



English Language Knowledge Influencing the Choice of Mobility Mode When Abroad: A Case Study

Irena Ištoka Otković*, Aleksandra Deluka-Tibljaš, Lidija Kraljević, Anamarija Štefić

Abstract: According to some previous researches the English language knowledge, turned out to be important, both in professional and private life of adult population, including students, from the Republic of Croatia. This paper presents a study of the influence of knowledge and application of the English language on the choice of students' mobility mode during their stay in foreign cities. The research is based on a survey of students studying civil engineering and architecture from two Croatian towns - Osijek and Rijeka. The survey included a total of 221 students from both towns, and based on the created databases, a prediction model of the choice of mobility modality was developed (based on the data gathered from the students from Osijek), which was validated (based on the data gathered from the students from Rijeka). The mobility modality prediction model was developed using a neural network and with 27 input parameters related to the knowledge and use of the English language, it achieved a correlation of 77% (R^2 0.57, MAE 0.16), and the validation results gave a correlation of 63% (R^2 0.39, MAE 0.18). The influence of certain input parameters on the choice of mobility modality of students in foreign cities was analyzed by applying statistical tools in each urban area separately. The main limitation concerns both the sample size and the unequal distribution of respondents between the two cities, which should be taken into account when interpreting the comparison.

Keywords: choice of mobility mode; English language; foreign cities; neural network; students

1 INTRODUCTION

Sustainable mobility has become the goal of contemporary transport policy as cities strive to reduce emissions, improve public health, and create more livable urban environments. This shift encourages a transition toward multimodal networks that support cycling and walking both domestically and abroad [1, 2], a process that relies on a well-informed public capable of understanding key mobility concepts. As sustainable mobility becomes increasingly international, basic English proficiency enables users to interpret transport information accurately and make consistent, environmentally responsible choices of urban mobility modes.

The research conducted in 2003 showed that English is the most important foreign language in private and professional life of the adult population in Croatia [3]. In the research, the term personal life referred to everything related to home, family, free time, internet, etc. whereas the term professional life applied to the requirements of the profession - workplace and studying as a profession. In this research [3], from the total sample of 388 participants, there was 22.4% of students. In 2007, the same group of authors completed the research with a targeted survey of 250 students of the University of Zagreb, through which they wanted to determine in more detail whether and for what purposes students needed the English language [4].

In both studies, a great proportion of students pointed out that they needed the English language - in the 2007 survey, even 99.2% of the surveyed students stated the same. The most frequent situation in which students needed English was when they were using the Internet, followed by when they were watching movies and giving information to foreigners. Traveling was listed as the 12th out of 87 offered situations where they needed English language proficiency and traffic as the 63rd one. The overall author's conclusion was that students considered English indispensable not only for studying, but also, even significantly more so, in their private lives.

Sustainable mobility has become the goal of the transport system development since the release of the Green paper in 1992 [5]. Promoting sustainable mobility is the key objective in transport policies across all government levels. Today, any plan, project, or policy related to the transport sector, invariably includes the concept of sustainable mobility. Sustainable aspects of urban mobility promote environmentally acceptable modes of mobility such as walking and cycling, as individual forms of movement that, in addition to positive social goals, also have beneficial health impacts. An important factor of achieving results in changing the movement mode is investing in the efficient public city transport, which, as it turns out, plays a key role in reducing greenhouse gas emissions [6].

Knowing the spatial features of the urban transport network and different options of mobility modes is considered a prerequisite for choosing adequate mobility modalities, according to the results of some earlier researches [7]. When considering tourists as users of the transport system (analyzed in more detail in the next chapter), these researches focused on determining the legality of tourists' movement towards destinations, as well as on factors influencing the choice of movement mode in the destination area - inside or outside the urban area [1, 2, 8-13]. One of the factors that was found to affect the choice of movement mode was the tourist age - younger tourists and students, as a special group of younger tourists, displayed a greater tendency to use public city transport and to cycle and walk [1, 2].

This paper investigates the extent to which students' English language proficiency influences their choice of mobility modes in foreign cities. The scientific hypothesis of the study is that English language knowledge has an impact on the selection of urban mobility modes when navigating unfamiliar environments abroad. The research was conducted using a survey among civil engineering and architecture students from Osijek and Rijeka, yielding a total sample of 221 respondents. The analysis examined how English language skills affect students' ability to navigate

urban traffic systems and their subsequent mobility choices. Survey results from the two cities were compared, and a neural-network-based prediction model of mobility mode choice was developed. The model was trained on data collected in Osijek and validated on an independent dataset from Rijeka, enabling the identification of key parameters that shape students' mobility behaviour in foreign urban settings.

2 RESEARCH REVIEW

The topic of the way tourists move when arriving at a specific destination and in the area of a tourist destination itself, is in the focus of a series of studies and researches all over Europe and the world.

The project co-financed by the EU civitas destinations tested during the period of 4 years, 83 different mobility modes on the 6 European islands, addressing mutual empowerment aspects of tourism and mobility with the focus on positive and negative interactions at the city level. The 3 clusters analyzed in the Project were: shared mobility and walking, clean vehicles and public transport for all of which a series of measures and indicators were defined. The main conclusions, regarding traffic development, were: that it was necessary to systematically monitor data on the mobility of tourists, that tourists liked to explore destinations on foot, and that transport was an important part of the touristic experience [8]. Researches of the impact of traffic on the sustainable development of tourist destinations conducted for the Tyrol area showed that in such a natural environment, 40–60% of the environmental load linked to tourism were caused by transport of tourists between their homes and their destinations, as well as by local transport within the destination area.

Several studies were published on the topic related to the traffic generated by tourism in Norway [9], that is, by the traffic habits of individual tourists [10]. Tourism - leisure mobility was detected as a strong generator of movement, and action plans that would influence the reduction of the use of cars and airplanes were defined as an important factor of sustainable development in general.

Researches on the use of transport modes during a tourist stay have recently been motivated by a large increase in tourist movements, which create additional pressure on existing transport systems and have negative environmental impacts to cities.

Authors Mahdi et al. [11] developed models to predict the probability of using different means of transportation for leisure purposes based on travelers' and journey features. It turned out that the sociodemographic characteristics of users influenced the choice of a mobility mode. Younger people and men had, according to this Budapest research, a greater affinity towards using bicycles, while women showed a greater interest in walking. It also turned out that public transport was used more often by families with more than 2 members and those with a lower financial status.

The developed transport mode choice Binary logit model revealed that the key factors influencing the choice of a mobility mode, in the case of tourists in Beijing, were the scope of travel, time of visit, daily consumption, age, private vehicle possession, and type of tourist attractions [12].

The study conducted on Malta based on the semi-structured in-depth interviews with tourists provided insight for the need to better understand the influence of tourists' attitudes towards a bus service in the host country [13]. The factors that were defined, by the visitors, tourists and those staying on Malta for educational reasons, as important for quality bus service were: time (punctuality), information (accuracy), bus drivers (behavior), fare, fleet and environmental impact.

The analysis of the existing research presented in the paper [1] detected some specific socio-demographic characteristics of tourists that had an impact on the individual's choice of city means of transportation. It turned out that younger tourists showed a greater affinity towards the use of public transport and, generally, sustainable forms of mobility. However, the influence of gender on the choice of the mobility mode was not unequivocal, but that did not appear to be significant among the younger population (students). The home countries of tourists, their level of education, income and possession of a driver's license were also analyzed in the research as potential influencing factors on the use of public transport, though the influence of these parameters was not unambiguously proven. The influence of language proficiency, which was analyzed in a smaller number of studies, unequivocally showed that language knowledge affected the choice of public means of transportation in a tourist destination - individuals who were not proficient in local language seemed to be less inclined to utilize public transportation [1].

Assuming that environmentally friendly transportation for visitors is the pre-condition for creating a sustainable tourist destination, the authors Zamparini et al. [2] conducted a study with the aim of identifying the determinants of green mobility choices made by young adults during their vacation. The survey was conducted on a sample of 979 students from Italy and Spain. The results of this research showed that, when it came to green mobility modes, there was a high correlation between the students' patterns of traffic behavior when they were at home and the way they behaved at a tourist destination. It turned out that those respondents who arrived at the destination by their own cars, used their private vehicles to move around, as well as that the willingness to use green forms of mobility largely depended on how tourist attractions and destinations were interconnected.

The adjustment of transport choices during international temporary relocations of students and researchers was also studied during the last decade due to its ever-increasing relevance. It is expected, among other things, that in the period of 2021-2027, 10 million students and teachers will be using ERASMUS+ mobility and stay temporarily outside their place of study/work for a duration of one week to a year [14]. A survey-based study by Monteiro et al [15] focused on frequency of use of public transport and satisfaction with it. The model showed that public transport in the city where the respondents were temporarily staying was used more by those students and researchers who usually used it in their home city and that the use of public transport depended on where they were located in the host city. It also turned out that the higher the level of perception that the use of public transport technology facilitates movement, the more often they used it.

The analysis of the existing research shows that the use of a certain form of mobility, including green forms of mobility (walking, cycling, public transport) is usually linked with the mode of movement that tourists choose in their home places and with the interconnection of certain tourist attractions with a particular form of transport. The influence of tourist sociodemographic features is also significant, among which the tourist age stands out.

Knowledge of language as a predictor of the choice of mobility mode in a tourist destination has not been investigated in detail yet, although existing available researches show that it does influence the choice of travel mode (individual/in a group) and use of public transport in the tourist destination.

The student population, made up of younger age groups, is more inclined to use public transport and generally sustainable forms of mobility but the question arises as to how much the English language knowledge, as a prerequisite for understanding how these mobility modes function, influences their choices.

3 METHODOLOGY

The research, based on the results of the survey of civil engineering and architecture students from two towns in Croatia, Osijek and Rijeka, focused on the extent to which knowledge of the English language benefits them in choosing a mobility modality in foreign cities. The basic methodological research steps are shown in Fig. 1.

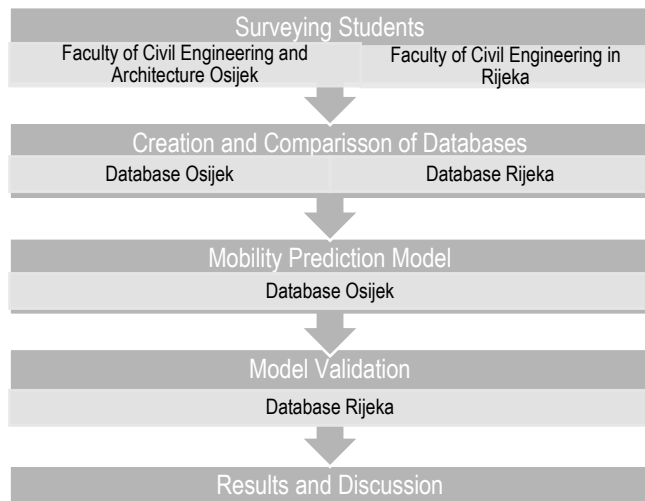


Figure 1 Scheme of basic methodological steps

The towns of Rijeka and Osijek are very similar in terms of number of inhabitants, but very different in terms of population density, which is in Rijeka, according to GeoStat data for 2021 [16], the highest in Croatia with 25 inhabitants/hectare, compared with Osijek, which has 5,5 inhabitants/hectare. This difference conditions the way their urban space and the transport system were developed. In Osijek, when talking about green modes of mobility, in addition to public city transport, the conditions for bicycle traffic are also being developed, so that students of the Faculty of Civil Engineering and Architecture Osijek regularly use bicycles in daily traffic. Rijeka is a town located

on topographically very unfavorable terrain with a high density of content, which consequently results (when talking about green mobility modes) in a higher proportion of walking daily trips and an almost complete absence of the use of bicycles in city traffic. Previous researches of the authors showed a significant difference in the drivers' behavior [17] and the behavior of child pedestrians [18], so that a difference in the choice of mobility had also been expected.

Since the analysis of the existing research showed that the choice of mobility in foreign cities is influenced by mobility habits acquired in the domicile environment, the survey focused on the analysis of this important aspect.

3.1 Survey

The student survey was conducted online, while the instructions to the surveyed students were partly given in direct communication with different groups of students. The survey was voluntary and anonymous, and the participants were explained the procedure of the survey and the goal of the research, noting that the results will be analyzed and presented cumulatively and statistically. All surveyed students were of legal age and gave their consent for the survey.

The structure and content of the questionnaire is shown in Tab. 1.

Table 1 Structure and content of the survey questionnaire

| | | | |
|--|-----|--|---------------------|
| Demographic questions | I1 | Gender | text |
| | I2 | Age | Multiple choice |
| | | Birthplace | text |
| | | Faculty | text |
| | | University | text |
| Self-evaluation of the English language knowledge | I3 | Knowledge of English language | Evaluation from 1-5 |
| Number of visited (foreign) cities/towns | I4 | up to 3 4-6 7-10 more than 10 | Multiple choice |
| English language use | | Choosing a travel destination Selection of accommodation Travel planning Planning activities during the stay abroad | Multiple choice |
| Use of the English language in spatial orientation | I5 | Spatial orientation | Evaluation from 1-4 |
| | I6 | Finding desired urban content | |
| | I7 | Tour planning and its realization | |
| | I8 | Pedestrian orientation | |
| | I9 | Bicycle orientation | |
| Use of the English language in public transportation | I10 | Direction recognition | Evaluation from 1-4 |
| | I11 | Finding the right type of public transport | |
| | I12 | Finding a suitable line in public transport | |
| | I13 | Purchase of public transport tickets | |
| Use of the English language when driving a car | | Direction recognition Finding a suitable road route Finding the target destination Connecting different locations Finding a parking lot Parking ticket purchase | Evaluation from 1-4 |

| | | | |
|--|-----|--|---------------------|
| Use of the English language for network applications | I14 | for car driving | Evaluation from 1-4 |
| | I15 | for public transportation | |
| | I16 | for cycling for walking | |
| Use of English language in direct communication | I17 | with passers-by on the street | Evaluation from 1-4 |
| | I18 | with passengers in public transportation | |
| | I19 | with people who rent cars, bikes, scooters, etc. | |
| | I20 | with restaurant or hotel staff | |
| | I21 | with tourist guides | |
| Factors influencing the experience of a foreign city | I22 | with taxi drivers | Evaluation from 1-4 |
| | I23 | with other people in other situations | |
| | I24 | Direct communication with residents | |
| | I25 | Traffic orientation | |
| Choice of mobility modality in foreign cities/towns | I26 | Attractive public areas for pedestrians | Evaluation from 1-4 |
| | I27 | Spatial orientation | |
| | O | Perception of pedestrian safety | |
| Choice of mobility modality in foreign cities/towns | O | Car (as a driver) | Multiple choice |
| | | Car (as a passenger) | |
| | | Public transportation | |
| | | Bike / e-bike | |
| | | Scooter / e-scooter | |
| | | Walking | |
| | | Other: specify | |

3.2 Databases

Based on the respondents' answers, two databases were created to analyze and compare the mobility mode choices of students abroad coming from two similarly sized urban environments that differ in their spatial and traffic characteristics: the cities of Osijek and Rijeka.

All input influencing variables were categorical (I1-I27), as was the dependent variable (*O*) – the choice of mobility mode in foreign cities, with an emphasis on the choice of green forms of mobility. In this study, public transport is considered “green” due to its lower emissions and energy consumption per passenger compared with private cars, as well as its contribution to reducing congestion and spatial pressure. The analysis shows [1, 6, 7, 12] that environmental friendliness has a positive but secondary influence on transport mode choice.

In this study the choice of mobility modality was a multiple choice with the possibility of multiple answers (Tab. 1), and when the database was created, it was converted into a categorical numerical variable. For respondents who only used a passenger car, either as drivers or passengers, the associated numerical value was 0. For respondents who used only green forms of mobility, which include walking, cycling, use of mobility scooters and public city transport, the numerical value was 1. For all the combinations of the use of a passenger car and green forms of mobility, the associated numerical value was 0.5. The decision to group the dependent variable into three categories enhances model robustness and enables an initial insight into the effect of each predictor, thereby providing a foundation for more sensitive modelling.

3.3 Prediction Model

A cascade-correlation neural network, using Neuroshell Predictor, was applied for creating the models. This network,

firstly introduced by Fahlman and Lebiere [19], is a supervised self-organizing network with a structure that is similar to backpropagation neural networks. The cascade-correlation network in NeuroShell Predictor is composed of three layers: the input layer, where the number of neurons (i_1, i_2, \dots, i_n) corresponds to the number of model input variables; the output layer with one output neuron (o_1) and hidden layer with the number of neurons increased during training. These neurons are linked by a connection, whose weight is adjustable, and by a bias, permanently set to +1 neuron in each new epoch of learning.

Prediction of mobility mode choice is an area of significant scientific interest [2, 11, 12]. The advantage of neural networks as a prediction model lies in their ability to accurately map non-linear relationships between input parameters and the dependent variable, as well as to identify the relative influence of each input parameter on the prediction outcome.

4 RESULTS

In Osijek, 162 students of the Faculty of Civil Engineering and Architecture were surveyed, and in Rijeka there were 59 surveyed students of the Faculty of Civil Engineering. There is a significant difference in the number of respondents between the two cities, so the comparison and analysis of the results should be interpreted within that context. Although a smaller number of respondents may reduce the reliability of the findings, the data can still serve as a valuable starting point for analyses and comparisons.

The question related to the place of birth was asked with the potential idea of analyzing the influence of urban and rural environments on the choice of mobility, but all the respondents in both databases came from smaller or larger urban environments.

The distribution of the respondents by gender, expressed in percentages, is shown in Fig. 2, and in both environments, it was similar, with a higher number of female respondents.

The age range (I2) of the surveyed students in Osijek was from 18 to 29 years, and in Rijeka it was slightly higher, from 18 to 32 years, which was also reflected in the average age of the respondents (Fig. 3). The graph in Fig. 3 shows the average ratings of all the variables, except for the distribution by gender, which is shown separately.

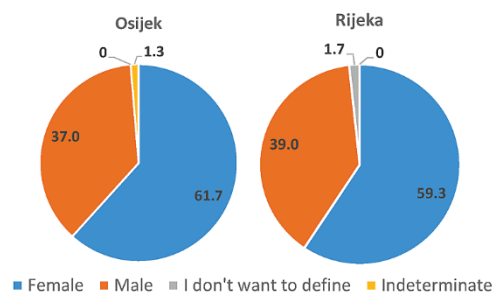


Figure 2 Distribution of respondents by gender

The average score of the self-evaluated English language knowledge (I3) was statistically not significantly different, students from Rijeka scored slightly better. There was a noticeable difference in the number of visited foreign cities

(14). Namely, the students from Rijeka visited, on average, a larger number of foreign cities (9 compared to 7 visited by the Osijek students). The students from Rijeka gave a lower score for the use of the English language to navigate cycling (I15) and the use of applications intended for cycling (I15), which was the expected result, because they choose cycling, as a form of mobility, less often, as visible from Fig. 4. According to the results of the survey, the students from Rijeka more often engaged in English conversation (I17-I22), as visible from Fig. 3.

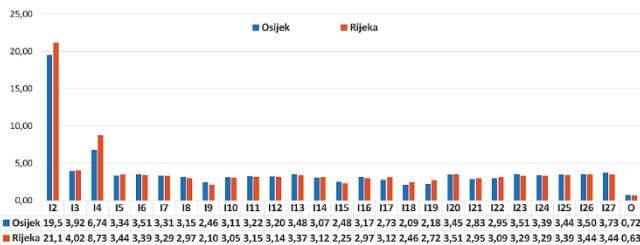


Figure 3 Comparison of average scores of individual parameters

The selection of green forms of mobility (O) is slightly higher among the students from Osijek, but that difference might have also been caused by the number of the respondents.

The comparison of the mobility choice between the students of the two towns is shown in percentages in the graph in Fig. 4. Each respondent could have chosen more than one answer.

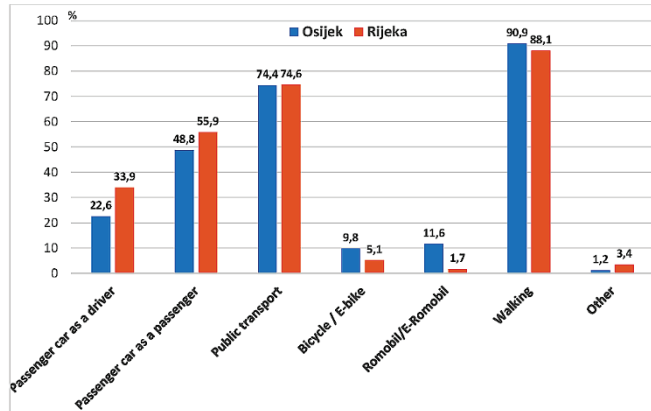


Figure 4 Comparison of mobility modality selection

4.1 Osijek and Rijeka Database

The results of the descriptive statistics for the dependent variable (O), which is the choice of mobility modality for both databases, are presented in Tab. 2.

Table 2 Basic statistical indicators

| | N | Mean | StDev | Median | Variance |
|--------|-----|--------|--------|--------|----------|
| Osijek | 162 | 0,7160 | 0,2780 | 0,5000 | 0,0768 |
| Rijeka | 59 | 0,6271 | 0,2876 | 0,5000 | 0,0813 |

All the variables are categorical, so the Spearman Rho statistical test was chosen to analyze the correlations between the input parameters and the dependent variable (Tab. 3). The

Spearman correlation does not require continuous-level data and works with monotonic relationships [20, 21].

Considering that these were preliminary analyses, a significance threshold of 0.1 was adopted. In bold, the table presents the results for the input parameters that showed correlation with the dependent variable according to the adopted significance threshold.

Table 3 Comparative analysis of correlations using the Spearman Rho test

| | | Osijek | | Rijeka | |
|---|-----|------------------|-----------------|--------|--------------|
| | | S-R [†] | p ^{**} | S-R | p |
| Gender | I1 | 0,014 | 0,856 | 0,117 | 0,379 |
| Age | I2 | -0,03 | 0,696 | 0,086 | 0,517 |
| Self-evaluation of the English language knowledge | I3 | 0,017 | 0,833 | 0,308 | 0,018 |
| Number of visited cities/towns | I4 | -0,04 | 0,595 | 0,101 | 0,445 |
| Spatial orientation | I5 | 0,005 | 0,953 | 0,237 | 0,074 |
| Finding desired urban contents | I6 | 0,007 | 0,928 | 0,044 | 0,739 |
| Tour planning and its realization | I7 | 0,031 | 0,674 | 0,011 | 0,933 |
| Pedestrian orientation | I8 | 0,017 | 0,826 | 0,012 | 0,931 |
| Bicycle orientation | I9 | -0,02 | 0,817 | 0,044 | 0,743 |
| Direction recognition in public transportation | I10 | 0,023 | 0,775 | 0,036 | 0,786 |
| Finding the right type of public transport | I11 | 0,055 | 0,491 | 0,018 | 0,891 |
| Finding a suitable line in public transport | I12 | 0,021 | 0,788 | 0,070 | 0,599 |
| Purchase of public transport tickets | I13 | 0,137 | 0,083 | 0,064 | 0,632 |
| Network applications for public transportation | I14 | 0,032 | 0,690 | 0,127 | 0,337 |
| Network applications for cycling | I15 | 0,021 | 0,790 | 0,145 | 0,272 |
| Network applications for walking | I16 | 0,106 | 0,149 | 0,051 | 0,699 |
| Communication with passers-by on the street | I17 | 0,031 | 0,696 | 0,018 | 0,895 |
| Communication with passengers in public transportation | I18 | 0,021 | 0,794 | 0,052 | 0,696 |
| Communication with people who rent cars, bikes | I19 | 0,155 | 0,048 | 0,101 | 0,449 |
| Communication with restaurant or hotel staff | I20 | 0,008 | 0,916 | 0,069 | 0,601 |
| Communication with tourist guides | I21 | -0,01 | 0,886 | 0,097 | 0,465 |
| Communication with other people in other situations | I22 | 0,087 | 0,270 | 0,085 | 0,527 |
| Significance of direct communication with residents | I23 | 0,145 | 0,066 | 0,025 | 0,852 |
| Significance of traffic orientation | I24 | 0,134 | 0,090 | 0,101 | 0,445 |
| Significance of attractive public areas for pedestrians | I25 | 0,227 | 0,004 | 0,127 | 0,106 |
| Significance of spatial orientation | I26 | 0,151 | 0,055 | 0,033 | 0,803 |
| Significance of pedestrian perception of safety | I27 | 0,127 | 0,109 | 0,124 | 0,135 |

[†]Spearman rho correlation coefficient; ^{**}p-value

4.2 Model Results

The statistical analysis showed a correlation between individual variables of the English language use and the mobility choice in foreign cities. The model was developed by means of the neural network, with the database from Osijek serving as the base for the development of the prediction model. The model provided a prediction for the choice of mobility mode, and the input parameters of the model are shown in Tab. 1. The prediction model was developed by the entire database, the network structure and learning results are shown in Tab. 4.

The neural network had three layers, the input layer had 27 neurons that corresponded to the number of the input parameters, and the output layer had one neuron that corresponded to the dependent variable (O) – the choice of mobility modality. The number of neurons in the hidden layer was subject to optimization during learning, as well as the weight coefficients of the individual input parameters.

The learning outcomes were assessed using the selected statistical indicators. The correlation coefficient is a statistical measure of the strength of the relationship, the coefficient of determination (R^2), the mean absolute error (MAE), the mean square error (MSE), and the root mean square error of prediction ($RMSE$).

Table 4 Neural Network Structure and Learning Outcome

| Structure of a neural network | | | Learning outcomes | | | | |
|-------------------------------|--------------|--------------|-------------------|-------|-------|-------|--------|
| Number of neurons | | | Correl coef | R^2 | MAE | MSE | $RMSE$ |
| Input layer | Hidden layer | Output layer | | | | | |
| 27 | 79 | 1 | 0,852 | 0,726 | 0,117 | 0,021 | 0,145 |

Generalization of the model is the application of the formed prediction model to the test data set. The results of the generalization of the model are shown in Fig. 5 and Tab. 5.

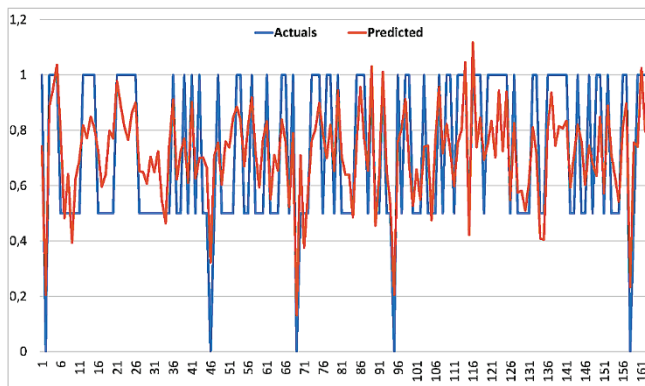


Figure 5 Comparison of Mobility Selection and Neural Network Prediction

Table 5 The result of the generalization of the model

| The generalization model | | | | |
|----------------------------|-------|-------|-------|--------|
| $Correlation\ coefficient$ | R^2 | MAE | MSE | $RMSE$ |
| 0,771 | 0,565 | 0,162 | 0,033 | 0,183 |

The entire database was selected for the test data set, which meant that the generalization was evaluated on the entire database. The results of the generalization were

considered relevant for evaluating the applicability of the model. The results showed that the most common form of mobility was a combination between a personal car and green mobility modes. The results also showed that there were more green mobility options than just using a personal car.

4.3 Model Validation

The validation of the model was performed on the database created by surveying the students from Rijeka, on the independent database, which the neural network did not see during learning.

The validation results are shown in Tab. 6 and Fig. 6.

Table 6 Model validation results

| Model validation | | | | |
|----------------------------|-------|-------|-------|--------|
| $Correlation\ coefficient$ | R^2 | MAE | MSE | $RMSE$ |
| 0,626 | 0,392 | 0,180 | 0,050 | 0,225 |

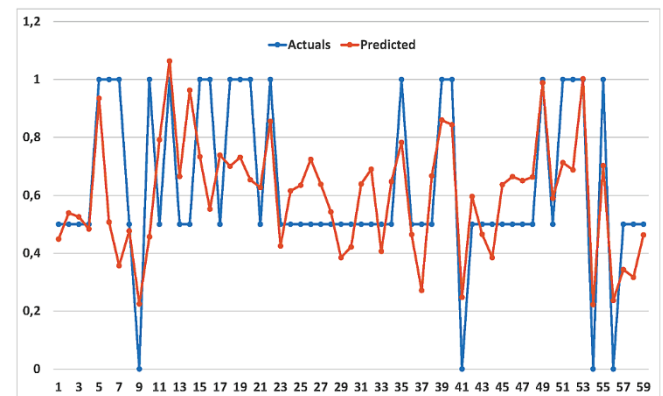


Figure 6 Model validation results

5 DISCUSSION

The database analysis showed a significant difference in the number of the visited foreign cities, students from Rijeka visited an average of 9 cities, whereas students from Osijek an average of 7 cities. The self-evaluation of the English language knowledge showed a high score of 4 out of 5, for Rijeka it was 4.0 and for Osijek 3.9. The difference in grades was visible for the use of the English language to navigate cycling and use applications intended for cycling, which was the expected result, because students from Rijeka chose cycling less often as mobility option. The results of the survey showed that the students from Rijeka engaged more often in English conversation, which could have been expected because they self-rated their knowledge of the English language higher than their colleagues from Osijek.

The analysis of the collected data revealed that walking in foreign cities was the dominant mobility mode of all the surveyed students, which was an expected result considering that these were young people who had no physical limitations for walking. Walking was chosen as a favorable mobility mode by 91% of the students from Osijek and 88% of the students from Rijeka. Public transport was the second ranked mobility mode, chosen by 74% of the respondents in both databases, which was, the expected choice for more distant destinations. The results coincided with the previous researches according to which younger visitors (tourists)

avored exactly these two mobility forms for moving in their tourist destinations [1, 11].

Personal cars were used more by the students from Rijeka, 56% of them used a car as passengers and 34% of them as drivers, compared to 49% of the students from Osijek, who used a car as passengers, and 23% of them as drivers, which can be explained by the difference in geographical position of these two towns. Namely, Rijeka is located a few hours' drive (approx. 250-300 km) from several attractive tourist destinations where it is necessary to use a foreign language (for example, Trieste, Venezia, Ljubljana, Graz).

The students from Osijek chose scooters and bicycles as a form of mobility more often than the students from Rijeka. A bicycle as a mobility mode was chosen by this student group twice as frequent (10% Osijek, 5% Rijeka), which was also expected, because students from Osijek tend to use bicycles as a mobility form in their home town, unlike the students from Rijeka, who do not have a bicycle infrastructure. The research conducted specifically on the student population showed that the choice of movement mode in another urban environment correlated with the same choice in one's own city [2, 15], which was also confirmed by the research results presented in this paper.

What was unexpected was that the students from Osijek chose a scooter more often (12%) than a bicycle (10%), in contrast to the students from Rijeka who chose a bicycle (5%) more often than a scooter (2%). It is evident that an e-scooter, as a mobility form, is getting more popular as a local mobility option for the students from Osijek, too.

The statistical analysis (Tab. 3) showed that there was a correlation between 10 input variables and the dependent variable of the choice of mobility modality for both databases, of which 6 variables were found to be significant for the database of the students from Osijek:

- language use when buying tickets for public transport (I13),
- the use of languages for online hiking applications (I16),
- use of language in direct communication with car, bicycle and mobile vehicle renters (I19),
- use of language in direct communication with residents (I23),
- the significance of traffic orientation (I24),
- the importance of spatial orientation (I26).

For the database of the students from Rijeka, 2 variables proved to be significant, which were not significant for the students from Osijek:

- self-evaluation of the English language knowledge (I3) and
- application of the English language in spatial orientation (I5).

Two input variables that proved to be significant for both databases were related to the spatial and safety perception of public areas intended for pedestrians:

- attractive public pedestrian areas (I25) and
- feeling of safety when hiking (I27).

The prediction model was formed on the basis of the data from Osijek, and validated on the basis of the data from

Rijeka. When forming the prediction model, the neural network did not denote a single variable as unimportant, which meant that the prediction function used all 27 input parameters.

Given the size of the database used to train the neural network—162 respondents and 27 input parameters—there was a concern about potential overfitting and limited generalization. Generalization was therefore evaluated in two stages: first, on the test data set of the original training database (Osijek), and second, on a completely independent database that the network had not encountered during training, collected in Rijeka.

The correlation achieved by the neural network on the training data set was 85%, but the valid correlation achieved on the test data set was 77%, which can be evaluated as a good correlation according to the indicators shown in Tab.5. The validation of the model was made on the basis of the data from Rijeka, and the achieved correlation was 63% (Tab. 6), which could be explained in the context of the students coming from two different towns, that make different choices of mobility modes and their different traffic habits, which could have been confirmed by the previous researches [17, 18].

The results of the model validation shown in Tab. 6 were evaluated as acceptable, which confirms that the prediction model can be applied in other urban environments as well.

When interpreting the results, one should consider the study's limitations, especially the modest total sample size and the imbalance in the number of respondents between the two cities.

6 CONCLUSION

The analysis of the influence of the English language knowledge on the choice of a urban mobility mode abroad, based on the results of a survey of the students from Osijek and Rijeka, confirmed the differences in the traffic habits of these two groups of students. The differences in the students' choices of mobility forms can be related to a number of influential factors (as shown by the results of this and previous researches on the behavior of pedestrians and drivers in two observed urban environments), among which is knowledge of the English language. A number of the analyzed input parameters that are related to the knowledge and use of the English language have a statistically significant influence on the choice of mobility modality, as the research results presented in this paper showed. For the students from Rijeka, their perception and self-evaluation of their knowledge of the English language on the choice of mobility modality turned out to be statistically significant, which is an interesting result that needs to be further investigated.

The input parameters that proved to be relevant in both databases are attractive areas for pedestrians and the perception of pedestrian safety, which are not directly related to the knowledge of the English language, but to the perception of the urban environment and the traffic network. To what extent these parameters can be indirectly connected

with the knowledge of the English language, is the topic that remains to be further investigated, yet.

The results of this research confirmed the results of other researchers conducted elsewhere in the world, which indicate the preference of the younger tourist population for green mobility modes and also show the influence of their domicile traffic habits on choosing mobility modalities abroad.

Public transport can be considered a form of green mobility that can potentially be used by all tourists, which is not the case with other forms of green mobility – walking, using bicycles or scooters. The student population is the one which, due to their objective physical abilities, should be ready to use both public transport and all other forms of green mobility at their tourist destinations. A prerequisite for this is the ability to navigate unfamiliar urban environments and systems (IT) required for renting vehicles and knowledge of the English language plays here a very important role.

The research limitations that should be kept in mind when analyzing the obtained results are the number of surveyed students of a certain profile and the fact that only two urban areas were analyzed. The results of this research should be supplemented with the results of the conducted research on the students' mobility modalities in their local, domicile surrounding, the collection and analysis of which is in progress.

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Authors' contacts:

Irena Ištoka Otković, full professor, PhD
Faculty of Civil Engineering and Architecture Osijek,
Josip Juraj Strossmayer University of Osijek,
Vladimira Preloga 3, 31000 Osijek, Croatia
+385 31 544 683, iirena@gfos.hr

Aleksandra Deluka-Tibljaš, full professor, PhD
Faculty of Civil Engineering, University of Rijeka,
Radmile Matejčić 3, 51000 Rijeka, Croatia
+385 51 265 900/ +385 51 265 998, aleksandra.deluka@gradri.uniri.hr

Lidija Kraljević, senior lecturer
Faculty of Civil Engineering and Architecture Osijek,
Josip Juraj Strossmayer University of Osijek,
Vladimira Preloga 3, 31000 Osijek, Croatia
+385 31 544 702, lidijak@gfos.hr

Anamarija Štefić, senior lecturer
Faculty of Civil Engineering and Architecture Osijek,
Josip Juraj Strossmayer University of Osijek,
Vladimira Preloga 3, 31000 Osijek, Croatia
+385 31 544 702, biskup@gfos.hr