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REEDUCATION OF DRIVERS INVOLVED TRAFFIC ACCIDENTS WITH THEIR OWN FAULTS THROUGH WEB BASED DISTANCE EDUCATION

ABSTRACT

The aim of this study is to provide a framework to re-educate people participated in traffic accidents with their own faults. The aim of the framework is to eliminate the driver's faults by an internet based education as a result of measuring general knowledge of the drivers and re-instructing for their mistakes. In the beginning of the education, after the determination of the driver's faults who had an accident, those drivers were applied a first test prepared depending on the types of the faults and their general traffic knowledge. Then, the drivers were given training. Finally, they were asked to take a second test. The present study shows that while the mean score of success of the participants was 16.46 before the application of the instruction module, it became 30.02 after that.

Keywords: Distance Education, Drivers' Faults, Web Based Traffic Education, Driver Reeducation, After Traffic Accident

WEB TABANLI UZAKTAN EĞİTİM İLE TRAFİK KAZALARINA KUSURLARIYLA KARIŞMIŞ SÜRÜCÜLERİN YENİDEN EĞİTİMİ

ÖZET

Bu çalışmanın amacı, trafik kazalarına sürücü kusurları ile karışmış kişilerin yeniden eğitilmesini konu almaktadır. Özellikle kazalara birden fazla kez karışmış veya kural ihlali yapmış ve bu kazalarda/kural ihlallerinde "sürücü kusurları" ön planda yer alan sürücülerin belirlenmesi, bu sürücülerin genel trafik bilgilerinin ölçülmesi ve kusur yoğunluklarının ortaya konması sonucunda kusurların internet tabanlı eğitimle ortadan kaldırılması hedeflenmektedir. Çalışmada, uzaktan eğitim tabanlı gerçekleştirilen eğitim; nesne tabanlı programlama kullanılarak yazılan www.e-surucu.com internet adresinde 366 kişiden oluşan deneklere uygulanmıştır. Eğitim başlangıcında kusurlu trafik kazası geçirmiş sürücüler belirlendikten sonra, kusur türlerine ve genel trafik bilgisine göre hazırlanan ilk sınava girmişlerdir. İlk sınav sonrası sürücüler uzaktan eğitime tabi tutulmuş ve daha sonra hazırlanan ikinci sınava alınmışlardır. Bu çalışmada, bu sınav sonuçları temel alınarak elde edilen veriler ışığında değerlendirme yapılmıştır. Değerlendirmeler sonucunda kursiyerlerin ortalama başarı puanları eğitim modülü uygulaması öncesi ilk sınav için 16,46 iken, eğitim modülü uygulaması sonrası son sınav için 30,02 düzeyine çıkmıştır.

Anahtar Kelimeler: Uzaktan Eğitim, Sürücü Hataları, WEB Tabanlı Trafik Eğitimi, Sürücülerin Yeniden Eğitimi, Trafik Kazası Sonrası

1. INTRODUCTION (GİRİŞ)

In the present time, the basic factor making a human being different from another is the knowledge. The speed of gaining knowledge with the influence of technological developments has increased significantly. It is inevitable that knowledge has an impact on human and his surrounding either in a positive or a negative way. Application of knowledge and observation of its outcomes are expected to increase the effectiveness of knowledge much more. Therefore, it is necessary that knowledge should be kept renewed and fresh constantly.

One of the most significant factors affecting human life and his surrounding is traffic and traffic accidents. Since there are human faults at traffic accidents, there is a need for review and re-education in terms of knowledge and application concerning the issue. Making drivers involved in a traffic accident aware of the new facts and carrying out the traffic education once again with the most effective and fastest modern way of information technology appears as a necessity. Within the information technology, there is a convenience of using web based distance education through the internet, which is regarded as more common, higher in accessibility, faster, spending less time and easier to use. Distance education has eliminated all the limitations or the walls of conventional education. In other words, distance education offers the opportunity of learning for whoever wishes, wherever or whenever s/he wants [1].

The aim of the present study is to determine the drivers with remarkable driving faults, who were included in an accident more than ones, to measure general traffic knowledge of these drivers, and to eliminate these faults by the help of a web based education.

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)

In this work, a structure (A Web Site for the Education of the Drivers Who Involved Traffic Accidents Frequently Through Web Based Distance Education) providing the report, analysis, and evaluation of traffic accidents, and the instruction of the drivers involved in the accidents has been constructed with the help of computer technologies and distance education methods. All aspects of the relationship between the accidents and the data has been tried to be studied through this structure. The obtained data is re-evaluated after the employment of the web base distance education of the drivers involved in the accidents. The level of the success of the education has been determined.

The results obtained at the end of the present work show that the aim of the study, namely collecting the information after the accidents, analyzing these informations, re-educating the drivers, and reporting the data has been achieved successfully. It is believed based on the obtained results that with the help of the needed legal regulations and completion of the required technical tools, the proposed system can be applicable.

3. THEORETICAL BASIS (TEORİK TEMELLER)

The first of the two theoretical basis examined in the current study is web based distance education, while the second one is traffic accidents. The presence of distance education with the improvement of information technologies has been known for a long time. Scientists studying distance education have several common points for the definition of the term, while they have some discrepancies as well.

3.1. Distance Education (Uzaktan Eğitim)

The term "distance education" which was appeared for the first time in the 1892 Almanac of the University of Wisconsin, was used in

an article in 1906 by William Lighty who was the administrator of the same university. The term has gained a wide range of usage since 1960s [1].

Distance education is a form of education where the lecturer and the learner are distance from each other physically. Although the definition of distance education remains the same in present time, it has been performed in various ways. According to the latest definition by Constant Education Group of the University of Wisconsin, distance education is a planned learning and teaching experience using wide technological tools designed in a way that would enable student interacting, learning, and gaining a certificate by reaching a distance mass [1]. In another definition made by California Distance Education Institute, it is described as an education system realized by making connections with students and educational sources. It is highlighted that the facility of being able to offer an opportunity of education for those with no chance to register to any educational program is a situation increasing the opportunity granted to students in recent times [2]. Distance education consists of two basic parts, teaching involving teachers and learning involving students [3].

Besides its definition of "a planned way of education where students and teachers are brought together in various ways in a virtual class environment with the help of technological facilities without a need for a teacher physically to be in the place where students are", distance education can also be defined in a short mode as "a formal way of learning realized at a situation where learner and lecturer are at distance places from each other" [4]. Web Based Distance Education, is an interface that builds a contact between student and instructor by writing, picture, sound, active real image, simulation and animation documents, using internet and computer devices [5].

The history of Web Based Distance Education dates back very earlier times depending on development of the Internet. In the last decade, it has increased much both in Turkey and in the world. Distance education in Turkey started as education through letters in 1961 and became more common in the field of official and widespread educational level of General Directorate in 1966. The Higher Education Center of Education through Letters was established in 1974. The center was replaced by Widespread Higher Education Institution. While School Radio and TV School serving under the Ministry of Education were supporting formal education in 1980s and 1990s, they offered an opportunity of informal education for whoever desired. The institutions working within the General Directorate of Educational Technologies that teach individuals from a variety of ages using distance educational techniques are; Open High School founded in 1992 and offering a diploma of secondary education, Open Primary School founded in 1997 and starting its education in 1998 and teaching from 6^{th} to 8^{th} grade students intending to get a diploma of primary education, and Vocational and Technical Open School offering the certificate of electricity installation.

An Open Faculty has been established in the Anadolu University with the 2547 Higher Education Law which has been put into rule in 1983. E-learning services and open education in the Anadolu University system were initiated in 1994 in order to provide the students of Economics and Open Education Faculty to be able to study interactively with computers, television and books they have. Electronic learning series, which provide students to study on the Internet whenever and wherever they want, have been presented in the name of e-learning portal. Distance education applications on the Internet for the whole country started in 1996 with a pioneering role of the Informatics

Institute of Middle East Technical University and National Committee of Informatics founded in 1999. Some internet based certificate, graduation or post graduation educational programs have been carried out at various universities.

One of the basic reasons increasing the need for the Internet Technologies (IT) Based Distance Education is the limitations of traditional educational methods. Some of these limitations are; large classes, insufficient number of teachers, inflexible education times, physical space problems, and lack of educational technologies. In addition, the IT Based Distance Education alternative is primarily an opportunity for those having no chance for traditional university education, yet it has the features supporting life long learning philosophy [6, 7].

3.2. Traffic Accidents and Driver's Education (Trafik Kazaları ve Sürücülerin Eğitim)

Behaviors and actions of pedestrians, animals and vehicles on the motorway are called "traffic". The one managing and/or driving a vehicle with or without a motor on a road is called "driver". A Traffic accident is a case where one or more vehicles that are moving on the motorway include and resulting in death, injury and/or harm [8]. Even though there is no common definition for the term "Driver's Reeducation", depending on the purpose of the current study, it could be defined as the reinstruction of drivers involved in traffic accidents on certain topics or on general driving issues.

Traffic accidents occurring throughout the world result in more than a million deaths and injuries in a year. Pedestrians, those driving vehicles without a motor and motorcycle riders are the majority causing deaths and injuries in the countries with low and moderate income levels. On the other hand, for the developed countries elderly people, children and the handicapped are subject to traffic accidents in particular [9].

Besides many problems causing traffic accidents, road security is not taken enough attention both at national and international scale. The other problems related to traffic accidents can be listed as the lack of general awareness and sensibility, the high cost of health problems, economical and social issues, and precautions to prevent accidents and/or to diminish the harm and injuries which are all not well known and not well studied yet [9].

With 90% load of traffic problems on the countries with low and moderate income levels, death toll is also increasing rapidly in these countries. Although the data about the cost of traffic accidents are limited, it is clear that their economical outcomes for individuals, families, communities and countries are quite much. The loss appearing due to traffic accidents could reach to 2% of GDP of countries [10]. In recent years, even though the number of traffic accidents decreased thanks to the efforts in developed countries, they are still regarded as one of the most significant public health problems in developing countries. The number of traffic accidents and death and injury in developing countries is increasing day by day [11].

Approximately 50.000 people die and one and a half are injured every year on the motorways within European Union. Following the Treaty of Rome, about 2 million people died and some 40 million people were injured in 12 member countries (up to 1995). Traffic accidents bring about dramatic results in terms of human values. However, economical dimensions of traffic accidents are also important. These losses within the union are thought to be 70.000 ECUS (1ECU=1.3 USD). Depending on the method used in these predictions, the values are between 45.000 and 90.000 ECUS [12].

According to the estimations of World Bank, 350.000 people die at automobile accidents in developing countries every year. 3.601 people were documented to have been killed at traffic accidents in Canada in 1993 and it means an increase of 2.9% compared to 1992. Yet, this figure is 3.2% less than the average of the last three years.

There is a 4E rule adopted throughout the world in order to prevent and reduce traffic accidents. These are;

- Education
- Engineering
- Enforcement
- Emergency and First Aid [13].

The fact that these rules cannot be fulfilled well enough in Turkey is thought to have an effect on the occurrence of traffic accidents. When we have a look at the statistics of traffic accidents in Turkey, it was determined that there became 4.199 deaths and 24.608 injuries at 36.914 accidents in 1980 and the physical harm due to these accidents were 26.975.551 USD, while 3.802 people died and 109.681 were injured at 494.851 accidents in the year 2004 with a physical harm of 485.008.796 USD. The number of traffic accidents increased parallel with the increase in population and number of vehicles in Turkey. The highest death toll in the statistics was in 1987 as 7530 deaths [14]. When we compare the statistics between the years 2000 and 2007, it is revealed that there is an increase of 50% at the numbers of accidents. Although there is a relative decrease in the number of accidents with a death, the increase in the number of accidents with injury and physical harm is at a level that has a negative impact on the economy of the country.

Depending on the types of traffic accidents in 2007, 26.609 accidents occurred due to crashing on the sides or head to head, 12.203 occurred as crashing into a pedestrian, 17.352 happened as driving out of the road. 17.352 accidents of crashing into a pedestrian show that a pedestrian could be involved in an accident any time even if he/she does not drive in the traffic [15].

As for the current position of traffic education in Turkey, the most important reason why there is a trouble at the solution of transportation in the country is the lack of educated and specialist human resource. The gap of education starting from primary school up to higher education is tried to eliminate with the efforts of media. However, the programs prepared mostly aim at correcting the behaviors of drivers within traffic. It shows that transportation is only related to traffic in the country [16].

The social, cultural and legislative reasons of traffic accidents have increasing risks in Turkey. The main parameters determining the occurrence of the accidents are the surrounding of transportation, infrastructure of the motorway, traffic management, its supervision and practice, vehicle and traffic conditions, the behaviors of those using the road (driver – pedestrian – passenger) and environmental conditions. Of the function determining the risk following the crash are assistant services after the accident [17]. Concerning the elements leading to traffic accidents, drivers, pedestrians, vehicles, road and road faults are of crucial importance. Of these elements, driver's fault is 98.18% for the year 2007. Such a result reveals the need to pay serious attention on driver's faults.

The reasons and types of driver's faults having an effect on almost all the traffic accidents were examined by the General Directorate of Security in detail and they were recorded within accident reports and statistics. Driver's faults were divided into two basic categories and issued in 2007.

There is no detailed legislation in Turkey concerning the reeducation of drivers who were involved in traffic accidents. In many countries of European Union, drivers are required to have extra traffic education when their traffic scores reach a certain criteria depending on the variety and the importance of faults they committed. At the end of the present study, a scheme is recommended for the reeducation of drivers having a fault in a traffic accident in Turkey.

4. METHOD AND APPLICATION (METOT VE UYGULAMA)

The data for the people participated in traffic accidents with their own faults was evaluated in this study by supposing that it has been taken from the General Directorate of Security, the Presidency of Traffic Education and Investigation Department. Depending on the results obtained by the evaluation, an education was given to the related people through the method of Web Based Distance Education. The activities such as preparing a web page, getting a domain name for this page and hiring a space from a host firm were carried out for this study.

No concern of population and sampling was carried out in the study. Therefore, only descriptive statistics was thought to be enough. As descriptive studies are the ones trying to determine the things as they are and not trying to find differences and relations, they have no arrangements peculiar to them. Depending on the nature of the study, some scales and some records were used as well. A subject group was formed for the study consisting of academic and administrative personnel of Gazi University and their relatives. Of the formed subject group of 366 people, 153 were men while 213 were women. 190 people of the group were teachers, 56 were academicians, 17 were officials, 12 were informatics specialists and other 91 people were from other professions. Educational status of the subject group is as the following; 328 are graduated from a university, 14 have a post graduate degree, 21 have graduated from a high school and 3 are graduates of a primary school. While 293 people have B type driving license in the subject group, 73 have another type of driving licenses [18].

Only those being able to use the Internet were included in the study. Each of the participants was randomly asked 50 questions from the data base formed for the present study where 10 of those questions were related to their faults. In order to be able apply Web Based Distance Education, a web site named Web Based Distance Education Site for the drivers involved in a traffic accident is constructed for the current study. The web site was written in the programming language of C#.Net-ASP.Net on the platform of Microsoft Visual Studio NET 2008 using Microsoft SQL Server 2005 and Microsoft Net Framework 3.5 working under Microsoft Windows 2003. The object oriented programming architecture was used. The domain name www.e-surucu.com was bought and it started its service by hiring a space from the firm Met-Ay Bilişim Ltd. Şti. The page was offered for the use of 97 seniors of Teaching Primary School Mathematics majors of the Gazi University Education Faculty and a positive feedback was obtained over the structure and workability of the page.

The flow chart showing the process of directing people involved in a traffic accident in the last two years and the structure between the occurrence of the accident and transforming it into the data base where the records of the accidents are hold is given in the Figure 1.1.

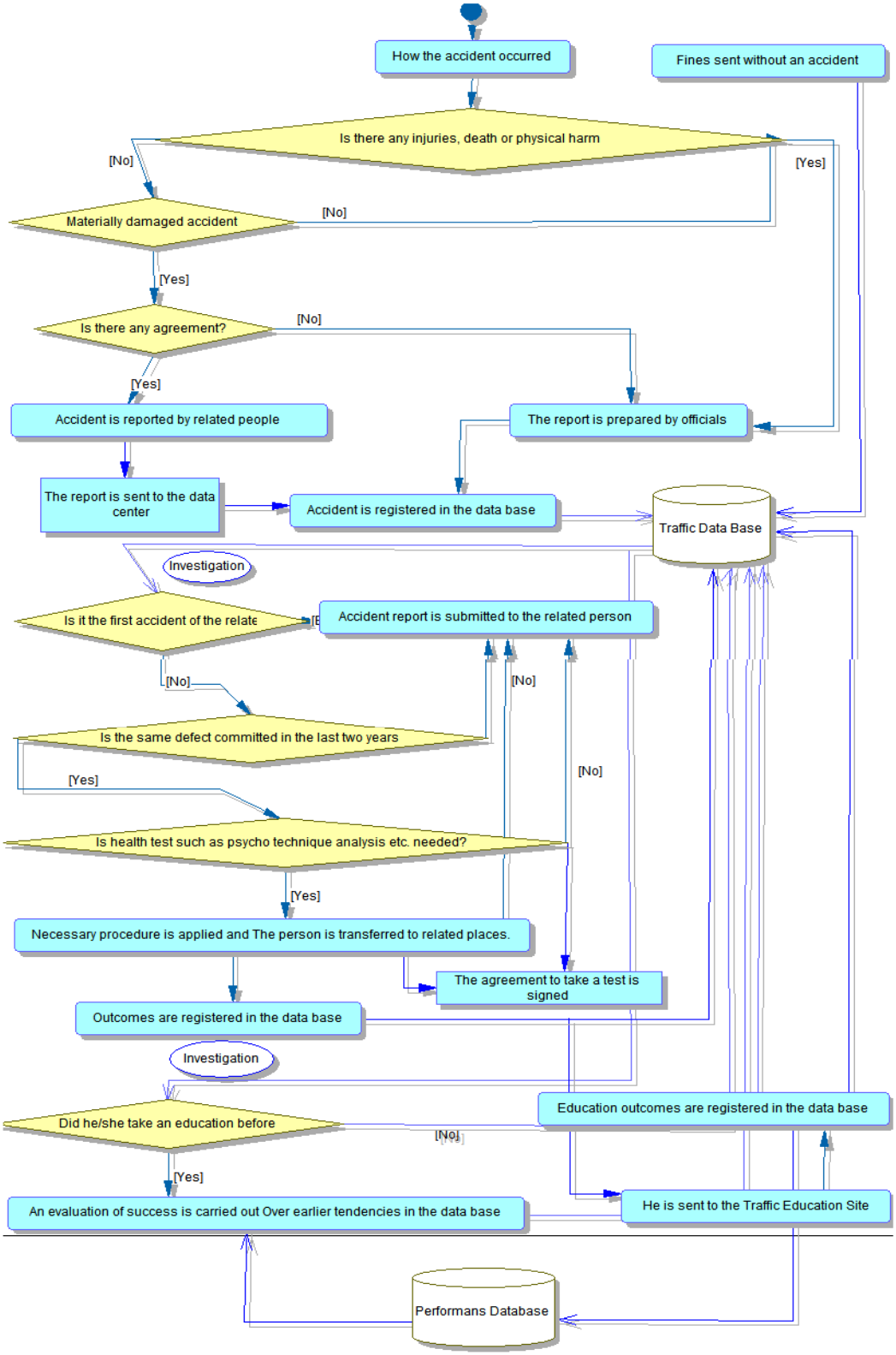

Figure 1.1. Process algorithm from the accident to database
(Şekil 1.1 Kazadan veritabanınan işlem algoritması)

The process starts with the occurrence of an accident or a fault without an accident. If the case starts with an accident, what is examined first is whether the accident has a physical harm or not, or whether there is an injury, death or harm for the public property. If there is physical harm at the accident, it is tried to find out whether there is an agreement between the individuals. In the case of no agreement, the police team is called and a report is made to prepare and the report is submitted to the traffic office by the officer. The related person records the data as an input into the traffic data base. In the case of an agreement, the report is prepared by the drivers. This report is submitted to the Information Center for Traffic Insurances (TRAMER). TRAMER sends the report data to the traffic data base. If there is an injury or a death or harm for the public property, the police team is called and is made to prepare a report and the report is submitted to the traffic office by the officer. The related person records the data as an input into the traffic data base.

The process of the fines sent without an accident starts with the delivery of the report to the address in the cases where the driver does not have an accident but has a fault in the traffic (for example, not obeying the red light by the driver). The data in the report sent to the driver is registered in the traffic data base synchronously.

The data recorded in the traffic data base after the occurrence of an accident or a fault is questioned according to the information given by the individuals. The investigation is carried out in three stages. In the first one; the officer preparing the report investigates the information belonging to the driver by connecting to traffic data base with distance access technology GPRS (General Packet Radio Service), 3G etc. with a hand terminal. In this investigation, whether the driver had an accident in the last two years with a similar fault is examined. If not, the report of the accident is submitted to the driver. If yes, the report is again given to the driver by asking him to sign the agreement for the education in order to give him general traffic reinstruction. The data is also registered into the traffic data base by the officer. If the accident fault requires such health tests as psycho technical analysis, the procedure is applied to the driver and transferred to the related places. The transfer data of the driver and the results of the evaluation at the institution where he is transferred by the institution are registered into traffic data base by the officers.

In the second one; the traffic data base is questioned periodically and the drivers having two similar traffic faults without an accident are called for education. The education given to the drivers in the Web Based Distance Traffic Education Site and the outcome information are sent to the traffic data base in certain time intervals by the administrators of the site. The officers preparing reports for the traffic data base make the data got from TRAMER and Web Based Distance Traffic Education Site available for the investigations and statistical analyses.

In the third case; the drivers sent to education through investigations made in certain intervals within traffic data base are examined over whether he/she was given an education before due to a similar or a different fault. In this past investigation, the feedbacks of the drivers having the education are determined. The results show the performance of the system. If the number of the users coming back to the system in spite of the fact that they have already had an education is high, then the performance of the system is low. Therefore, the real success of the system is not the last test taken

after the first education, but the feedbacks in the investigations showing the performance of the education. The fact that the number of the ones having a first education in the system is low could lead us to the result that the education given on the Web Based Distance Traffic Education Site reached the aimed goal.

When the people having an access to the Web Based Distance Traffic Education Site for the drivers included in an accident by the address http://www.e-surucu.com would like to participate in the study by registering the system, they will find the explanation how to use the site on the home page. How they will use the site is explained clearly in the directions. As the site works systematically, the module the user is in should be completed in order to pass from one to the next module.

The data from which the study is inspired was supposed to have been made up of the people included in traffic accidents with the same driver's faults in the last two years within the light of the data obtained from the General Directorate of Security, the Presidency of Traffic Education and Investigation Department. However, in practice, the 366 people being a member of the web site completed the first and second test modules of the site between June and December of 2008 at the address www.e-surucu.com on the Internet. In order to be the member of the site and join to the study, one is required to have driving license and be included in a traffic accident with a driver's fault in the last two years.

5. RESULTS AND DISCUSSION (SONUÇLAR VE TARTIŞMA)

41.8% of the visitors of the site were men, while 58.2% were women. The majority (51.9%) of the trainees were teachers. If we include the academicians with a rate of 15.3%, there were a group of students at a rate of 67.2% in the field of general education. 89.6% of the students were graduates of a university. In addition, 80.1% of them have a driving license of type-B. Since this type is used for the vehicle group of automobiles, such a rate should be regarded as normal. 84.2% of the trainees have got their licenses in the last 10 years. When the dispersion of the accident faults is considered, the fault of crashing from the back is observed as the most committed fault with a rate of 23.2%. In the second rank, not obeying the priority of passage at the junctions takes place with a rate of 12.3%.

The first and last test arithmetical mean scores and standard deviations of the students included in the practice at the site where driver's education was carried out through the Method of Web Based Distance Education were given in the Chart 1.1. In the chart, the arithmetical means and standard deviation values with 10 questions dealing with the faults of accidents and general 40 questions were given separately. A significant difference was found in the favor of last test between the first test score means (3.71) and the last test score means (6.11) at the questions dealing with faults. For the first test, total mean scores in 50 questions were 16.46 while in the second one it is increased up to 30.02. The results show that the proposed reeducation of drivers involved in an accident improves the initial mean scores of the trainees up to 83%.

Table 1. First test-last test mean scores and standard deviations of the students
(Tablo 1. Kursiyerlerin ilk sınav-son sınav ortalama puan ve standart sapmaları)

First Test						Last Test					
Rel. Quest		Gen. Quest		Total		Rel. Quest		Gen. Quest		Total	
Mean	SDV	Mean	SDV	Mean	SDV	Mean	SDV	Mean	SDV	Mean	SDV
3,71	2,27	12,75	5,96	16,46	6,91	6,11	2,66	23,91	4,97	30,02	6,29

6. CONCLUSIONS (SONUÇLAR)

The conclusions derived as the results of the current study are summed up below:

- The success rate of the students included in the practice at the site of the Education of the Drivers Participated More Than One Traffic Accident through Web Based Distance Education is increased for 10 questions dealing with their faults from a mean of 3,71 for the first test to a mean of 6,11 for the last test.
- Total success rates of the students increased from a mean of 16,46 for the first test to a mean of 30,02 for the last test. This difference can be considered as an indicator of the success of the education module at the site of Driver's Education through the Method of Web Based Distance Education.
- In the study of the Reeducation of the Drivers Included in More Than One Traffic Accident through Web Based Distance Education, it was found that the success and knowledge of the students can be increased.
- As a result of the findings obtained at the end of the study, the following recommendations concerning the related issues and future studies can be listed:
- In order to apply the method to a large extent and in a qualitative way, more studies on the preparation of such web sites providing distance education for drivers should be carried out.
- A commonly accepted definition of "driver's reeducation" is needed.
- Data collection studies should be carried out by the related institutions and departments cooperatively.
- A method of calling the determined target group to the reeducation should be clarified.
- The tests and reeducation of the target mass need assistance from universities and related or authoritative institutions.
- Coordination between the related institutions and departments should be constructed by necessary legislative protocols.
- The public should be informed about the opportunities, means and obligations of the web based distance traffic reeducation through the mass media.

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