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RESEARCH METHODS IN LANDSCAPE ARCHITECTURE; AN ANALYTICAL FRAMEWORK AS BASIS FOR RESEARCH FOR THE REDESIGN OF 19TH CENTURY PUBLIC PARKS IN CENTRAL AND EASTERN EUROPE

METODY BADAWCZE W ARCHITEKTURZE KRAJOBRAZU; ANALITYCZNE STRUKTURY JAKO PODSTAWY BADAŃ PRZY PROJEKTACH REKOMPOZYCJI XIX-WIECZNYCH PARKÓW PUBLICZNYCH W EUROPIE ŚRODKOWEJ I WSCHODNIEJ

ABSTRACT

This article will focus on an analytical framework as a research tool in design disciplines. Key problem for an analytical framework in landscape architecture is how to deal with the dynamics of landscape form, design and use in the design process.

We start with a short overview will be given of analytical frameworks. In the second part some generic principles of analytical frameworks will be applied in three case studies of 19th century public parks. The third part will focus on how results of such an analysis can be used for the future and how results of people-environment studies can be part of that.

One of the conclusions is, that people-environment studies can play a role before, during and after the design process. In most cases results of people-environment studies cannot be applied directly but rather as part of an iterative process of research and design.

Key words: design process, design and use, design knowledge, design and research, case study approach, people-environment studies

STRESZCZENIE

Artykuł skupia się na strukturach analitycznych jako narzędziach badawczych w dyscyplinach projektowania. Kluczowym problemem dla struktur analitycznych w architekturze krajobrazu jest sposób radzenia sobie z dynamiką formy krajobrazu i wykorzystania jej w procesie projektowania.

Zaczynamy od krótkiego przeglądu struktur analitycznych. W drugiej części niektóre ogólne zasady struktur analitycznych zostaną zastosowane w trzech studiach przypadków dziewiętnastowiecznych parków publicznych. Trzecia część skoncentruje się na tym, w jaki sposób wyniki takiej analizy mogą być wykorzystane w przyszłości.

Jednym z wniosków jest to, że badania ludzie-środowisko mogą odgrywać rolę przed, w trakcie i po procesie projektowania. W większości przypadków wyniki badań ludzie-środowisko nie mogą być stosowane bezpośrednio, ale jako część iteracyjnego procesu badań i projektowania.

Słowa kluczowe: proces projektowania, projektowanie i użytkowanie, wiedza projektowa, projektowanie i badania, podejście studium przypadku, badania ludzie-środowisko

1. INTRODUCTION

Design is gradually moving from ‘black box’ approach based entirely on personal experience and tacit knowledge, towards knowledge-based design. A condition for knowledge-based design is to make design knowledge, which is ‘hidden’ in realised projects and the minds of their designers, explicit. To develop this design knowledge demands for a systematic analysis of plans which searches for design principles, approaches and methods.

In design disciplines, learning from earlier projects by analysing plans is common practice as a way of acquiring new design knowledge (Toorn, Guney, 2011). Analysing plans on the basis of an explicit analytical framework is called ‘precedent analysis’. An analytical framework is a conceptual tool for analysis and used as a guideline in the research process. Analytical frameworks are also used in precedent analysis in other disciplines (law, medical sciences, engineering). ‘Precedent’ is a general term for any earlier project, event or case. In that context the case study method is used as a basis for a generic research approach, but has to be adapted for use in design disciplines by developing an explicit analytical framework, that can be used as a guiding principle in the analysis of precedents.

Knowledge-based design implies, that the role of research in the design process is becoming more important. In the development of design knowledge different types of research play a key role; research

on evidence, precedent analysis, Post Occupancy Evaluation (POE) (Zimring, Reizenstein, 1980; Nasar, 2008; Brown, Corry, 2011; van den Toorn, 2015). In this article we will focus on precedent analysis, the analysis of plans.

In a research project on the 19th century public parks, we have developed an analytical framework, which forms a guideline in the research and design process.

In this article, we will illustrate, how such an analytical framework actually works in three case studies.

In architecture, analysis of plans has been done for some time, both by architects and by non-designers. In his classical study on cross-cultural architecture ‘House form and culture’, Rapoport (1969) analyses, how the need for shelter has developed into quite a diversity of house forms over time and in different parts of the world.

In landscape architecture the development of the landscape as a living environment for people is different from architecture with its focus on buildings as autonomous elements. In the landscape the focus is more on the process and organisation of space in time, which makes it not only more dynamic, but also different in terms of forces behind the form — such as natural, socio-economic, cultural forces.

The overall goal of the article is to show, how an analytical framework can function as guideline in design research, for this article, how to analyse historical urban parks in the context of planning and

design of contemporary urban landscapes. Key part of the question is, how to analyse plans in landscape architecture?

Research questions:

- What is an ‘analytical framework’?
- How can it be applied in the analysis of 19th century urban public parks?
- What does the use of an analytical framework mean for the relation between research and design, and in particular for people-environment studies?

In this article a special part of the living environment is analysed: three 19th century public parks in the urban landscapes of Central and Eastern Europe. These parks are now in bad state of maintenance and are in process of changing use and users.

Describing, analysing and comparing these parks from the viewpoint of design history requires a systematic and explicit approach. Overall the research approach is based on the principles of case study research (Francis, 1999; Yin, 2003; Zeisel, 2006). So each park is considered as a case study and analysed separately. The results of the analysis of each case accumulates knowledge by refutation and validation of former results on the matter.

In the analysis we make use of on an explicit analytical framework in order to be able to compare different parks in different countries by different designers. The research methods comprise first of all an investigation of the existing material — mostly in the languages of the country — and on the basis of that information additional fieldwork and site analysis, precedent analysis, literature research.

An analytical framework comprises scope and limits, presuppositions, definition of terms, approaches, methods and techniques, that are needed for the analysis; the decomposition of plans. It forms the basis for the analysis of plans, being systematic, coherent and explicit. Goal of the analysis is to analyse plans in a systematic way with regard to program, design means, functioning, use and performance. Moreover to enable comparison between different plan types and inside one plan type. Always keep in mind, that an analytical framework is a mental construct and a tool, not a goal.

Definitions and terminology, that are important in this article:

- Design knowledge
Knowledge — declarative, procedural, tacit — that is needed in the design process from problem analysis to realisation of the plan.
- Design history
The chronological sequence of planning and design interventions of a project.

- Design means
Interventions, that form the content of the plan from design concept to realisation; we distinguish here ‘design principles’, ‘types used’, ‘materialisation’.
- Landscape architecture
Landscape architecture comprises the planning, design and management of the landscape (ECLAS, 2014). Many disciplines and professions deal with the landscape, but in landscape architecture the landscape is object of planning, design and management. Usually three basic types of landscapes are distinguished: urban, rural and infralandscape. Infralandscape are landscapes, that are directly and indirectly influenced and affected by flows of people, matter, energy or information.

2. ANALYTICAL FRAMEWORKS AS USED IN LANDSCAPE ARCHITECTURE

Any research project always needs to make clear in the very start, what are the goals, what is the scope and how is the research being done. In research terms: what is ontology, epistemology and methodology and how are these concepts related in the research project? Since research in design disciplines is not a ‘clear cut’ and well-defined approach — to put it mildly — an analytical framework is used as a conceptual guideline for research. It does explain its origin in presuppositions, approach and methods. So, it is first of all a conceptual tool for analysis and used as a guideline in the research process. In all research you always need an analytical framework in some or another form. In design disciplines it is in many cases implicit. Analytical frameworks as research tool are quite common in social sciences, medical sciences and engineering, in design disciplines they are getting more and more used.

To illustrate how analytical frameworks are used, we will present three studies.

2.1. Three examples: Baljon, 1992; Pinon, 1994; Goossens et al., 1995 in three studies the use of an analytical framework will be explained

Pinon, 1994

Pinon analysed twelve plans of urban reconstruction or extension in France on the basis of an explicit set of criteria (‘grille d’analyse’), which can be considered as an analytical framework.

Here we show the study of the island of Île Seguin in the Seine River in Paris (fig. 3).



Fig. 1. The site and its context of Parc de la Villette, Paris.

Baljon did a study on the comparative analysis of the entries for the competition (Barzilay et al., 1984) of Parc de la Villette (fig. 1).

The study of Baljon (1992) is an example of using and describing explicitly the background of the analysis (fig. 2). Since the plans were entries for the international competition of La Villette, all plans were at the same scale. It is predominantly an analysis of design means.

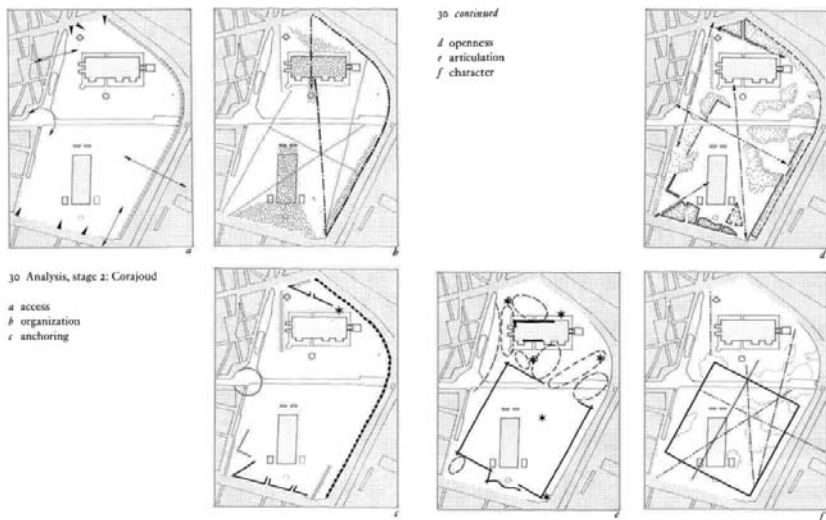


Fig. 2. Parc de la Villette, Paris.

Analysis of structure and elements in one of the entries for the competition (Baljon, 1992) in four steps:

1. The first stage explores the graphic composition of the plan and results in a representation of points, lines and planes.
2. In the second stage the following question is posed: 'What is the significance of the graphic composition for the spatial functioning of the park?'
3. The third stage considers, which design principles direct the designers' approach to the conditions, potentials and meanings, both of the site and of the requirements of the programme.
4. The fourth stage explores, which concepts of form have been used in the design, how is styling used to concretise the spatial structure?

By means of this characterisation an attempt is made to comprehend the logic of the spatial forms and patterns:

- inventive and spiritual (innovative),
- virtuosic and ingenious (mannerist),
- perfunctory and unimaginative (cliché'd),
- indolent and sensationalist (populist),
- austere and clinical (formal),
- artless and unpretentious (informal or pragmatic).

Note, how in this study the site and levels of intervention are included in the analytical framework. The use of an explicit analytical framework enabled the comparison of the results with the same type of projects in different locations.

Goossens et al., (1995)

A study about the quality of public space in the city of Rotterdam and its surroundings.

In the descriptions and analysis all aspects of the design process are dealt with: planning, design, politics, financing of public space, realisation and management.

Comparison of projects is in this case made possible by redrawing all plans to the same legend (fig. 4). In fact the analytical framework forms the legend. In this study, implicitly the functioning and use of the projects has been taken into account.

In a comparative overview (fig. 5) the three analytical frameworks are compared.

2.2. Analytical frameworks, headlines

Unlike in the natural sciences, in design disciplines there is not one scientific method, that forms the basis for all research. Landscape architecture is a knowledge domain, that comprises science, art and engineering. In addition, all research and design takes place in real life, in real time, no reduction as in the natural sciences takes place. That's why an analytical framework is needed to organise and guide the research and design process, so that it can organise research questions, site analysis, design principles in case studies into a coherent approach for generating new design knowledge (Coral, Bokelmann, 2017).

For the study of design knowledge in landscape architecture a dedicated analytical framework for landscape architecture has been developed (van den Toorn, Guney, 2011; Donadieu et al., 2012; van den Toorn, 2017).

An analytical framework is not fixed, but evolves during the research process in a series of

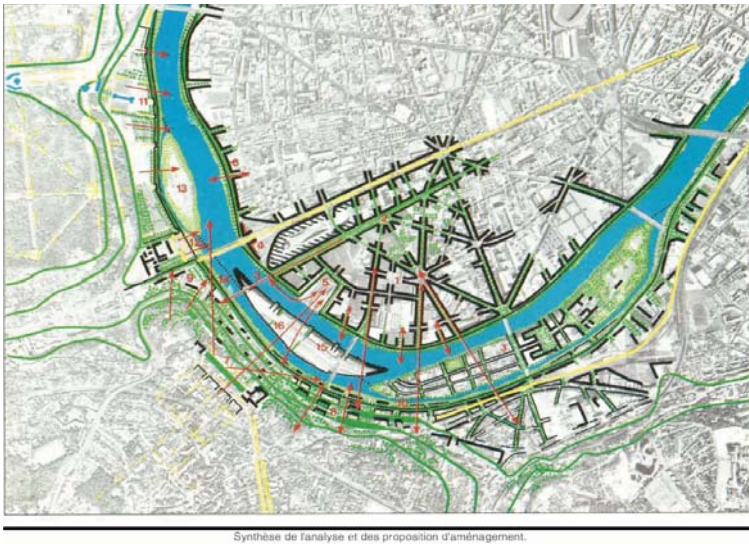


Fig. 3. Analysis of plan for Île Seguin, Boulogne-Billancourt, Paris.

The criteria are:

- Assignment and program: this is to present the site and the assignment, and to specify the form of consultation, to which the project responds.
- Consistency of the project: this involves identifying the type of intervention (substitution, extension, creation) and presenting the levels of interventions (roads, plots, buildings and open spaces) implemented or not.
- Criteria for analysis: types of intervention, levels of intervention and constituent elements, essence of instruments and modes of composing, temporal terms, correspondences between types and levels of intervention.

Conclusion: evaluation, confrontation with other projects.

Note, how the plan for the island is related to both banks of the Seine River.

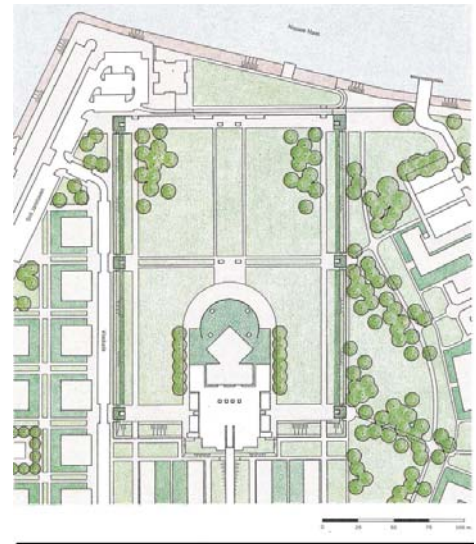


Fig. 4. Analysis of plan for Dokhaven Park, Rotterdam.

In the study five types of interventions have been distinguished, that cover the entire city, not only the city centre:

1. Urban and regional green structure.
2. Urban expansion.
3. The city centre and subcentral areas.
4. Urban renewal.
5. Workscapes.

In these five types of interventions altogether 35 projects are described and analysed by re-drawing all plans based on the same legend: materials, ground, water, plantation, metalling, pavements, footpath, pavements in light colours, pavements in dark colours, buildings, special elements.

Plans have been redrawn in order to enable comparison: the analytical framework is the legend.

Baljon, 1992	Pinon, 1994	Goossens et al., 1995
<p>Baljon did a study on the comparative analysis of the entries for the competition of La Villette in four steps. Only the winning entry was realized.</p> <p>The analytical framework focusses on the analysis of design means.</p>	<p>Pinon analyses twelve plans of urban reconstruction or extension in France on the basis of an explicit set of criteria ('grille d'analyse'), which can be considered as an analytical framework. The plans are realized, but in this study only the plans have been analysed.</p> <p>In this study also the levels of intervention are included in the analytical framework. The use of an explicit analytical framework enabled the comparison of the results with the same type of projects in other locations.</p> <p>Note, how in this analysis the urban context is taken into account.</p>	<p>A study about the quality of public space in the city of Rotterdam and its surroundings. In the study five types of interventions have been distinguished, that cover the entire city. In these five types of interventions altogether 35 projects are described and analysed by redrawing all plans based on the same legend.</p> <p>All plans in the study have been realised.</p> <p>Comparison of projects is in this case made possible by redrawing all plans to the same legend. In fact the analytical framework forms the legend.</p>

Fig. 5. Comparative overview of analytical frameworks in three studies.

Three analytical frameworks in landscape architecture compared; note, that none of them pays attention to functioning and use in relation to design interventions.

iterative steps between problem analysis, intermediate results, reformulating the problem, new results. It functions as a guideline. So, it provides a structure for the working process, but is dynamic in the elaboration and application of research methods depending on intermediate outcomes.

In this study it is used to analyse plans (precedent analysis) to acquire design knowledge on the planning and design of historical urban parks.

It comprises phases in the design design process (perception, analysis, synthesis) related to different levels (element, structure, process). At each level of intervention specific design means can be distinguished being made up of: design principles, types used, materialisation.

In the research approach for precedent analysis usually three steps in plan development are distinguished: the situation before intervention, the plan

(intervention), the situation after realisation (fig. 6). Key to the precedent analysis is to analyse, how existing site, program, design means have influenced (or not), how the plan functions, is used by people and performs after realisation.

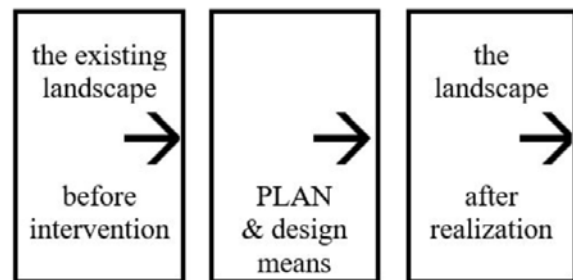


Fig. 6. The basis for analysing plans.

The analytical framework is used as a guideline for the systematic analysis of plans. In its most basic form it comprises three subsequent steps.

Before intervention	<i>landscape as a natural system</i>	<i>landscape as a socioeconomic system</i>	<i>landscape as a cultural system</i>	Plan; design means	<i>design principles</i>	<i>typed used</i>	<i>design materials and metalling</i>	After realization	<i>functioning</i>	<i>use</i>	<i>performance</i>
level of element	–	–	–	level of element	–	–	–	design principles	–	–	–
level of structure				level of structure				typed used			
level of process				level of process				performance			

Fig. 7a. The site before intervention.

What are the levels and how does the landscape function?

Distinction of three levels:

In a plan context there are not only levels in the existing landscape (the study area), but also levels of intervention are distinguished. These levels of intervention are defined by the size and contour or the plan area and the program. At each level of intervention we distinguish design means:

- the landscape as a natural system,
- the landscape as a socioeconomic system,
- the landscape as a cultural system.

The functioning at different levels can be represented in a matrix.

Fig. 7b. The plan and its design means.

What design means have been applied and how?

In a plan context there are not only levels in the existing landscape (the study area), but also levels of intervention are distinguished. These levels of intervention are defined by the size and contour or the plan area and the program. At each level of intervention we distinguish design means:

- design principles,
- types used,
- materialization,
- design materials,
- metalling,
- pavement,
- transitions.

How the design means function on each level of intervention is represented in a matrix.

Fig. 7c. The plan after realisation.

How the landscape functions and is used after realisation of the plan is analysed through: efficiency, efficacy of design means in relation to site and program.

Efficiency means acting or producing something with a minimum of waste or expense or effort. So the effect is related to means. Efficiency in design context relates to the use of design materials, to energy use, use of water. In general, when goals are defined and how these goals are to be accomplished with the least use of energy, materials, efforts.

Efficacy deals with the question, whether the design means, did have the intended effect. It has to do with the ability or capacity to do something, but not about how to do it. That is where efficiency comes in.

Performance refers to the quality of design, some design interventions not only function and work as required, as described in the program, but initiate extra forms of use, or are very well functioning or working, they perform well.

2.3. Use of an analytical framework in research and design

Why is an analytical framework needed?

In the sciences, where the everyday world is reduced, the need for an analytical framework is less obvious because the ‘scientific method’ provides the necessary framework. In science there is one scientific method, which varies slightly depending on the different disciplines, but its framework of reduction, modelling, testing remains the same.

In design disciplines, research is always related to design, but so are the research methods diverse, dependent on the problem and context. Indeed a generic background for all research is the case-study approach, but that is so general, that it always needs further elaboration into a specific research approach and method, which we call an analytical framework. It functions first of all as a basis for a systematic way of working.

In design, where the everyday world is object of planning and design, to do research there is a need to define scope, context, approach in the form of an analytical framework.

Secondly to have a standardised approach for the analysis of different cases in order to enable comparison.

Design as an iterative process

In landscape architecture there is no design without research — think for instance of a site analysis — but also no research without design (Motloch, 2001).

Design problems are never well-defined and ready-to-start. In that context Rittel and Webber (1973) coined the term ‘wicked problems’. Wicked problems do not have clear yes or no solution. There are only better or worse solutions to wicked problems. In design the problem is always ill-defined; hence the need for a problem analysis in the start of any project. Zeisel (2006) puts forward the idea of first analysing the problem in its context, scope and possibilities in the form of a ‘problem analysis’. Such a problem analysis helps to define, what he calls a ‘problem space’.

This intricate relation between design and research also dominates the design process itself, where problem and intermediate solution are constantly interacting (Buchanan, 1992). Core activity in this iterative process is ‘design thinking’ (Rowe, 1987), in which imagining, conceptualising and drawing play a role (Lawson, 1980).

Design thinking is a problem solving approach, that is used to address ‘wicked problems’.

In such an iterative process, new insights from research open new opportunities and limitations and lead to new concepts, these new concepts initiate new research questions.

3. APPLICATION OF ANALYTICAL FRAMEWORK TO CASE STUDIES; THREE 19TH CENTURY PUBLIC PARKS IN CENTRAL AND EASTERN EUROPE

The analysis of 19th century public parks in Central and Eastern Europe is part of a larger project under the code name HYPPE, which was initiated at the Faculty of Landscape Architecture and Urbanism in Budapest. Goal of the project is to analyse the design history of this type of parks as a basis for planning and design of the parks as part of the urban landscape for the future. The project comprises in total nine case studies, in which nine schools of landscape architecture collaborate.

<i>Application in 3 case studies</i>	Kalemegdan Park, Belgrade	Sad Janka Kráľa, Bratislava	Maksimir Park, Zagreb
<i>before intervention</i>	X		
<i>plan development</i>		X	
<i>after realisation</i>			X

Fig. 8. Analytical framework applied to three case studies. In this paper we have chosen three case studies — Kalemegdan Park, Belgrade, Sad Janka Kráľa, Bratislava, Maksimir Park, Zagreb, City Park — just to research the approach and principles.

The case studies in this article are part of the above-mentioned international research project (HYPPE), here we focus on three case studies: Sad Janka Kráľa, Bratislava; Maksimir Park, Zagreb; City Park, Kalemegdan Park, Belgrade. In each of the case studies only one part of the precedent analysis is briefly described and analysed (fig. 8).

3.1. City Park, Kalemegdan Park, Belgrade

Focus on landscape before intervention: what was the site before plans were made?

The Kalemegdan Park is a 19th century public park within the Belgrade fortress located at the confluence of the Sava and Danube River. The Belgrade fortress complex is a Monument of culture of exceptional importance and dates from 1869 (Jelavich, 1999 [1]; [2]; Ćorović, 2010). Due to its dramatic site conditions at an elevated point, where two rivers come together, it is the element in the urban landscape structure, whose distinct landscape character accounts for a distinct spirit of place — a *genius loci* in the region at large. It is the largest urban park in Belgrade (53 ha) and heavily used both by locals and visitors.

Kalemegdan is directly connected to the old part of the city of Belgrade and as such part of the urban landscape of Belgrade.

The landscape before intervention is analysed on the basis of the landscape and its different systems: the natural system, socio-economic system and cultural system (fig. 9).

the existing landscape before intervention	the landscape as a natural system	the landscape as a socio-economic system	the landscape as a cultural system
level of element	—	—	—
level of structure			
level of process			

Fig. 9. The existing landscape before intervention. The landscape as a system at different levels.

The landscape as a natural system

The landscape as a natural system is dominated by topography and landform of the site of the city at large and its relation to the two rivers (fig. 10).

The distinct and dramatic landscape structure still defines and characterises the urban landscape of Belgrade at large.

The landscape as a socio-economic system

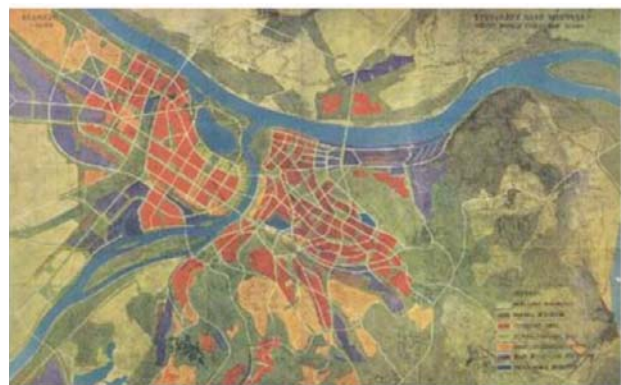
In the course of time the city has developed on both sides of the Sava River, but only on the left bank of the Danube. The old city of Belgrade is



Fig. 10. Belgrade and Kalemegdan Park — contour lines and rivers.

‘Belgrade and the elevations as basis for the natural system’ (Loannidou, 2014).

On a more detailed scale the elevation of more than 120 meters defines also the relatively narrow edges around the park, that are basically the banks of the river.



Сл. 16. Генерални план Београда (1950). Општи план Генералног плана, рус. издање арт. Милош Стамболић, рачунари 1:10.000 (извор: „БЕОГРАД Генерални урбанстички план 1950“, ур. Оливер Милош, Изградња одбор НО Београда, 1951)

Fig. 11. Belgrade and Kalemegdan Park, Master plan 1950.

‘Belgrade and the urban development’ (Vrzić, Grozdanić, 2011).

Railway connections and port on the left bank of the Danube define the 19th century economic functioning of the city. The urban extension on the left bank of the Sava River shows a rational layout and courser grid structure. The new airport is also located in this part. Motorways and airport define the contemporary economic functioning of the city.

directly connected to the area of the Kalemegdan Park (fig. 11).

The internal structure of the Kalemegdan Park is first of all defined by its distinction between the great, the little park and the lower areas close to the rivers. The great park can be considered as a transition zone between the fortress and the town. The little park is largely occupied by the Belgrade Zoo.

The landscape as a cultural system

Belgrade was founded in 1867, after the Ottoman withdrew from the site, the area became a park. The first plan provided the same structure, which is still visible today (fig. 12).



Fig. 12. Kalemegdan Park in relation to the rivers and the city of Belgrade in the 19th century.

Belgrade in the first half of the 19th century (1815–1862), plan compiled by Ž. Škalamera ('Istorija Beograda', vol. II, ed. V. Čubrilović, Belgrade: Prosveta, 1974), (Vrzić, Grozdanić, 2011). In its development over time the park can be characterised by the change of the military function to cultural monument, that stands for a long history of the city and for the country.

We conclude, that both the natural setting of the park and its long history of plan development have contributed to the contemporary situation. In a plan development for the future, next to program and site, these two aspects need to be taken into account. This history of the place is a major factor in the contemporary role of the park in the urban landscape of Belgrade.

The genesis of the landscape is characterised by a transition from military function to cultural monument.

3.2. Sad Janka Kráľa, Bratislava

Focus on plan and design means

Sad Janka Kráľa Park is a historical urban park in Bratislava, which was established already in the 18th and covers now 42 ha (Gutkind, 1972; Taylor, 2008). It is located on the right bank of the Danube River and is separated from the historic town by the Danube River.

It is intensively used by citizens and tourists, but is in bad condition due to lack of management, maintenance and not being adapted to contemporary conditions for use (Tóth, van den Toorn, 2018).

Design means stand for the means, that enable site and program to be transformed into a new landscape (fig. 13).

the plan: design means at each level	<i>design principles</i>	<i>types used</i>	<i>materiali- sation</i>
level of element and materiali- sation	—	—	—
level of structure and structuring			
level of process and strategy for landscape development			

Fig. 13. The plan at its design means at different levels of intervention.

We distinguish three main factors, that comprise the design means: design principles, types used, materialisation. In the materialisation of form we distinguish three basic components: design materials (ground, water, plants), metalling, pavement and transitions.

Design principles

The design principles for the park are twofold, first the choice of the location, and secondly the internal structure. The choice of the location was based on the strategic position in military sense. The design principle for the internal structure of the park is based on the connection to the city and to shape of the former island in the river (fig. 14, 15).



Fig. 14. Bratislava and the Danube River before diking. The location was before the regulation of the Danube River characterised by an island in the river.

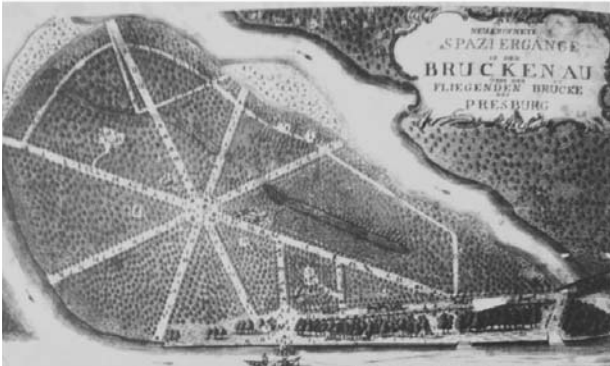


Fig. 15. The island after diking: a radial structure with a main axis. One of the first plans for the park: contour and structure refer to the former island although the contour is different from the image in fig. 14. The path system does not show any relation to the old city, there is also no bridge indicated.

Note, that this plan is south oriented; the river is at the bottom!

Types used

Even though the internal structure of the former island is designed in a radial pattern, the longest line is an Axis, that is more or less parallel to the longitudinal form of the island. This axis is still recognisable in the contemporary situation. So, in this case the axial structure is the most character-

istic type. While formerly this area was part of the river forelands of the Danube and most likely in forest, the park can still be considered as a special type of forest.

Materialisation

The forest type also comes back in the material form: tree plantation is the dominant design material. Note, that the land is now — for the largest part of the year — lower than the level of the river. Due the dike, the river is not visible from the park itself, while it is next to the river.

3.3. Maksimir Park, Zagreb

Focus on how the plan is used and experienced after realisation (fig. 16).

After realisation: relations between design means and use	functioning	use	performance
design principles	—	—	—
types used			
performance			

Fig. 16. The plan after realisation.

How is the plan functioning and working after realisation and how is that influenced by design?

Maksimir is the oldest urban park in Zagreb and even though it got much smaller in size due to illegal urbanisation, it is still large: 316 ha in size. Its original foundation dates back to the 18th century, when it was located outside the city (Lavedan, 1952; Ogrin, 1993). It is located at a slope and comprises, lakes, meadows, forests, park buildings. Besides a major green space for the citizens, it is also a cultural monument for the city and is heavily used by tourists as well.

In the course of time a series of plans have been made for the Maksimir Park, which has been repre-

sented in a time line (Rechner Dika, van den Toorn, 2018).

How is the park used in the contemporary situation (fig. 17)

Use

In the past the park has been used mainly by the citizens of Zagreb for leisure, even at a time when it was located outside the city (Šćitaroci & Šćitaroci,

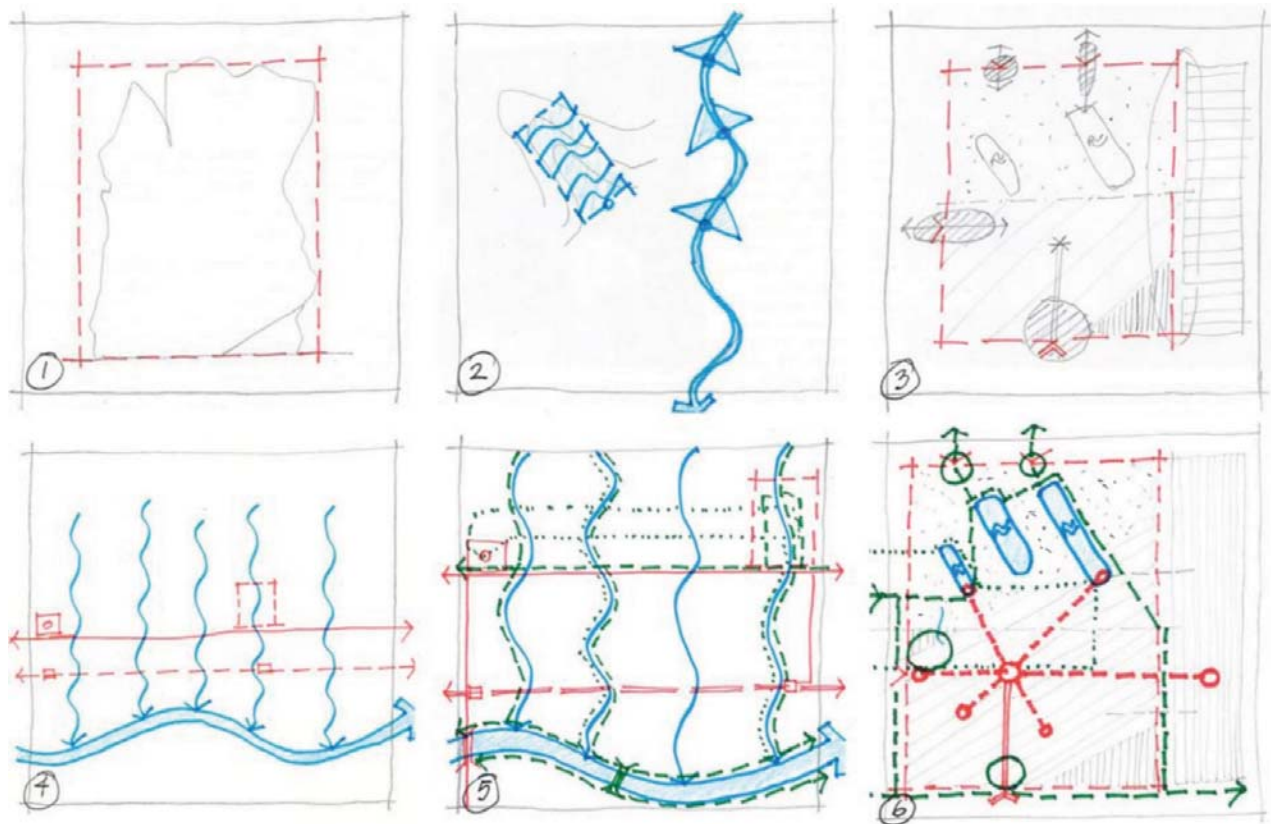


Fig. 17. Conceptual sketches for future development of Maksimir Park.

The very first issue to tackle is the defining of the boundaries and formalise them (#1). Second step is the improvement of the water storage and the infiltration into the underground to diminish the run-off into the Sava River, at the same time building hydropower units in creeks and water reservoirs (#2). A third step would be to reorganise use in the park and integrate into the park system of Zagreb by improving connections to the city for slow traffic. This would also include to displace the zoo to a better location in the city with more space.

The concept of park systems, where parks are not only considered as elements, but also as parts of an urban green structure, is very interesting for Zagreb, because of the relation to the water system, since the city itself is also part of that same water system. From a viewpoint of landscape as a natural system the parks should take into account the structure of the main water flow, that is North → South. From the viewpoint of use and users the East-West connections are important, connecting the city centre with the Maksimir Park (van den Toorn, Rechner Dika, 2018).

Functioning

The park has been functioning since its foundation as part of the natural system, as part of the watershed on the foothills. The reservoirs, that are part of the park, still function well and provide water storage, effective means in preventing peak discharges. Water storage could even be extended and contribute to improvement of the water management and conserving fresh water now part of the EU policy on water management (Directive, 2000; Chave, 2002).

2014; Rechner Dika & Toorn, 2018). Nowadays there are also other groups of users. First of all by people living in the neighbourhoods next to the park, but also by a growing number of tourists. Dolenc et al. (2012) see even a larger potential for tourism and compare Maksimir to urban parks in Western European cities.

Performance

The park is, despite its bad state of maintenance and poor management, very well used and performs quite well for different types of users. Interesting is the

emergence of a ‘Public Institution Maksimir Park’, a public body of citizens and concerned users, that represents and works for all users.

How has the plan development over time influenced this use and users?

Since its foundation in the 18th century there have been many changes in the park, both planned, and unplanned, resulting in a ‘layered landscape’ of different plans and interventions over time (fig. 18).

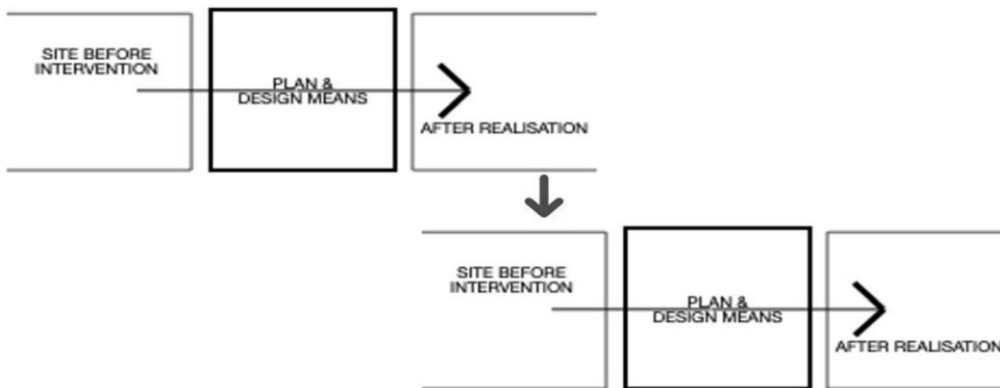


Fig. 18. The landscape of Maksimir Park as a ‘layered landscape’ of different plans. Over time a series of subsequent plans and interventions have been made. This layered structure is still visible in many parts of the park (Rechner Dika, van den Toorn, 2018).

To give an idea about ideas for future development design concept (van den Toorn, Rechner Dika, 2018) for the long run has been developed, relating to contemporary functioning and use, in which energy transition, water management, leisure and heritage are integrated (fig. 17).

4. LANDSCAPE ARCHITECTURE: THE TRANSITION FROM SUSTAINABILITY TO THE CREATION OF HEALTHY ENVIRONMENTS FOR PEOPLE

4.1. New challenges for designers in general and landscape architects in particular

Today, society at large demands new challenges to be met for the future: energy transition, improving water management and water storage and the creation of comfort and healthy environments for people. These challenges affect not only the work of landscape architects, but have also an impact on people-environment studies.

First of all, the energy transition to renewable forms of energy and the decentralisation of energy production. It will demand a new attitude towards limited resources of the carbon-based energy production and it will definitely decentralise energy production.

Secondly, the improvement of water management and fresh water storage. The shortage of fresh

water is already a problem in certain parts of the world, but will also affect the western countries, because of the increase of use of fresh water on an individual level and the increase of population. It is typically a long term problem, that needs structural intervention in the long run, not an easy task in political sense, since politics mostly focusses on the short term dictated by elections. The problem of inundations is explicitly also part of an approach to improve water management.

Thirdly, the creation of comfort and healthy environments for people. Air pollution has reached levels, that create conditions for the living environment, that are almost comparable to those of the 19th century industrial revolution. Drastic changes will have to take place in the planning and design of living environments, which are also directly related to energy transition and water management.

4.2. People-environment studies: use and experience of the daily environment is multi-dimensional

How people use their daily environment and how they experience and attach meaning to it, is multi-dimensional and certainly not a one-dimensional cause-and-effect phenomenon. Physical interventions as results of plans have a diverse and different effect on different users and groups of people.

It also means, that results of people-environment studies cannot be used as simple cause-and-effect in the design process, but require a multi-dimensional approach. Practically it means, that the results of people-environment studies should be part of an iterative and interactive exchange between results of research and ideas, proposals instead of a linear process of providing results of research, that can be directly implemented. So they can only be used in context of other information, such as design knowledge and design experience on the project at hand. In the design process, results of people-environment

studies should be used in combination with results of earlier experiences and contemporary design experiments.

Both the historical experiences being analysed in precedent analysis and the contemporary design experiments should be translated and abstracted into design principles. These design principles can be worked out into a specific site, because all design is place and time related.

4.3. The need of specific people-environment studies on design interventions

People-environment studies are partly specific in approach and subject. So far, we have not seen studies, that analyse the effect of design interventions in realised plans for users and their experiences specifically. It could enhance the design disciplines to a great degree in becoming more evidence-based, while at the same time maintaining the specific quality of design as integrating, synthesising of site, program and use, which can result in new meaningful environments for the future.

Before and after the design process ‘evidence-based research’ and Post Occupancy Evaluations (POE) could greatly improve daily design work and eventually lead to forms of ‘knowledge-based design’. Note, that design will never be a completely rationalised process, the role of intuition, invention and creation will always remain the core of what design can contribute to the creation of meaningful environments for people.

5. CONCLUSIONS

- For landscape architecture the transition from sustainability to creation of healthy environments for people forms the basis for a more integral design approach. Key elements in this approach is taking into account the long term and working on integrated solutions, that comprise the natural, social and cultural aspects in real life situations.
- Historical urban parks have, next to their regular function, as green space an important function, as cultural monument for the city and its inhabitants, which implies also different types of use and users. This cultural functioning is becoming more and more important also for the identity of the city.
- For the historical parks in these case studies, design interventions will be based on renovation of the parks, which means conservation through development based on site, design history, contemporary program.

- A systematic analysis of plans based on an explicit analytical framework will generate new design knowledge in the form of design principles, that can be applied in contemporary and future planning and design.
- Analysis of plans gives an insight and background on the design process and design methods, but also to the application of results of research on evidence as done in people-environment studies.
- People-environment studies produce research for the social sciences as well as research applicable in environmental design and landscape architecture, these different goals also affect the research methods.
- For the application of results of people-environment studies — and for that matter all social sciences — in design, it is always important to distinguish sharply between correlation and causality. In design we always deal with ‘real life’ situations. In all such cases causality is in most cases multi-dimensional; single cause-effect relations are rare.

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