

# Comparison of students and experts attitudes on planning and managing of the Drava and Mura river landscape

---

Stober, Dina; Pogačnik, Andrej; Lončar-Vicković, Sanja

Source / Izvornik: **Tehnički vjesnik, 2012, 19, 573 - 581**

Journal article, Published version

Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

Permanent link / Trajna poveznica: <https://urn.nsk.hr/urn:nbn:hr:133:711111>

Rights / Prava: [Attribution 4.0 International](#)/[Imenovanje 4.0 međunarodna](#)

Download date / Datum preuzimanja: **2025-01-16**



GRADEVINSKI I ARHITEKTONSKI FAKULTET OSIJEK  
Faculty of Civil Engineering and Architecture Osijek

Repository / Repozitorij:

[Repository GrAFOS - Repository of Faculty of Civil Engineering and Architecture Osijek](#)



# COMPARISON OF STUDENTS AND EXPERTS ATTITUDES ON PLANNING AND MANAGING OF THE DRAVA AND MURA RIVER LANDSCAPE

*Dina Stober, Andrej Pogačnik, Sanja Lončar-Vicković*

Original scientific paper

River landscapes are perceived and preferred as a particular phenomenon of nature. Planning and management of river areas anticipate conflicts of various interest groups that are most commonly identified in researches as experts and non-experts (the public). The article presents the results of the comparison of student attitudes and those of experts for regional, cross-border area of Slovenia, Hungary and the Croatian landscape transformations on the Drava and the Mura rivers. The questionnaire, which consisted of visual and written parts, explored attitudes on the dimensions of the landscape, linkage with river scenery, views on the transformation of river landscapes and trust in the authorities responsible for planning and management of the river area. The results suggest a common positive platform of trust in a paradigm of sustainable management, and international border rivers management, but also indicate different sensitivity of the observed groups considering the transformation of river landscapes and trust in the authorities.

**Keywords:** attitudes, Drava River, Mura River, scenarios, transformation of river landscapes

## Usporedba stavova studenata i stručnjaka o planiranju i upravljanju riječnim krajolikom Mure i Drave

Izvorni znanstveni članak

Riječne krajolike se doživljavaju i vrednuju kao poseban fenomen prirode. Planiranje i upravljanje riječnim prostorom anticipira konflikte različitih interesnih skupina koje se najčešće identificiraju i u istraživanjima promatra kao stručnjake i nestručnjake (javnost). U članku se iznose rezultati usporedbe stavova studenata i stručnjaka regionalnog, prekograničnog prostornog obuhvata Slovenije, Mađarske i Hrvatske o transformacijama krajolika Drave i Mure. Anketnim upitnikom koji se sastojao od vizualnog i pisanog dijela istraživali su se stavovi o dimenzijama krajolika, povezanost s riječnim krajolikom, stavovi o transformaciji riječnog krajolika i povjerenje u autoritete planiranja i upravljanja riječnim prostorom. Rezultati ukazuju na zajedničku pozitivnu platformu povjerenja u paradigmu održivog upravljanja i međunarodnog upravljanja pograničnim rijekama no ujedno i ukazuju na različitu senzibilnost promatranih grupa obzirom na transformaciju riječnog krajolika i povjerenje u autoritete.

**Ključne riječi:** Drava, Mura, scenariji, stavovi, transformacija riječnog krajolika

### 1

#### Introduction

Basic actors of spatial changes were defined by the European Landscape Convention [1] in 2000 as action and interaction between human perceptions vs. the perceived area. Twenty three years earlier, in the introduction of Scenic Assessment: An Overview, Arthur et al. [2] claimed that "there is no longer a need for researchers and land managers to treat scenic beauty assessment as virgin territory". The scope of studying visual landscape began to develop different models of valorisation even half a century ago, looking for objective criteria of visual quality. The scientists from the American continent have studied this topic with a stress on psychological, cognitive and phenomenological theories, analyzed them with different mathematical approaches and checked their conclusions in practice with concrete examples [3, 4, 5, 6]. In the European research fields most recent researches have spread their structural findings by using a holistic approach and by looking for indicators in line with the paradigm of sustainable development and its cultural dimension [7, 8, 9, 10]. In their studies the authors have researched the relationship between different types of landscape and scenic beauty, such as wetlands [11, 12], town areas [13, 14, 15], open spaces [16, 17], forests [18], and watersheds [19, 20, 21, 22, 23]. The river area is perceived as a special phenomenon of the landscape. Since the late 1960s landscape preference research results presented water as a strong positive contributor to perceived landscape beauty [3, 24, 25, 26].

The field of planning theory has gone through periodical changes, with previous dominant theories drawing on, and in turn reacting to, urban-form concepts;

comprehensive, rational decision-making, advocacy, and equity planning [27]. On the West European theoretical platform of planning in the 90ies titles of scientific papers on the theory of planning offer concepts such as "new planning" [28], "new approaches" [29], "innovative" [30]. Concepts of comprehensive planning, rationalism, technicism and land-use suffer critique and shift to strategic planning, communicative planning, structural plans and emancipatory planning. As an integral part of strategic planning there is a concept of "communicative planning". According to Throgmorton (cited in Faludi [31]) communicative approach builds on three principles:

- (1) Plans and analyses are always addressed to someone, so the audience is important.
- (2) Planning-related utterances are replies to other utterances, so we always argue in the awareness of differing or opposing views.
- (3) The meaning of such utterance is beyond control of the author, so we must think about this 'play of meaning' and about how audiences reconstruct meanings.

The purpose of this study was to measure students' and experts' attitudes on visual transformation of the river area in the trans-border area of Slovenia, Hungary and Croatia and on the development of the border area of the Mura and Drava Rivers.

### 2

#### Literature review of the landscape assessments

Zube et al. [24] studied the published papers by reviewing twenty journals (USA, The Netherlands, England) and in the paper Landscape perception:

research, application and theory presented the conclusions related to the classification of research. The authors offered the following clarifications for the paradigms: expert paradigm includes a qualitative evaluation of landscape on the basis of a skilled and educated observer assessing the environment in two directions—ecological and aesthetic; cognitive paradigm establishes a relationship between value attitudes and cognitive variables originating in the information from the environment; psychophysical paradigm searches for a link between physical phenomena in the environment and values related to environment and aesthetics; experiential paradigm requires a deeper understanding of individual experience in interaction with nature.

There are two basic groups whose attitudes are investigated: experts and non-experts. Experts' attitudes are investigated in the domain of visual quality and ecology, whereas investigating non-experts is linked with experimental psychology and research of individual experience and reaction to landscape. The research concentrates on describing "what" in landscape perception, and not on "how" and "why". Analyzing the overlap of four paradigms the conclusion is reached that there are possibilities of a common framework for integrative landscape research.

Scientific and expert works in the field of landscape research attempt to bridge the chasm between the subjectivist and the objectivist paradigm in researching the relation between the ecological and the visual quality of landscape. Aesthetic experiences may lead people to change the landscape in the ways that may or may not be consistent with its ecological function.

The Nassauer [33] article on landscape sustainability placed the relationship of aesthetics and ecology in the context of culture. The cultural concept of landscape is actually identified with landscape "as it should be" in the context of the visual. That idea is close to the Buijs' "image of nature" [34]. The following is said there regarding the cultural concept of landscape: "The cultural perception of nature is not wrong, it simply is." [33]. Thus it is perceived as necessary in planning regarding the concept of cultural expectations. Nassauer [33] finishes her paper with an integral recommendation on subjects and objects of planning in order to satisfy both the cultural and ecological criteria in landscape planning: "Cultural knowledge, scientific knowledge and design innovation are all needed to accomplish cultural principles for landscape ecology." Empirical research on wetland landscape confirmed the hypothesis that "...cultural concepts of nature are different from scientific concepts of ecological function." [12]. The landscape is shaped and changes according to the political system we are in, the economic management of land and our aesthetic preferences, social conventions and all that is comprised under the label of culture, but that culture at the same time filters the perception of landscape [12].

Gobster et al. [35] suggested the following theoretical platform:

- landscape aesthetics provides critical linkage between humans and ecological process,
- the most important emotional pleasure has a fundamental influence on our response to the stimuli,
- aesthetic experience can drive landscape change,

- understanding how people perceive and experience the beauty of all landscapes is central to achieving public support especially when aesthetic preferences and ecological goals are not aligned,
- people tend to interpret their aesthetic experience of landscape as providing information about its ecological quality,
- landscape planning, design and management are key to the cultural sustainability of vital ecosystem functions,
- aesthetic experiences are fundamentally triggered by affective (emotion-based) processes.

The authors formed the model which puts landscape pattern in interaction with situational context and has as a principle goal the ecological-aesthetic construct to "align ecological goals with aesthetic experiences to achieve culturally and ecologically sustainable landscapes" [35]. Gobster et al. [35] assume that there are two possible directions—interventions: by planning and education, i.e. knowledge transfer.

Most recently, Lothian [36] points out that landscape beauty is a public, not private, pleasure and that should be assessed by the public. It has been argued that common opinion of the group of experts and non-experts is greater than the number of differences that appear in the research, but concludes that involvement of the community to rate the scenes ensures that the results reflect the prevailing community preferences rather than those of a particular professional group involving the community to rate the scenes ensures that the results reflect the prevailing community preferences rather than those of a particular professional group.

### 3 Drava and Mura River study area

Regulation and melioration works in the North-eastern Croatia river plain have had considerable impact on the development on its relief, as supported by the fact that the river flow has been reduced by 60 % or by 182 km in the part from the Mura mouth to its confluence with the Danube [37, 38, 39]. It has resulted in the increase of eroding force, wood cutting in the source area as well as melioration works (embankments and drainage canals) and has influenced the level of flood waters (frequent floods). The influence on the morphological forming of the river bed has been exerted by water steps and accumulations (Austria and Slovenia 19, Croatia 3).

Current events around the Drava River basin gathered international activities in the form of projects The Mura-Drava Euro-region, Drava River Basin, The Drava river Declaration so that at the beginning of February 2008 the Ministry of Culture of the Republic of Croatia declared a preventive protection of the Mura – Drava corridor in the category of "regional parks" in accordance with the Nature Protection Law of the Republic of Croatia [35]. With Croatia's accession into the European Union the area along the Mura and Drava will become a part of the NATURA 2000 Network, as has already been the case with Hungary and Slovenia.

The situation on the Drava and the Mura River multiple borderlands is a complex upstream-downstream

Austrian-Slovenian-Croatian historical puzzle, including the conflict of the two common banks (Slovene-Hungarian and Hungarian-Croatian). The Austrian experience of the consequences of building hydroelectric power plants on the Drava and the Mura resulted in a series of revitalization projects. At the same time they provide the building of a new one, namely the "Gossendorf" hydroelectric power plant at the Mura. The Hungarians proclaimed their pro-environmental position in 1996, when they founded the Danube-Drava National Park, and five years later prevented the Croatian energy experts to construct the Novo Virje hydroelectric power plant on the Drava. Within the Croatian territory itself there are high tensions between non-governmental ecological organizations linked to the area of the Drava and Mura rivers and the state level that both suggested and withdrew the project. The regional level represented the environmental interests and protested against the Slovenian plan on eight hydropower plants on the Mura, appealing against it to the Hungarian county of Zala.

The situation is obviously very complex, and the interests transgress the management hierarchy, while national interests are defended across borders as well.

#### 4

#### Study instrument and procedure

Problems in space are perceived on a scale from underestimation to the overvaluation. Survey of attitudes in this study is not conducted to determine the reality of attitudes in relation to environmental issues already explored, but the opinions that shape behaviour and influence decisions on spatial solutions and spatial policy.

The aim of the survey was to involve a diversified sample, in order to include the international and interest affiliation variation. The study utilised a convenience sample of the undergraduate student population. Studying students' attitudes is important, as they are the population who will be affected by and will have to provide solutions to the environmental problems. Several studies found this sample adequate for environmental research [5, 32, 41]. By choosing young people in environmental research, we are asking future generations to participate in sustainability of solutions nowadays.

The methodology is basically quantitative (sampling, data analysis and data inference), but it also involves a qualitative data collection, like the coding of the respondents' drawing interventions and open questions, but some of them are outside of the scope of this paper.

A structured questionnaire consists of three parts. In the first part there is a visual material displayed representing the original and the modified scenes of the Drava and the Mura rivers. A series of six original scenes was chosen depending on the human impact on the scene. The landscapes were shaped as a human living space, a resource and a natural ecosystem [42] and were structurally modelled through four variables. The simulations were made by using the software packages Max3D and Photoshop PS.

The second part of the survey researched a wider system of values related to nature, man, technology and culture, as well as the attitudes on protection and

development linked to the river area. Environmental attitudes were assessed within three scales. The first was the ecocentric and the second was defined as the anthropocentric environmental attitude, subdivided in two subscales as anthropocentric-egoistic and anthropocentric-altruistic according to previous research [43]. The responses were made on a 5 point Likert scale ranging from "strongly agree" to "strongly disagree" with an added "don't know, don't want to" answer opinion. There were also open questions on memories, the river last visited etc. that were coded into clusters and linked to the frame attachment. The dimension of printed images was 6 × 8 cm in 320 dpi resolution since it had been proved as adequate in prior studies [22].

The third part of the questionnaire researched the age, sex, place of residence and other socio-demographic characteristics of the respondents.

There were 421 students and 58 experts participating in the survey.

An introduction letter was attached to the questionnaire and was also read to the audience in advance. During the introduction, all images were displayed on the wall, each for 7÷10 seconds, and one by one with an explanation of the protocol scenario. At the end of the introduction all images were displayed again, more quickly, for ten seconds each. The filling in of the questionnaires lasted from 35 to 45 minutes.

Initial vistas were ranked according to the intensity of human influence (see Fig. 1 and Fig. 2):

- 1) A completely natural vista
- 2) A ferry for transporting people, natural, non-fortified bank
- 3) A wooden mill on the water, partially arranged access
- 4) Pebbled beach with a slide
- 5) A ferry for transporting people and cars, regulated bank
- 6) Pedestrian, suspension bridge, a concrete access to water.

		Original scenes of the Mura and Drava Rivers					
		1	2	3	4	5	6
Scenario modification	D						
	C						
	B						
	A						
0							

**NATURALNESS** →

Figure 1 Schema of visualizing human impact

The scenarios were also construed through an increase in human impact as (Fig. 1 and Fig. 2):

- 1) Restoration (A)
- 2) Outdoor Recreation and Tourism (B)
- 3) Settlement Scenario (C)
- 4) Energy Production Scenario (D).

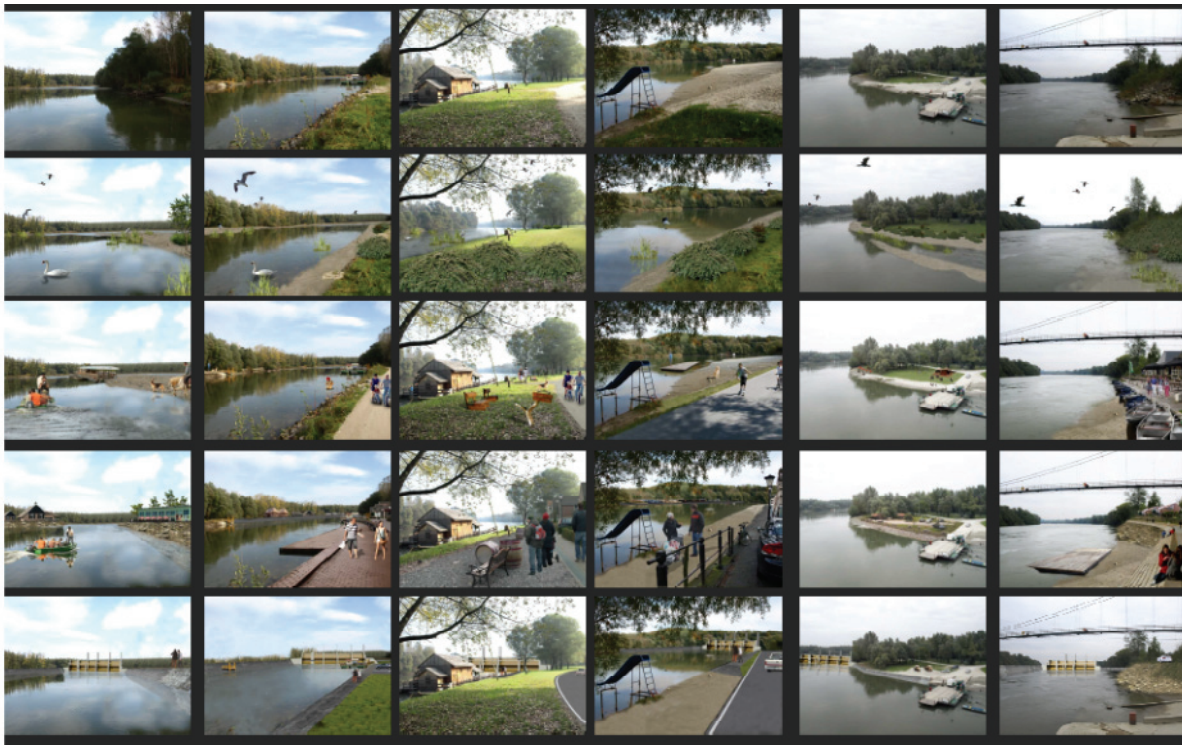


Figure 2 Original Vistas and Modified Vistas in Scenarios

4.1 Analysis

The data collected in the survey were analysed by using the methods of descriptive and inferential statistics, and the program SPSS 15 was used for the analysis. To determine the relationship between the indicated variables bivariate correlations were used. In the case of the ordinal scale, variables were calculated by Spearman’s Rho Correlation Coefficient and the Pearson correlation coefficient interval. In order to identify the direction of the relationship for each indicator individually, a correlation analysis was conducted for the images and other scales measured by significant values ( $p < 0,01$ ;  $p < 0,05$ ).

A  $\chi^2$  test was used for selecting the worst/best scenes because it is a dichotomous situation. For testing the differences in vista ranking, Mann–Whitney U test was used for groups of students/experts.

4.2 Student sample

An anonymous questionnaire was administered to students chosen by the criteria of different ethnicity and enrolment in different academic disciplines. A total of 421 students (268 male and 153 female students) were involved, from three universities – the University on Ljubljana (Slovenia), Kaposvar University (Hungary) and the J. J. Strossmayer University of Osijek (Croatia).

Respondent groups were planned according to the academic disciplines as well. Previous studies have shown differences in the attitudes of various disciplines [44, 45, 46]. The distribution of respondents is given in Tab. 1. The study explored expected differences among

disciplines but the theme exceeded the scope of this paper.

Table 1 Distribution of student respondents by nationality and disciplines

Nationality/Discipline	HARD	SOFT	ART
Slovenian	86	24	15
Hungarian	50	71	15
Croatian	70	41	12

All three university cities lie on the river, Ljubljana on Ljubljana, Kaposvar on Kapos and Osijek on the Drava River. The number of students from different countries was balanced, 128 from Slovenia, 142 from Hungary and 151 Croatian students participated in the survey.

4.3 Expert sample

The expert sample was observed as a unique group. There were forty one experts participating in the survey. The national distribution of respondents is as follows: 27 experts from Croatia, 9 from Hungary and 15 from Slovenia. The experts connected to river area planning make up a multidisciplinary set of theoreticians and practitioners of an international scope. The disciplines included are: spatial planners, architects, civil engineers of a hydro technical profile, landscape planners, biologists, urban sociologists and economy experts involved in spatial planning. As for their working place, the experts participating in the survey work at higher education institutions, public institutions and private firms. Distribution of the samples’ demographic characteristics is shown in Tab. 2.

**Table 2** Demographic characteristics of the survey respondents

	Students	Experts
Sex / %		
M	36,1	37,3
F	62,7	58,8
Age / %		
16 ÷ 19	12,3	0,0
20 ÷ 25	82,1	9,8
26 ÷ 30	2,4	13,7
31 ÷ 35	1,7	21,6
> 35	0,9	51,0

**Table 3** The relevance of differences within ranking Vistas of students and experts

	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
1	6927,500	8008,500	-2,364	0,018
1A	7178,000	78809,000	-2,097	0,036
1B	6841,000	7922,000	-2,461	0,014
1C	7473,000	79104,000	-1,622	0,105
1D	7448,000	79079,000	-1,723	0,085
2	6589,000	7670,000	-2,745	0,006
2A	8417,000	9498,000	-0,338	0,735
2B	8396,000	9477,000	-0,365	0,715
2C	6974,000	78227,000	-2,284	0,022
2D	7818,500	79071,500	-1,285	0,199
3	7939,000	9020,000	-1,022	0,307
3A	7561,500	79192,500	-1,485	0,138
3B	7903,000	8984,000	-1,058	0,290
3C	8622,000	9703,000	-0,101	0,920
3D	8235,500	79866,500	-0,763	0,446
4	7858,500	8939,500	-1,135	0,256
4A	8581,500	9662,500	-0,151	0,880
4B	8532,000	80163,000	-0,217	0,828
4C	8111,000	79742,000	-0,813	0,416
4D	8520,000	80151,000	-0,294	0,769
5	8561,500	80192,500	-0,176	0,860
5A	6915,000	78546,000	-2,438	0,015
5B	7120,500	8201,500	-2,073	0,038
5C	8390,500	9471,500	-0,403	0,687
5D	8689,500	9770,500	-0,007	0,994
6	8152,500	9233,500	-0,656	0,512
6A	7879,000	78755,000	-1,024	0,306
6B	7106,000	8187,000	-2,027	0,043
6C	6646,500	77522,500	-2,642	0,008
6D	8562,500	79438,500	-0,127	0,899

*n* – number of original scene; A – Restoration Scenario; B – Outdoor recreation and Tourism Scenario; C – Settlement Scenario; D – Energy production Scenario.

## 5

### The results of the difference in the attitudes of students and experts evaluating the initial and modified river scenes

The study of attitudes based on visual part is done by selecting the best and worst scenes and scenes ranking within sets. The results show that 10,2 % of the total sample of students chose the scenario scene Outdoor Recreation and Tourism to the mill on the Mura as the best view, and 12,7 % of respondents the Scenario Energy Production at the mouth of the beach Mura as the worst. The experts evaluated the scenes with the notion of "capacity" to human impact of the observed area and assessed the new impacts as more acceptable in areas

where they already obtained a moderate human influence, while minor influence was assessed as more acceptable with scenes in which environment had already been humanized (concrete shores, ferry, bridge). The experts chose the initial scene of Total Nature and Outdoor Recreation and Tourism to the mill on the Mura as the best view, and Scenario Energy Production at the pedestrian bridge at Križnica as the worst.

The difference between the students and experts attitudes has been confirmed even during the evaluation of sets by ranking scenarios. The consensus in the evaluation is constant for Energy Production Scenario Vistas and for the sets of Vistas No 3 (mill on the Mura) and No 4 (the beach at the mouth of Mura) as well (see Tab. 3).

The results of students' responses indicate homogeneous attitudes, and they evaluated the Restoration Scenario as the best and ranked it at the first place. Experts, whose education and experience are richer than the students', evaluate the scenarios heterogeneously, so that the following equally appear as first rated: Origin Vista, Restoration Scenario and Outdoor Recreation and Tourism Scenario. Experts, as opposed to the students, value the current state more than the modified one.

### 5.1

#### Resources for planning river landscape

In the written part of the survey we further researched the connection between the evaluation of the visual and the ecological value of river landscape. We attempted to use the instrument in order to investigate the evaluation of concepts in the visual and the written part and we also researched the attitudes on the acceptability of the actors in the river area. We also studied the acceptability of the most frequent types of hydro technological activities with the objective of flood protection, which were also simulated as a variable in the visual part of the survey (Tab. 4).

**Table 4** The relevance of differences within valuing different flood protection measures

	Students vs experts	
	<i>F</i>	<i>p</i>
Waterside concrete dams	7,306	0,007
Expansion of banks and branches	7,777	0,006
Construction of hydroelectric dams and lakes	2,727	0,099
Should not do anything	0,496	0,482

Comparison of attitudes of students and experts about the increased value of the river landscapes in the context of the nature for the dimensions of ecology and aesthetic, showed no statistically significant difference (see Fig. 3 and Fig. 4) ( $F = 1,475$ ;  $p = 0,225$  for Aesthetic and  $F = 1,314$ ;  $p = 0,252$  for the dimension named Ecology). The response rate shows that the experts are more aware of the positive aesthetic dimensions of the river scenery but do not see the need for greater protection of the river than other natural landscapes. Students are predominantly undecided (42,5 %) for the dimension of aesthetics, but correspond to a positive trend (45,5 %) for the dimension of ecology.

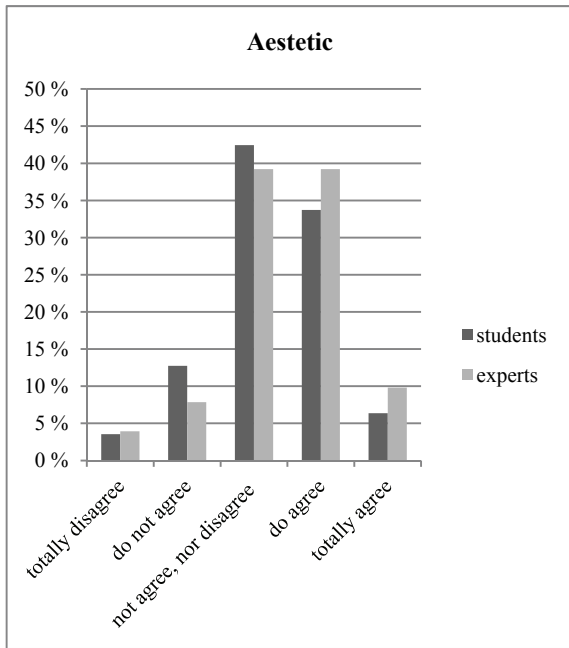


Figure 3 The response rate of students and experts to the aesthetic value dimension

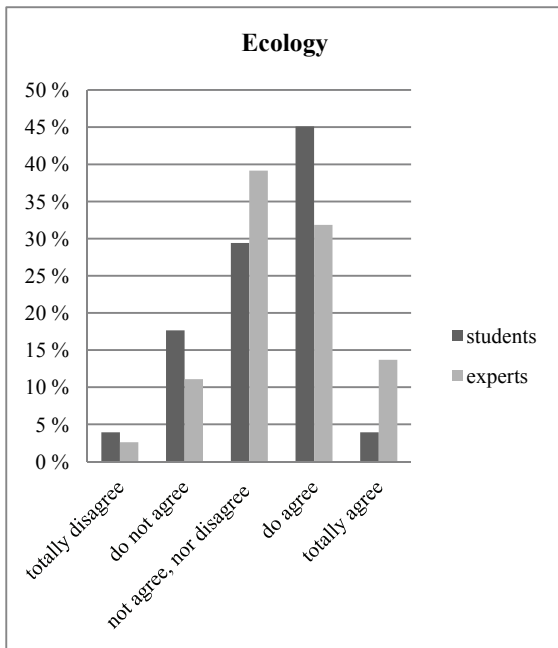


Figure 4 The response rate of students and experts to the ecological value dimension

The respondents further evaluate the importance of the concepts offered in a connection with the development of river areas. The concepts are designed according to the developmental and protective discourse following [36]. Results show that students and experts express a homogeneous attitude on importance of offered issues for the development of river areas, and showed a statistically significant difference only for the terms of cottage settlements ( $F = 13,330$ ;  $p = 0,000$ ) and for fish farming ( $F = 4,033$ ;  $p = 0,045$ ), which in both cases are valued more significantly by students than the experts.

The distribution of the results shown in Fig. 5, infers two tendencies: a disagreement with the views that the cottage settlements and gravel extracting are important for the development of river areas, and the positive attitudes

for all other themes. The most positive attitude is expressed for the term of protection from flooding, with a positive response of 93,2 % of student respondents. Results show that the protective discourse prevails over a developmental one, and that respondents perceive the development of the landscape through the protection process, which confirms the results of a pilot study conducted on 103 students in Osijek [43].

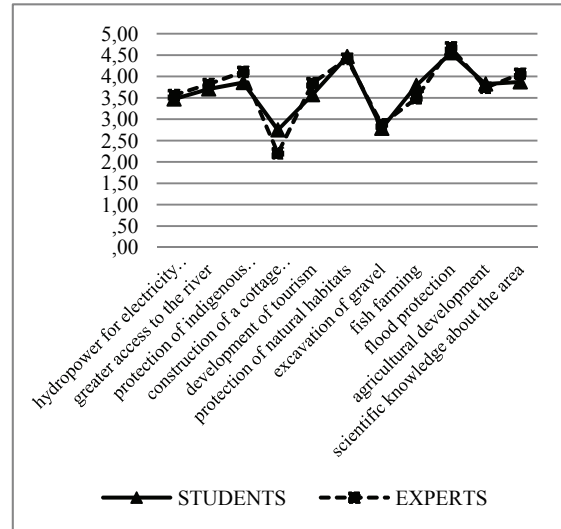


Figure 5 Comparison of mean scores of students and experts on the importance of issues for the development of riverside landscapes

The item on sustainable management of the river area got 100 % positive support (answers agree and totally agree) of experts and 81,3 % of students rate it positively. Common attitude on sustainable paradigm as adequate for river area is detected.

## 5.2 Attachment to the river area

The frame of the attachment to the river was established on the basis of the results [20, 22]. Buijs' [23] research results show a different attitude to river and river area restoration considering the situational coherence and the life experience of the observed respondents.

Attachment to the river was measured by four questions in order to detect the respondent's attitude to the river area. The first information represents the identification of the river last visited, with an aim of determining the sample of those who were in touch with the observed river bodies (the Drava and Mura Rivers). The second two questions relate to the frequency of the respondent's visits to the river and the identification of the manner of spending time at the river.

Experts point to a larger orientation to the river areas, and relate to such an area with much more preference than students, as well as time spend by the river more than students as shown in Fig. 6. According to Buijs [23], the frequency of being beside the river is also a factor that affects the formation of attitudes about the image of the river, which is a part of shaping the attitude towards the observed landscape.

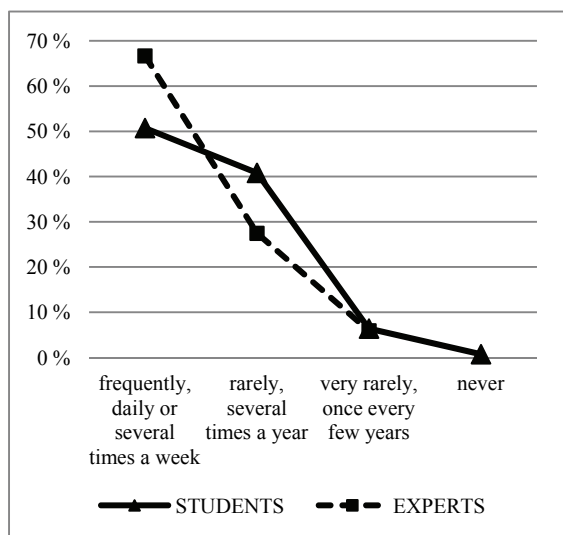


Figure 6 The response of students and experts on the frequency of visit to the riverside landscape

The last question is of an open type and it investigated the respondents' memory regarding their last visit to the river. The answers were coded in four groups after the first review of the concepts. The groups are: nature, water, action and emotion. The answers point out to the concept of nature as the most common term, and the water as the least stated term in the questionnaire (see Fig. 7). Statistically significant differences were shown to the concept of emotions ( $\chi^2 = 11,361$ ;  $df = 1$ ;  $p = 0,001$ ).

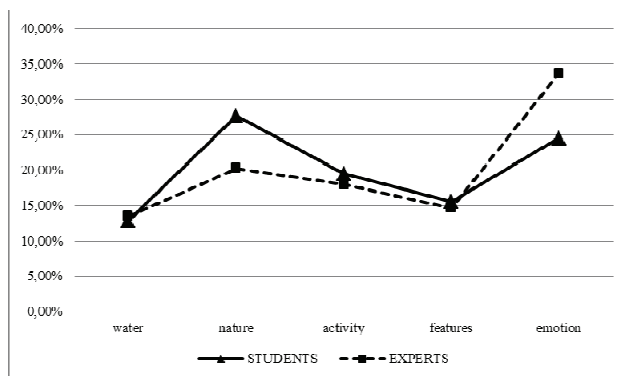


Figure 7 Comparison of the students and experts responses on the memory of the visit in the river area

#### 5.4

#### Policy preferences on river management and authorities

Planning of the river area anticipates different professions: spatial planners, landscape architects, economy subjects, farmers, inhabitants, tourists, energetic specialists, environment protectors and others. Spatial planning as an interdisciplinary profession whose objective is shaping, using and managing of planned space comprises all stakeholders [48].

Cross cultural studies [49] consider that the cause of the total social change is in the cultural, economic and political change. There has also been evident improvement in the form of an inter-generational change from the materialistic to the post materialistic values, which leads to the increased potential for mass participation in actions against the leading subjects.

In three questions the frame researched confidence, the attitude to responsibility and the attitude to international agreements as forms of managing trans-border rivers. The influence of the respondents' attitudes to the subjects of planning, to non-conventional and participant forms of involvement in decision-making and management was the backbone of the frame Policy preferences.

Results shown in Fig. 8 pointed out that the differences between groups of students and experts are statistically significant for the items of the government agencies at the local level ( $F = 5,693$ ;  $p = 0,017$ ), for non-governmental associations for environmental protection ( $F = 30,686$ ;  $p = 0,000$ ) and for land owners along the river ( $F = 4,135$ ;  $p = 0,043$ ).

The confidence of young respondents in the non-governmental organizations can be interpreted as an indicator of intergenerational transition of values in line with the fact that the majority of students are in the age group to 25 years, and the sample of experts are over 31 years old in the share of 72,5 %.

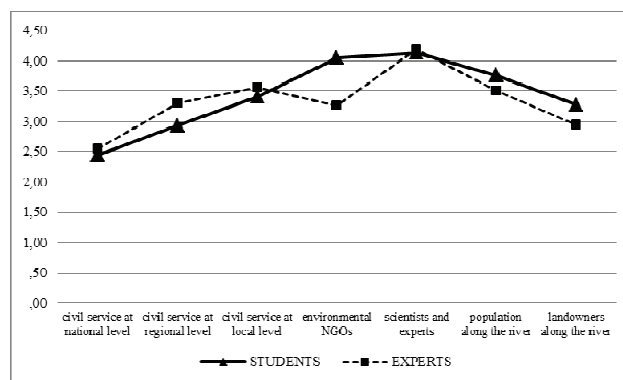


Figure 8 Comparison of mean scores of students and experts on authority of spatial planning and managing river area

The attitude on international scope for planning and managing river areas was rated positive for students and experts as well. No significant difference ( $F = 1,313$ ;  $p = 0,252$ ) was found for the statement and big pool of students (79,0 %) and experts (86,3 %) evaluate international cooperation for planning and managing cross-border rivers as a positive solution.

#### 6

#### Discussion and conclusion

The empirical results show that young participants of the total sample prefer river areas more than other natural landscapes and show pro-environmental position toward the transformation of river landscapes. River landscapes were better evaluated the greater their naturalness both in original scenes and in the transformed ones. The transformation of river landscapes explored by visual stimuli shows that respondents tend to rate landscapes with moderate human influence as „more vulnerable" than those of complete nature scenes. The emergence of a hydro power plant is the least acceptable in the context of other possible scenarios of restoration, of the functions of recreation, tourism and housing for all the groups studied. In evaluating scenarios, a global value consensus on the



necessity of orientation toward renewable energy sources was not applied during the evaluation of the scenes.

Culture, age and attachment to the place (experience) or subject (experts) affect the shaping of the various interest groups associated with the river area.

The results confirm the findings according to Lothian [36] that the similarities in the attitudes of students as representatives of public opinion and experts viewed as a single group in this study, are more dominant than the differences. This research shows that the negative attitude towards the hydroelectric dams in the context of the minor invasive functional scenarios offered is common to students and experts. They also represent a balanced attitude towards the development of river landscapes-referring to those river landscapes that represent moderate human impact.

Intensive support to the sustainable development of river landscapes and managing international rivers on the border between the two groups observed, highlight the real value platform for managing and planning of river areas. If we look at the differences, we can see that the group of experts is more "sensitive" to the initial state of the river, preferred to a greater extent than students did. Students tend to value more the modified conditions, especially the scenes that do not show greater human impact, but controlled and regulated nature. Differences can be viewed in the context of the identified experience, landscape preference and memory. The impact of connectivity and preferences was shown by Buijs [34] and Kaur [41]. The differences can be interpreted as the value of inter-generational transition, according to Inglehart and Welzel [49].

The connection between the public, scientific and professional spheres of a society could be found within the realm of education and the ways forms individual and social values. Education on multifunctional orientation of future eco labelled hydro plants, designed to promote recreational activities, sports, leisure as well as agricultural irrigation systems, would influence the perception of hydro plants in the river area. An initial negative response to hydro plants is built on its perception as environmental polluters rather than as renewable energy sources. The shift from a global towards a local consensus should be planned before crises arise.

To minimize the potential for conflict in the planning of watershed area between different stakeholders, we should take into account the level of trust in the planning authorities and involve actors accordingly. Reducing conflicts should be planned by increasing the experience of the interest groups in accordance with the intended function.

## 7

### References

- [1] Council of Europe, European Landscape Convention. Florence, 2000. URL: <http://conventions.coe.int/Treaty/en/Treaties/html/176.htm> (24.05.2010)
- [2] Arthur, L. M.; Daniel, T. C.; Boster, R. S. Scenic assessment: An overview. // *Landscape Planning*. 4(1977), pp. 109-129.
- [3] Shafer, E. L. Perception of natural environments. // *Environment and Behavior*. 1, 1(1969), pp. 71-82.
- [4] Kaplan, R.; Kaplan, S.; Brown, T. Environmental Preference A Comparison of Four Domains of Predictors. // *Environment and Behavior*. 21, 5(1989), pp. 509-530.
- [5] Chenoweth, R. E.; Gobster, P. H. The Nature and Ecology of Aesthetic Experiences in the Landscape. // *Landscape journal*. 9(1990), pp. 1-8.
- [6] Palmer, J. F.; Hoffman, R. E. Rating reliability and representation validity in scenic landscape assessments. // *Landscape and Urban Planning*. 54,1-4(2001), pp. 149-161.
- [7] Naveh, Z. What is holistic landscape ecology? A conceptual introduction. // *Landscape and Urban Planning*. 50(2000), pp. 7-26.
- [8] Palang, H.; Alumäe, H.; Mander, Ü. Holistic aspects in landscape development: a scenario approach. // *Landscape and Urban Planning*. 50,1-3(2000), pp. 85-94.
- [9] Antrop, M.; Van Eetvelde, V. Holistic aspects of suburban landscapes: visual image interpretation and landscape metrics. // *Landscape and Urban Planning*. 50(2000), pp. 43-58.
- [10] Antrop, M. Why landscapes of the past are important for the future. // *Landscape and Urban Planning*. 70, 1-2(2005), pp. 21-34.
- [11] Smardon, R. C; Fabos, J. G. Visual-cultural sub-model. // In Larson, J.S. (ed). *Models for Assessment of Freshwater Wetlands*. Publication 32, Water Resources Research Center, University of Massachusetts, Amherst, MA, 1976, pp. 35-51
- [12] Nassauer, J. I. Monitoring the success of metropolitan wetland restorations: Cultural sustainability and ecological function. // *Wetlands*. 24, 4(2004), pp. 756-765.
- [13] Pogačnik, A. Visual-aesthetic components in the cybernetics of urban planning. // *Computer-Aided Design*. 8(1976), pp. 41-48.
- [14] Pogačnik, A. Environmental public preferences as obtained by the method of photo interpretation in the Ljubljana region. // *Urban Ecology*. 4, 1(1979), pp. 45-51.
- [15] Nasar, J. L. Visual preferences in urban street scenes. A cross-Cultural Comparison between Japan and United States. // *Journal of Cross-Cultural Psychology*. 15, 1(1985), pp. 79-93.
- [16] Ulrich, R. S. Human responses to vegetation and landscapes. // *Landscape and Urban Planning*, 13(1986), pp. 29-44.
- [17] Purcell, A. T.; Lamb, R. Preference and naturalness: An ecological approach. // *Landscape and Urban Planning*. 42, 1(1998), pp. 57-66.
- [18] Sheppard, S.R.J.; Meitner, M. Using Multi-Criteria Analysis and visualisation for Sustainable Forest Management planning with stakeholder groups. // *Forest Ecology and Management*. 207, 1-2(2005), pp. 171-187.
- [19] Herzog, T. R. A cognitive analysis of preference for waterscapes. // *Journal of Environmental Psychology*. 5(1985), pp. 225-241.
- [20] Ryan, R. L. Local perceptions and values for a midwestern river corridor. // *Landscape and Urban Planning*. 42(1998), pp. 225-237.
- [21] Jessel, B.; Jacobs, J. Land use scenario development and stakeholder involvement as tools for watershed management within the Havel River Basin. // *Limnologica*. 35(2005), pp. 220-233.
- [22] Junker, B.; Buchecker, M. Aesthetic preferences versus ecological objectives in river restorations. // *Landscape and Urban Planning*. 85, 3-4, 30(2008), pp. 141-154.
- [23] Buijs, A. E. Public support for river restoration. A mixed-method study into local residents' support for and framing of river management and ecological restoration in the Dutch floodplains. // *Journal of Environmental Management*, 90, 8(2009), pp. 2680-2689.

- [24] Zube, E. H.; Sell, J. L.; Taylor, J. G. Landscape perception: research application and theory. // *Landscape Planning*. 9(1982), pp. 1-33.
- [25] Kaplan, R.; Kaplan, S. The experience of nature: A psychological perspective. New York: Cambridge University Press, 1989, p. 340.
- [26] Burmil, S.; Daniel, T. C.; Hetherington, J. D. Human values and perceptions of water in arid landscapes. // *Landscape and Urban Planning*. 44, 2-3(1999), pp. 99-109.
- [27] Faludi, A., van der Valk, A. J. Rule and Order; Dutch Planning Doctrine in the Twentieth Century: Kluwer Academic Publishers, Dordrecht, 1994.
- [28] Healey, P. Planning through Debate: The Communicative Turn in Planning Theory. // *Town Planning Review* 63, 2(1992), pp. 143-162.
- [29] Albrechts, L. In Pursuit of New Approaches to Strategic Spatial Planning. A European Perspective. // *International Planning Studies* 6, 3(2001), pp. 293-310.
- [30] Rivolin U. J.; Faludi, A. The Hidden Face of European Spatial Planning: Innovations in Governance. // *European Planning Studies*, 132(2005), pp. 195-215.
- [31] Faludi, A., Altes, W. K. Evaluating communicative planning: A revised design for performance research. // *European Planning Studies* 2, 4(1994), pp. 403-418.
- [32] Herzog, T. R. A cognitive analysis of preference for waterscapes. // *Journal of Environmental Psychology*. 5 (1985), pp. 225-241.
- [33] Nassauer, J. Culture and changing landscape structure. // *Landscape Ecology*. 10, 4 (1995), pp. 229-237.
- [34] Buijs, A. E. Lay People's Images of Nature: Comprehensive Frameworks of Values, Beliefs, and Value Orientations. // *Society and Natural Resources*. 22(2009), pp. 417-432.
- [35] Gobster, P. H.; Nassauer, J. I.; Daniel, T. C.; Fry, G. The shared landscape: what does aesthetics have to do with ecology? // *Landscape Ecology*. 22, 7(2007), pp. 959-972.
- [36] Lothian, A. Measuring and Mapping Landscape Quality Using the Community Preferences Method. New Zealand Planning Institute Annual Conference Blenheim URL:<http://www.scenicsolutions.com.au/8.%20Papers%20by%20AL/NZPI%20Conference%20May%202012.pdf> (15.06.2012).
- [37] Bognar, A. Basic geomorphological problems of the Drava river plain in SR Croatia. // *Geographical papers*. Vol. 6, Department of geography, Faculty of sciences, Zagreb, 1985.
- [38] Slukan-Altić, M. Hidroregulacije Drave i njezini utjecaji na transformaciju prirodnog i kulturnog pejzaža Podravine. // *Podravina: časopis za multidisciplinarna istraživanja*. 2(2002), pp. 128-152.
- [39] Mustać, I.; Gjetvaj, G.; Petošić, D.; Tomić F. Impact of the Future Multipurpose Danube-Sava Canal on Groundwater Dynamics. *Tehnički vjesnik*, 18, 2(2011), pp. 211-218.
- [40] Nature Protection Law (Official Gazette No. 70/05).
- [41] Kaur, E.; Palang, H.; Sooväli, H. Landscapes in Change – Opposing Understandings and Valuations. // *Landscape and Urban Planning*. 67, 1-4(2004), pp. 109-120.
- [42] Marušić, I. Krajinsko planiranje. // *Skripta*. Oddelek za krajinsko arhitekturo. BF. Univerza v Ljubljani, 2000.
- [43] Stober, D. Istraživanje vrijednosnih stavova o održivosti riječnog krajolika Mure i Drave, *Gospodarske i kulturne odrednice regionalnog identiteta*, Šundalić, A.; Zmaić, K.; Sudarić, T. (ur.) Osijek: Ekonomski fakultet u Osijeku, 2011. pp. 243-258.
- [44] Biglans, A. Relationships between subject matter characteristics and the structure and output of university departments. // *Journal of Applied Psychology* 57, 3(1973), pp. 204-213.
- [45] Becher, T. The significance of disciplinary differences. // *Studies in Higher Education* 19, 2(1994), pp. 151-161.
- [46] Porteous, J. D. *Environmental Aesthetics: Ideas, Politics and Planning*, Routledge, New York, 1996.
- [47] Schultz, P. W.; Zelezny, L. C. Values as predictors of environmental attitudes: evidence for consistency across 14 countries. // *Journal of Environmental Psychology*. 19(1999), pp. 255-265.
- [48] Marinović-Uzelac, A. *Prostorno planiranje, Dom i svijet*, Zagreb, 2001.
- [49] Inglehart, R. F.; Welzel, C. *Modernization, cultural change, and democracy: the human development sequence*. // New York, Cambridge University Press. 2005.

#### Authors' addresses

##### **Dina Stober, dipl. ing. arh.**

Sveučilište Josipa Jurja Strossmayera u Osijeku  
Građevinski fakultet Osijek  
Drinska 16 a  
HR-31000 Osijek, Croatia  
dstober@gfos.hr

##### **Prof. dr. Andrej Pogačnik, dipl. ing. arh.**

Univerza v Ljubljani  
Fakulteta za gradbeništvo in geodezijo  
Jamova 2  
SLO-1000 Ljubljana, Slovenija  
andrej.pogacnik@fgg.uni-lj.si

##### **Prof. dr. sc. Sanja Lončar-Vicković, dipl. ing. arh.**

Sveučilište Josipa Jurja Strossmayera u Osijeku  
Građevinski fakultet Osijek  
Drinska 16 a  
HR-31000 Osijek, Croatia  
sloncar@gfos.hr