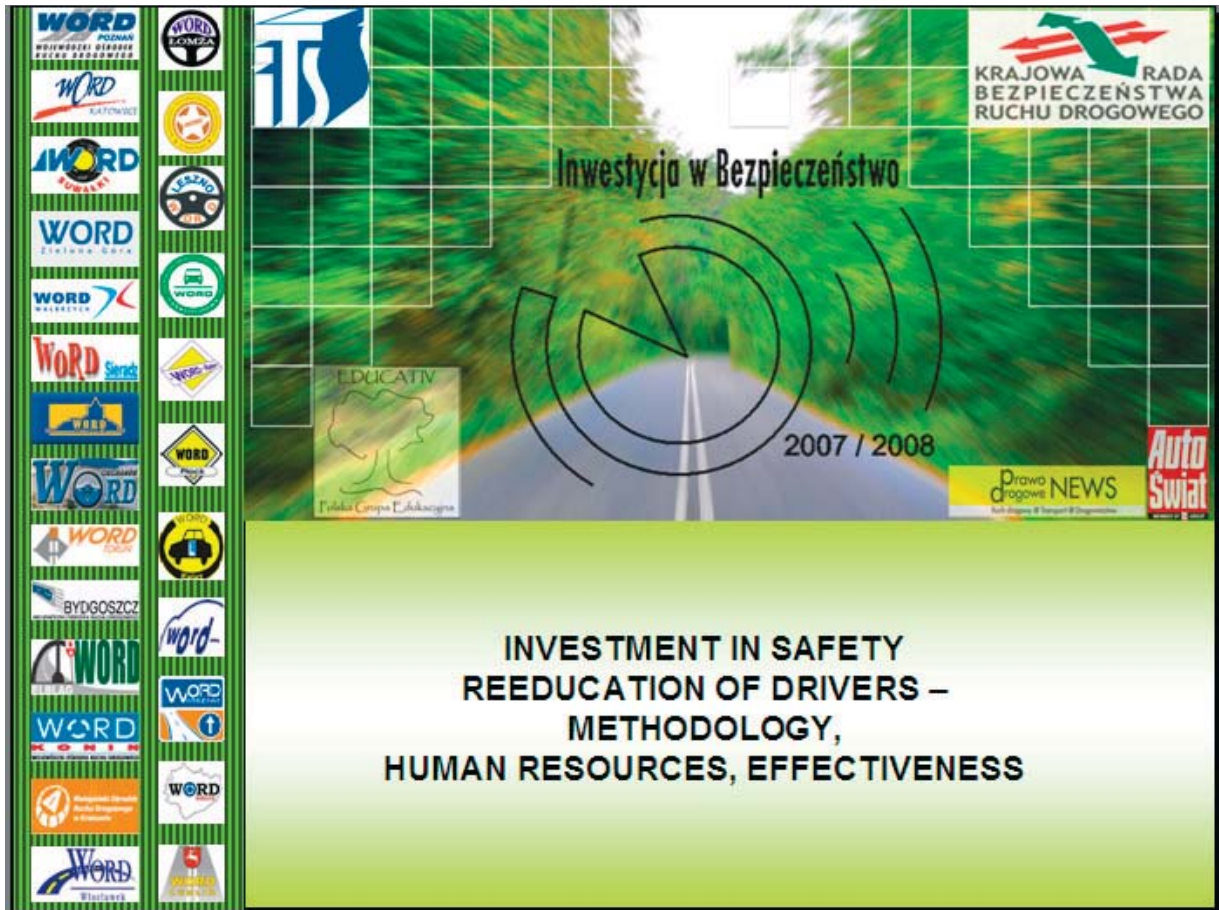


Fig. 7. Test web page graphics showing multiple organizations involved in the project

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