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Characteristics of modern landscape architecture and its education

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Abstract

Landscape architecture must keep the advantage it has gained because of its wide use of the knowledge of landscape which no other related disciplines have. Detailed landscape design, creation of new spaces—new landscapes, and use of characteristic, alive landscape material as well as nature protection, landscape ecology and regional landscape planning require both a creative and a scientific approach. The essential ability that landscape architects have, i.e. the capability of switching between concrete details and even global landscape interactions—enables them to achieve different and often better results than might be developed by architects, artists, urban planners, biologists, ecologists and other colleagues when dealing with similar landscape problems. Examples of our work, deriving from "the layer-cake method" and applied to recent studio projects, are used to illustrate key statements in the paper. A link to the teaching process is made in order to offer small but important solutions on how to teach landscape students the most characteristic and useful landscape basics.

Keywords: Landscape planning methods; Landscape design; Design process; Education

1. Introduction

The peculiar character of the landscape architecture profession requires landscape architects to be familiar with both a wide range of knowledge from the field of natural sciences and artistic creativity at the same time. The dichotomy between art in the landscape architecture on one hand and science on the other is often quite clearly demonstrated in a broad range of our works. Landscape architects who call themselves land artists create art installations. It is a creative act of expressing their understanding of the world and not a process of solving spatial problems. On the other hand, there are many works done either by colleagues coming from "related disciplines" or by landscape architects who deal with specific themes to such an extent that they could also be called civil engineers, ecologists, computer scientists, etc. They can focus on natural processes, preserve the nature but fail to create a new interesting space when needed. In both extremes, the products are problematic. They are too partial, addressing few tasks and not try to incorporate the core of the profession: the essential basic knowledge of natural science combined with artist's creativity.

Landscape architecture is a complex and interdisciplinary profession. Dealing with spatial problems inside certain societal requirements, how can we actually define the subject of our work—the landscape with its characteristics and requirements? What is the specific knowledge that defines landscape architecture in relation to other disciplines? What is the basic knowledge we need to teach students in order to successfully deal with the landscape as professionals?

In order to find the answer to these questions, the present paper is based on the following hypothesis:

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there are specific landscape architectural methods and techniques, developed over the last 30 years, which have upgraded much older garden architecture approaches and distinguished our profession from other related disciplines. At the same time, landscape architecture has combined a broad range of knowledge deriving from the character of our object—the landscape as its entire complex, on-going natural- and human-caused processes require. Our methods are exact, transparent, explanatory and very communicable in order to communicate not only with related disciplines but also with the public. A creation of new landscapes requires an intuitive creative ability landscape architects need to combine with analytical systematical approach.

2. Methods

2.1. What is landscape architecture?

It is simply impossible to offer a systematic and analytical overview of landscape architecture with detailed and correct definitions of landscape architectural terms because there is no such thing. In order to do that the best thing would be to compare several landscape architectural dictionaries in different languages from different countries and compare definitions. However, because we do not have them yet maybe a negotiated agreement between European countries should offer a satisfactory definition of landscape architecture. Although ELCER (2000) includes many positive and valuable demands for better common landscape the landscape architecture is completely ignored (not even mentioned). It doesn't exist as a profession not even in chapters where education is discussed. Slightly better is definition of landscape planning: "landscape planning" is the formal process of study, design and construction by which new landscapes are created to meet the aspirations of the people concerned. It involves framing proper planning projects, more particularly in those most affected by change and badly damaged areas (for example suburbs, peri-urban, industrial areas and coastal areas). The purpose of such planning projects is to radically re-shape the damaged landscapes. Hopefully, objections of the ECLAS committee and proposals of new definitions and especially introduction of landscape architecture would in future enhance and modernize the mentioned convention.

To continue from the two extremes mentioned in the introduction, this paper shall rather try to look for a set of keywords, terms and products, and later search for a clear method that could distinguish our profession from the others instead of clarifying existing or non-existing definitions of landscape architecture.

A landscape architect, who is educated and trained in the field ranging from landscape planning and ecology to landscape design and techniques, can think of various subdivisions of our professions based on the actions we take, the scales we use and the products we make as shown in Table 1.

Obviously there is a great amount of different knowledge that well-educated landscape architects must master. The basic methods we use are a combination of artistic intuition and creativity with strong graphic expression on one hand and systematic, scientific analytical thinking on the other. The most characteristic examples are as described later, with the intention of highlighting methods from related disciplines that are directly usable in the field of landscape architecture. The selection of examples and use of terms is personal and can be extended or revised.

2.2. Creativity in landscape drawing

The basic mode of landscape architectural expression is graphical in the same way as in architecture. Garden art was parallel to architectural development; architects, great gardeners and later landscape architects would develop drawings to present ideas of future park and garden design. Graphic presentations and the use of drawings in landscape plans were at a very high level. Not only that plans looked like paintings, new gardens were often illustrated by famous painters of the time. Landscape painting was certainly developed before garden art and landscape architecture and for that reason, it seems important to start the investigation of the creative process from landscape drawing and painting in fine art. To compare painting and landscape architectural drawing one should analytically study a process of painting first. When painters create a painting they usually keep it at a very personal, intimate level. The process of making a painting is not important for the spectator—only the final product, the painting. Therefore, the artist often does not

Table 1
Most common keywords in landscape architecture

Action	Scale	Keywords
Regional or spatial planning	Down to 1:50000	Research, nature conservation, development, economy, demography, sociology, politics, (new) land use, GIS, models, zoning maps, diagrams, statistics, charts, etc.
Landscape planning	1:50000–1:5000	Research, corridors, areas, landscape ecology, spatial or simulation models: attractiveness, vulnerability, suitability; environmental impact assessment, processes, interactions, conservation, new land uses, GIS, zoning maps, diagrams, etc.
Landscape design (large scale)	1:5000–1:1000	Landscape ecology, research, process, change, new design, CAD, models, zoning maps, plans, drawings or sketches, diagrams, etc.
Landscape design (detailed scale)	Under 1:1000	Art, form, shape, change, new design, CAD, plans, drawings or sketches, technical solutions, details, landscape techniques, constructions, planting plans, drainage, irrigation, maintenance, etc.

bother to explain his inspiration or his "muse". What becomes interesting for understanding of landscape drawing or painting is an educational process at the fine art academies. When imitation or copying of the master's work became insufficient, teachers had to develop a theoretical framework of their art in order to add teaching methods for their students. Although the artistic approach, intuition, inspiration and creativity are so personal, that according to their essence, they cannot be taught, teachers are forced to develop methods in order to explain those processes and to teach artists how to develop their own creativity. Then, it is also a technical knowledge of the material painters and other artists use in their work, perspective, geometry but creativity remains a personal matter of each artist.

Do the landscape architects draw the landscape as painters do? Some are capable and talented enough to create beautiful landscape paintings, but creativity in presentation of real world—the landscape, is not our task. Landscape drawing in landscape architecture is characteristic for its analytical approach. The landscape is our main object of work and we draw in order to understand the landscape and to present it as objectively as possible. Expressions, feelings, the moods (like with painters) are not relevant, but the structure of the landscape and its characteristics are. Not in a naturalistic way but in an analytical mode using various partial drawings. In a landscape architectural drawing, the landscape is taken apart, landscape elements are classified and a transparent drawing is introduced. This is similar with architectural drawing which is composed of architectural elements, graphical presentation of architectural rules (such as composition) and additional explanations architects need once they return to studio from the field trip. Then they run a re-interpretation of existing forms in order to use them in a new creation (Fig. 1).

Landscape drawing is even more analytical than architectural drawing. Main reason is that there are many scientific facts related to the landscape structure we want to carry over from preliminary drawings to new design. We can include information about the geology by emphasizing geological—tectonic marks, in the landscape drawing. Even more, we work on characteristic topography: edges, corridors, lines, peaks, valleys, sinks, banks and many other features are clearly presented in landscape drawings. Basic soil information can be added by using cross-sections or transparent drawing of soil layers. Vegetation is another large group of elements carefully managed in our drawings. Creative part of the drawing is less important than the analytical one which has an important role to bring as many information about the landscape through drawing as possible (Fig. 2).

2.3. Design process

Architectural methods of work are older than landscape architectural and are—at least in the field of landscape design—very similar to what landscape architects use in their work. Beside that, a design process in architecture is theoretically elaborated through various texts of which Rowe (1992) 'Design Thinking' was used for the purpose of this paper. Rowe (1992) uses a very typical architectural approach in explaining how architects and designers minds operate. His

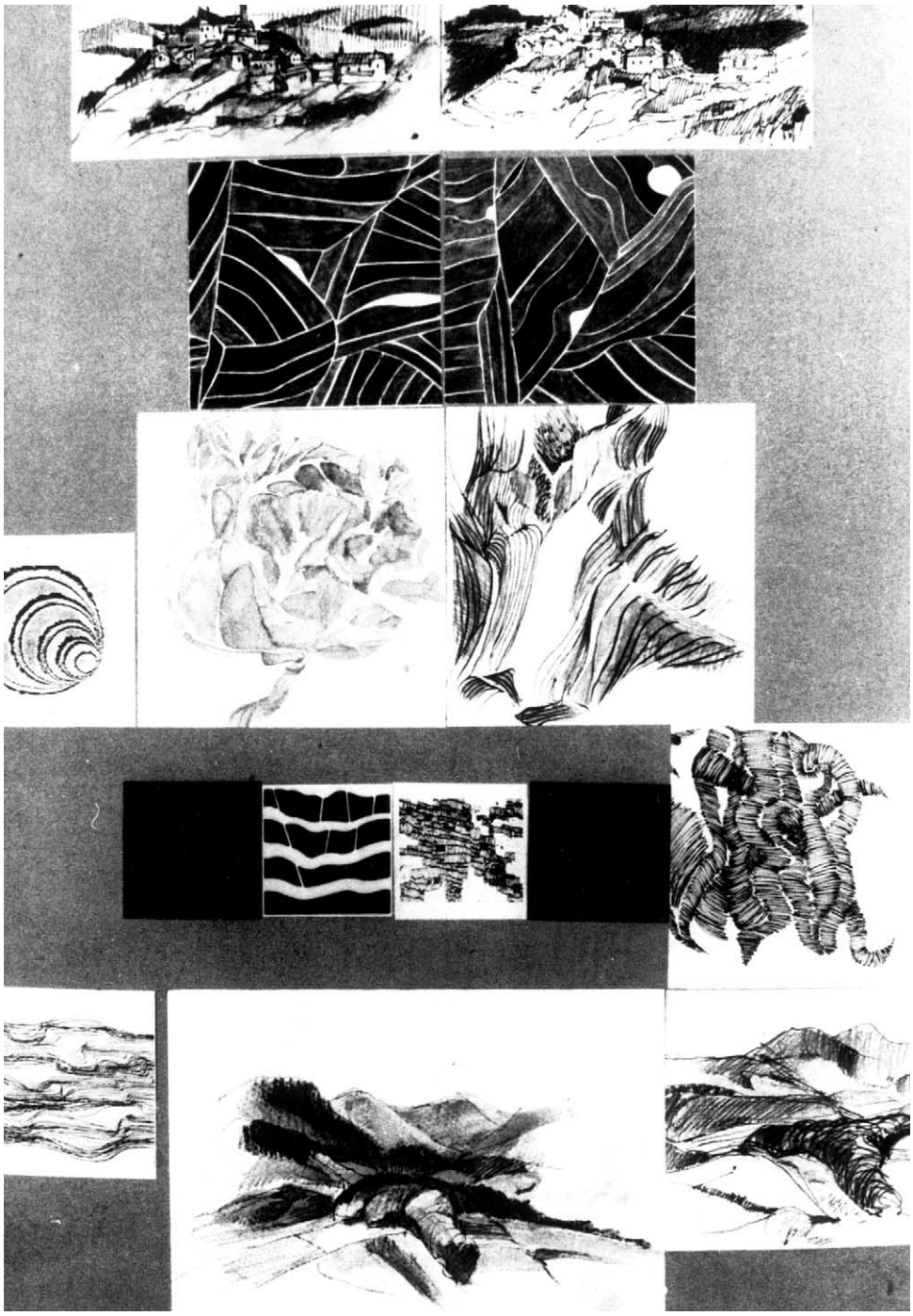

Fig. 1. In a drawing, techniques teaching process analytical distraction of landscape elements is used, existing forms, shapes and textures are read out of physical objects or landscapes and later used as the landscape elements that a designer would use in the further creative design process: the figure is an example of the drawing teaching method developed by Prof. Alojzij Drašler at the University of Ljubljana in course titled 'Landscape Drawing' for the first year students.

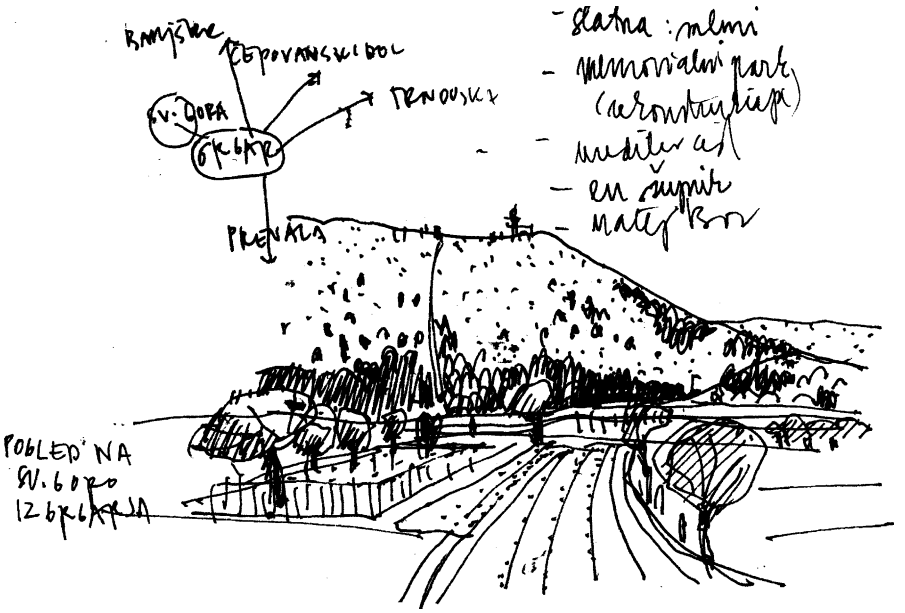

Fig. 2. Student's drawing from a field trip is clear and simple presentation of the landscape or rather of its components—topographical features and vegetation elements. An explanatory text about the location and other characteristics of the space is added (from the school archive).

theory has three characteristics. The first is an attempt to explain the procedural aspects of design process or thinking, as Rowe calls it. These aspects are general enough to be the same for landscape architects. The second is the use of architectural drawings for different projects showing several examples. The way in which the idea is shaped—or better, transferred onto the paper—is the same for all designers. It is about actual design thinking but with a pencil in the designer's hand. The floatation of the idea must be caught on paper in an objective drawing, such as sketch, diagram, ground plan, cross-section, perspective drawing, etc. Drawings are usually very personal at the beginning of the design process, yet become more and more readable in terms of using standard graphic elements for architectural drawing at the end. That is also what is claimed by Robbins (1994), who illustrates his ideas through interviews and real life projects and methods readable from drawings made by famous world architects, such as Silvetti, Piano, Rogers, Moneo and others. The architect's (designer's) first analytical stage is actually a creative search for the design idea rather than systematic analytical work. Design continues through more elaborated and detailed drawings introducing technical requirements for construction. The conclusion of the architect's work is a technical detailed plan of how to build the architecture, which is similar to many landscape design projects (Fig. 3).

Rowe (1992) provides a systematic explanation of design process in architecture and urban design which is hard to be explained. It is rather a conglomerate of various techniques architects use at their work. Creative search for architectural form is presented for example as well as many other formulas. In the third part of his design thinking text, he explains the architectural positions and their realms of inquiry. The major part of Rowe's work is architectural theory in terms of how he uses examples—architects and their work—to explain the design process. What is the most important part of his book for this paper is a point at which Rowe moves to the concept of the model (Rowe, 1992, p.163), referring to the work of Steinitz, 1990.[1] This link is important because it moves us from the architectural realm to spatial or landscape planning,

[1] Rowe refers to the book from 1970 titled 'A System Analysis Model of Urbanization and Change' by Steinitz and Rogers (MIT Press, Cambridge).

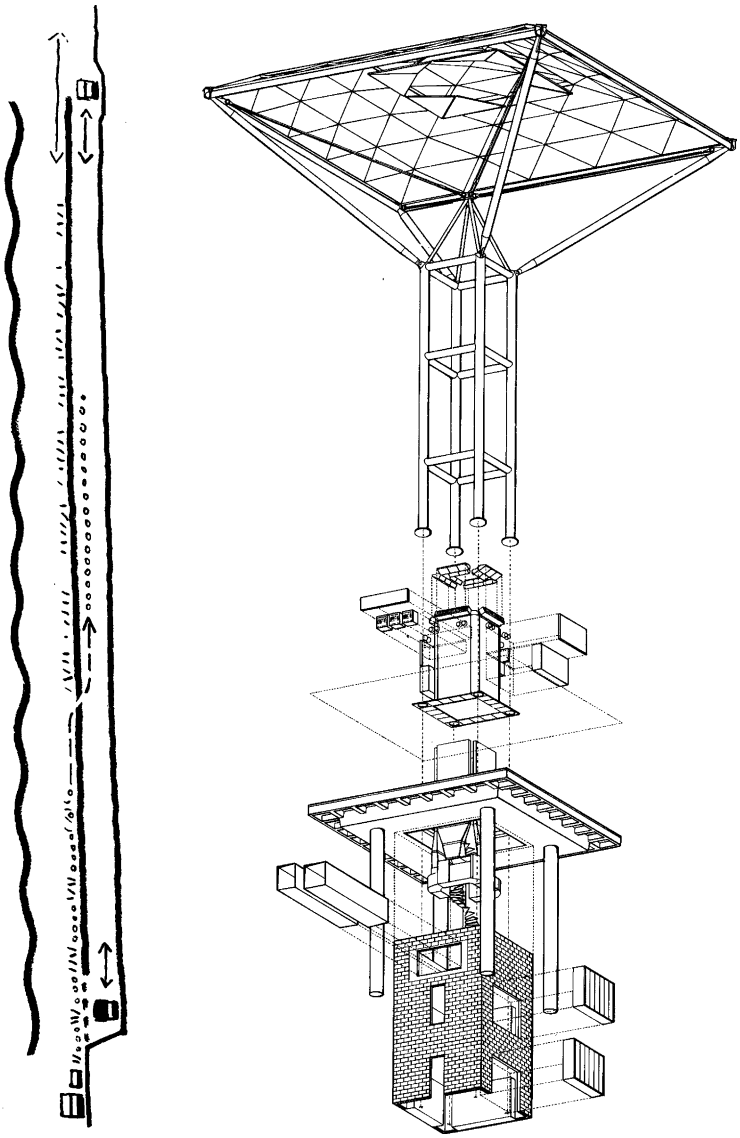

Fig. 3. Two examples of architectural drawings: an early creative diagram and final technical detail. The first sketch on the left is Foster's presentation of a basic design strategy for Stansted Airport. The next drawing is a technical detail of the same airport (Robbins, 1994, pp. 90 and 98).

from creative part to specifically systematical and analytical part of the design process. Spatial modeling is shifting the thoughts to landscape planning and to the heart of modern landscape architecture.

The first simple spatial modeling was done by Warren Meaning to be later further elaborated by McHarg (1969). Analytical extraction of landscape into thematic layers was an innovation not as a part of an analytical process but as a creative part of combining new layers back into a new landscape. Using hand-made maps and combine layer-by-layer was still creative part but introducing a scientific character of landscape architecture (planning) which is as shown in Fig. 4.

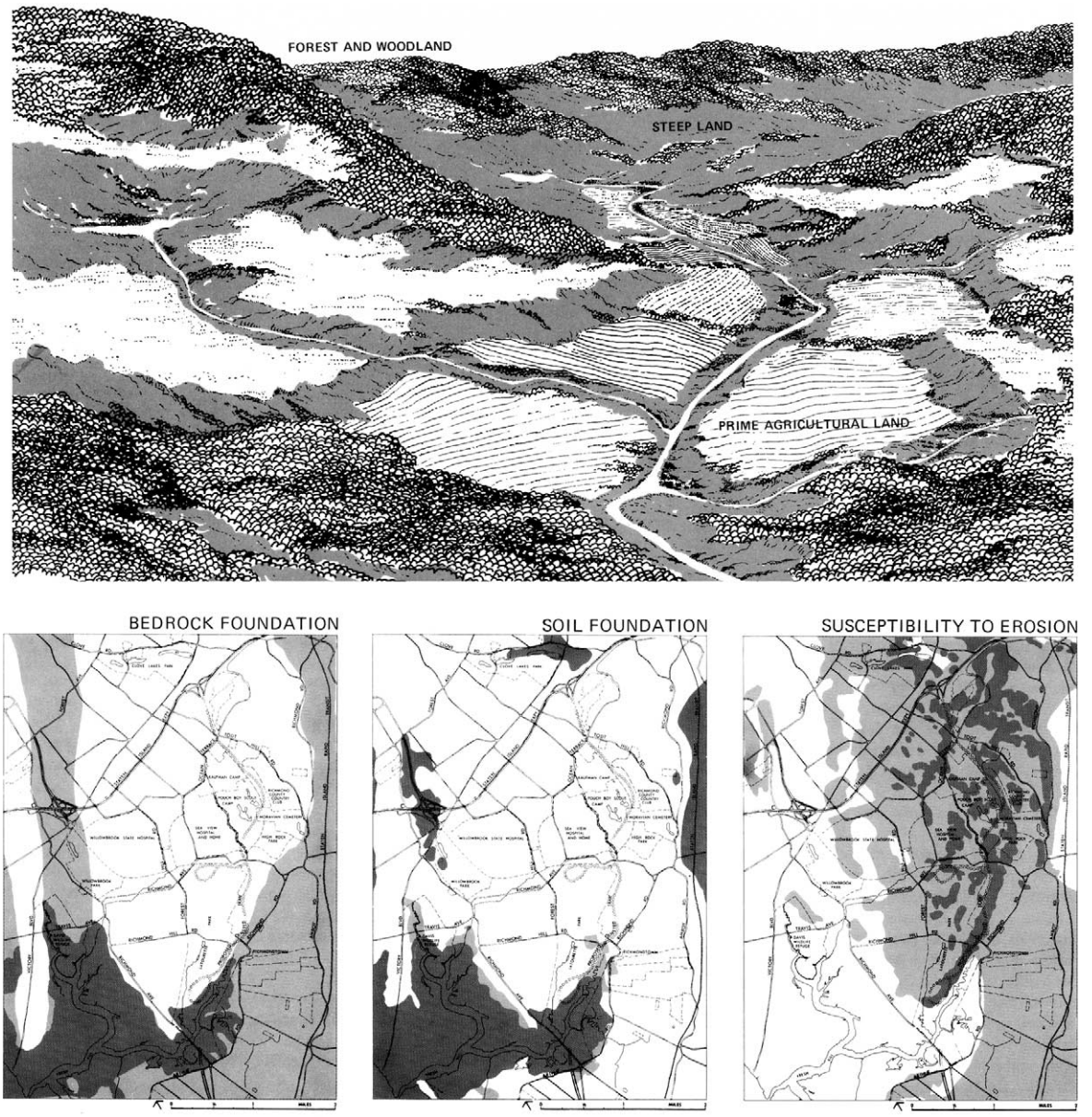

Fig. 4. McHarg's models from his pioneer work. In order to understand, upper part, complex landscape he used, lower part, elaborated analyses with separated layers of data maps (McHarg, 1969, pp. 60 and 36).

Simple modeling with layers on the trace paper led to more complex and elaborated computer modeling developed among others by Steinitz and his colleagues at Harvard. This development was of great importance for landscape architecture as this "layer-cake-model" has become a basis for all landscape analysis. From the present point of view, the layer-cake seems self-evident, but at the time when McHarg (1969) did, it was an innovative approach to landscape planning. At this point, landscape architecture definitely moved

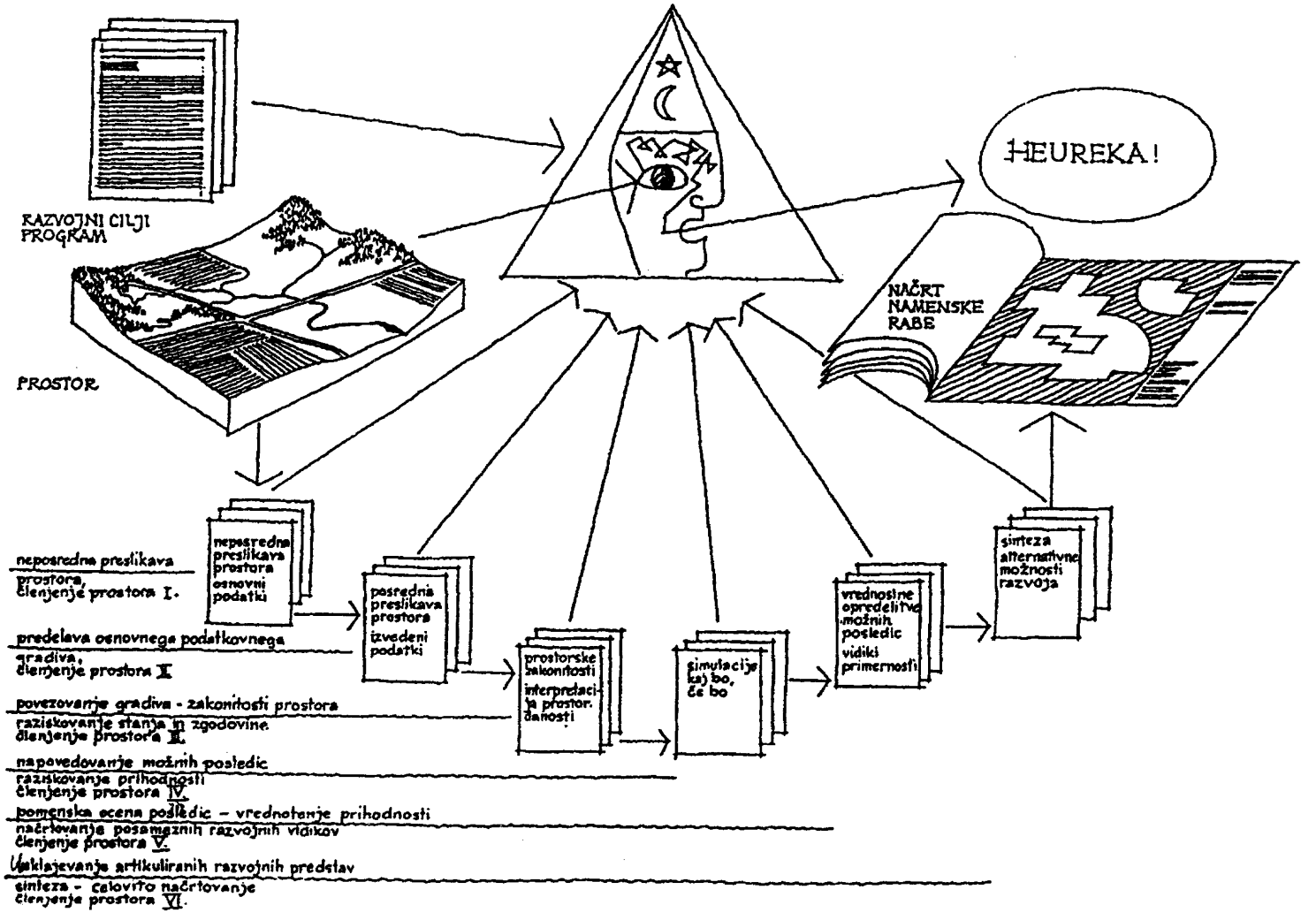

Fig. 5. Landscape planner—an expert runs spatial analyses starting with transformation of spatial data, continuing with their evaluation, adding simulation of future development and ends with a future land use plan (Marušič, 1986, appendix 1).

from garden art to modern landscape architecture and creative part of the design was completed by analytical scientific approach as well. A new special branch—landscape planning—developed inside landscape architecture and new framework and basis for any work that landscape architects, as interdisciplinary professionals, would conduct in future was established. This analytical process was always run as a first stage not only in any landscape planning problem-solving process, but often also in landscape design as a parallel process to the creative part. The ability to run both approaches at the same time became characteristic of modern landscape architecture. Steps in the design process became: understanding and clear definition of the problem; analytical interpretation of the landscape; evaluation of the existing landscape and impacts of proposed changes (by knowing specifics of need—future land use); creative design and proposal of new landscape.

Marušič (1986) used a diagram (see Fig. 5) to show the landscape design process characteristics, such as interaction between intuitive designer's work and exact algorithms, and connections between heuristic methods and the systematically analytical approach.

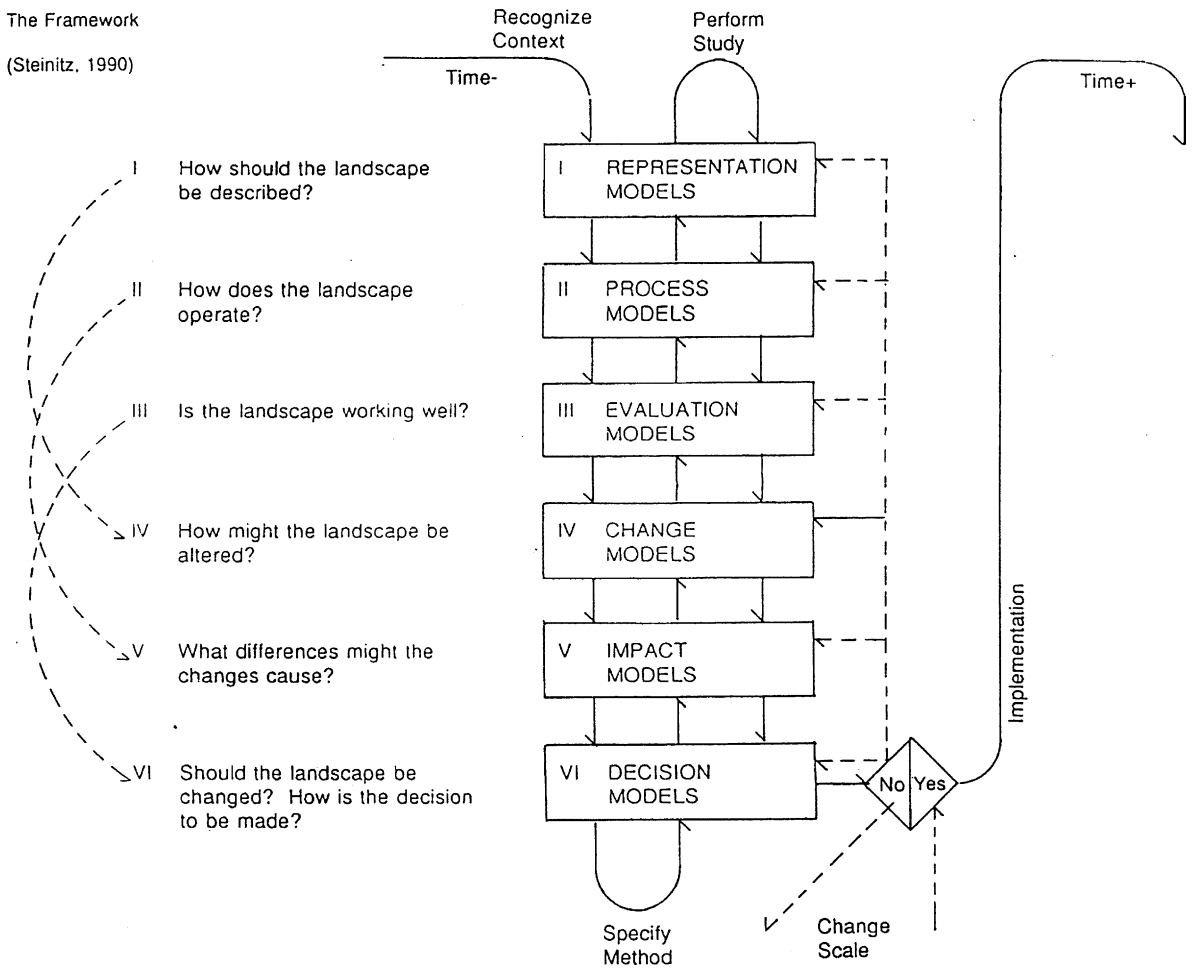

Fig. 6. Steinitz's framework is composed of six models. Each model involves different methods in order to find an answer to the question asked on the right side. The result in terms of maps, charts, etc. can vary. The framework's flexibility is important. Any step can be repeated and the process can be run as many times as necessary to get the final result (figure is taken from Steinitz's course Theories and Methods of Landscape Planning Textbook (unpublished), although he had published the same or modified diagrams on several occasions).

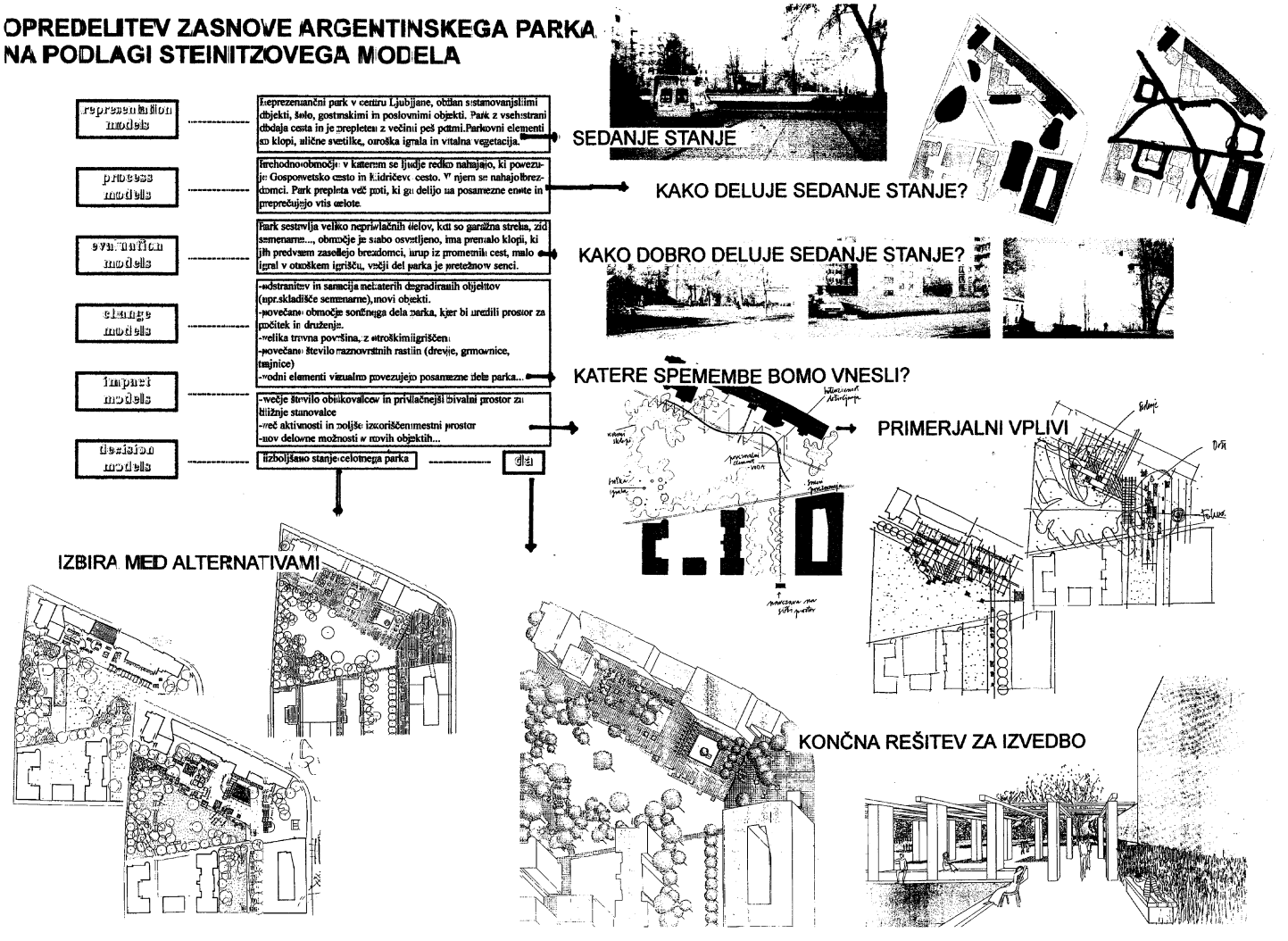

Fig. 7. Steinitz's framework is used to explain the steps students used in their projects for various landscape designs. A diagram completely illustrates the models by using drawings from the school project for a small urban park. Source: Landscape Design Studio—studio works, 1998/1999.

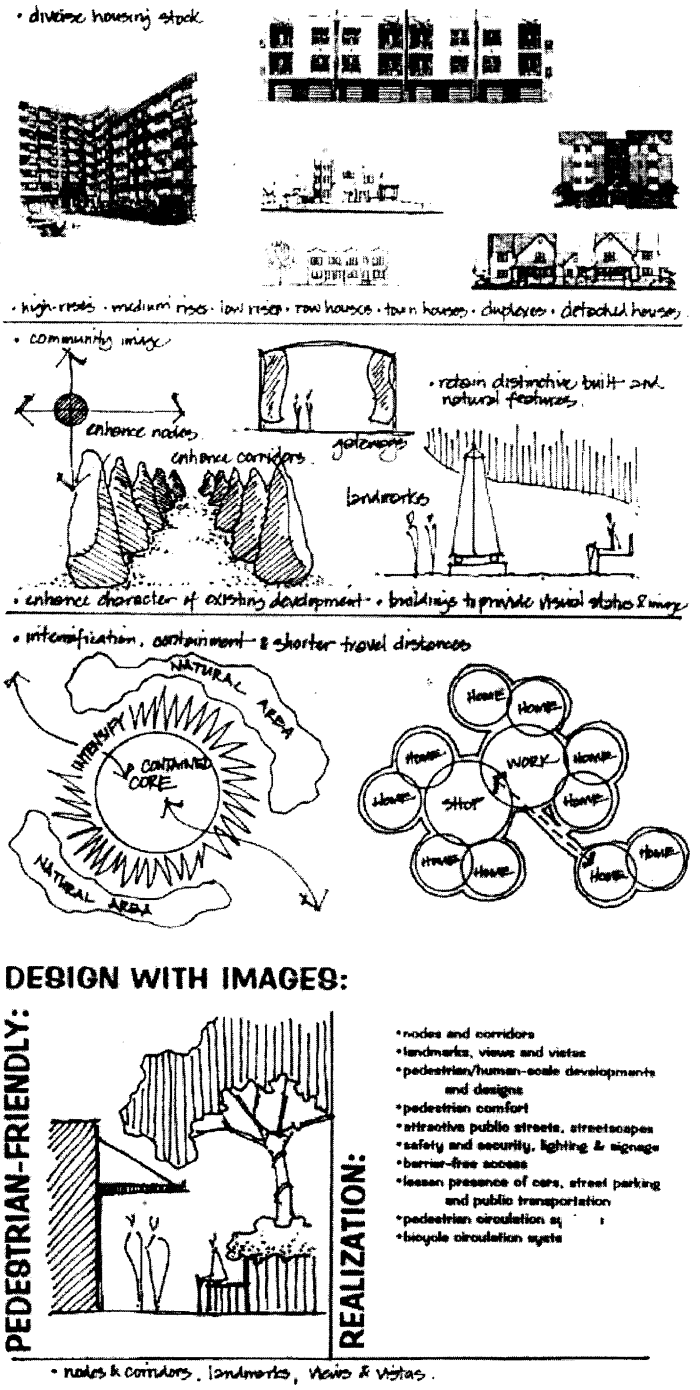

Fig. 8. An example of student's work shown on the knowledge mapping website source: http://www.clr.toronto.edu/KMAP/km.html.

His explanation of the planning procedure involves interpretation of the space by using various data, transformation of data, evaluation of the space, all of this through the model making process (Marušič, 1999, p. 61).

When talking about models in landscape planning, we must return to the work of Steinitz (1990) mentioned previously in this paper. After using various models for more than 20 years, Steinitz at the end of the eighties presented a "Framework for theory applicable to the education of landscape architects and other design professionals" (Steinitz, 1990). His intention was to illustrate the main stages in the landscape design process that designers could follow (rather systematically and not necessarily exactly as Steinitz suggested). The diagram was better elaborated than the one from the 1970s, and incorporates all stages of the design process as shown in Fig. 6.

Steinitz actually developed the framework from his practical work and used it in a teaching process as well. To test his diagram, senior students at the landscape architecture program in University of Ljubljana were asked to develop a landscape design based on Steinitz models. The results were not surprising. Once students understood the diagram, they developed their own systematic approach and implemented their personal models (stages) into the design process, rather than squeezing all of their personal phases into Steinitz's model. However, they felt very comfortable by using Steinitz's framework to explain their project (Fig. 7).

Canadian colleagues at the Center for Landscape Research at the University of Toronto conducted further research stimulated by Steinitz's framework. Wright (1993) "re-mapped" Steinitz' diagram and made his own personal, customized version of the framework. Wright (1993), Kesik (1996) and Hoinkes (2000) developed a knowledge-mapping concept[2] in order to "develop techniques for the documentation, acquisition and transfer of knowledge about our field" (Wright, 1993, p. 2). While Kesik (1996) worked further on the theory of knowledge-mapping, Hoinkes (2000) conducted research on the use of diagrams in landscape design process investigating the most common graphic elements and keywords in diagrams. He used the results of his research to build a computer program for complex diagramming—three-dimensional diagrams. The work and the website are still "under construction". The Canadians actually opened the website for everybody who would post his own research results and participate in a knowledge-mapping dialog. In their search for an adequate model, a great impact came from the fields of psychology, artificial intelligence and from computer science in general. However, the final products were studied through diagrams. It became obvious that, for landscape architecture, graphic presentations of knowledge diagrams are the best. When we shape our work and complete the final products we all use diagrams, drawings and as little text as possible, just keywords. Instead of knowing things about human perception, we learn how to present our ideas in order to achieve the best landscape we can design. Often we are forced to add to our knowledge operational tips from related disciplines, such as graphic design, architecture, visual art, computer design, shape grammar, etc. but we always customize this and mix these forms of knowledge in an interdisciplinary landscape architecture as shown in Fig. 8.

3. Results

3.1. Graphic expression of double character

Previously discussed double character of landscape architecture—a scientific and creative—is expressed in our graphic methods and their results—final drawings. Diagrams of all sorts are daily used in our work in order to show various stages of the project and are one of best tools to present the design process when needed. Diagrams are used to discuss issues with the design team members, clients and can as well serve as final product. In landscape planning, for example the models with their characteristics (parameters) are often more important than the final product. Landscape planners build complex spatial simulation models whose result is changeable in terms of different variations. Or rather, the parameters entering the model and the relations between them are more important than the final, static map. The design process is transparent, model parameters and relations can be controlled all the time, corrected, changed, updated; the process itself can be repeated by anybody with

[2] See website: http://www.clr.toronto.edu/KMAP/km.html.

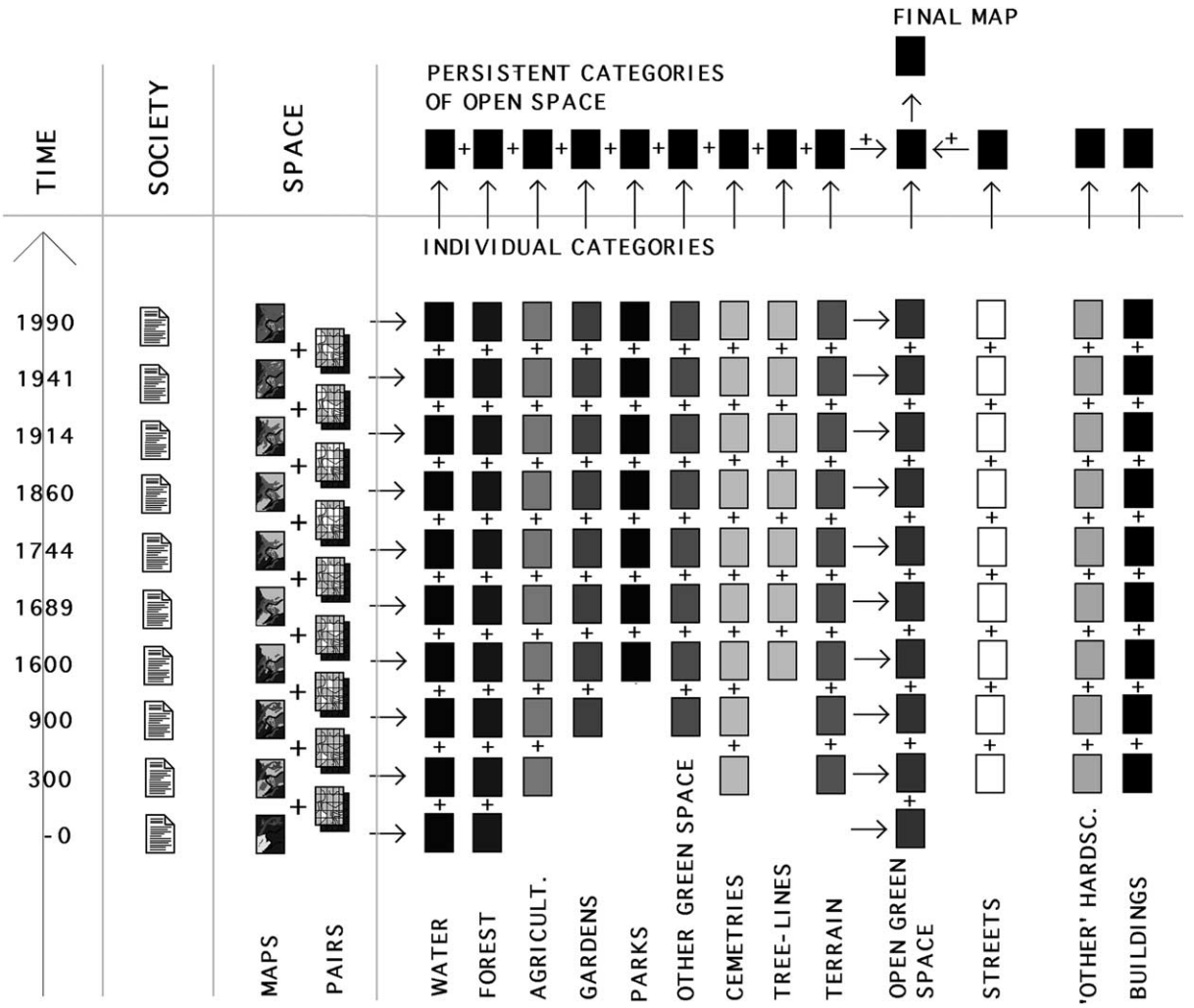

Fig. 9. The 10 time-periods of the same urban landscape are presented in the diagram of "persistent urban landscape analysis". Spatial changes can be read out from the overlaid maps (Gazvoda, 1996).

similar results. This kind of "glass box" model requires an elaborated process, the phases of which must be presented as well as ultimate model what is characteristic of landscape planning.

Beside that, considering the constantly changing landscape, the models we use must contain certain "relational time changes". Instead of showing changes of space in terms of animation, the models allow users to change the parameters and check the new situation. For example: one can increase the number and territory of certain species that is supposes to grow in future. The model changes and the new final map can then be presented. Although decision-makers do not like too complex models, they should be informed about several different alternatives if they are about to choose the best solution. To have only one option can be misleading if the arguments "pro et contra" are not sufficiently presented and understood. A final result of the planning process—a set of alternative land uses is presented and negotiated inside the society (local community, municipality, etc.) which brings up a final solution and selects the most appropriate alternative

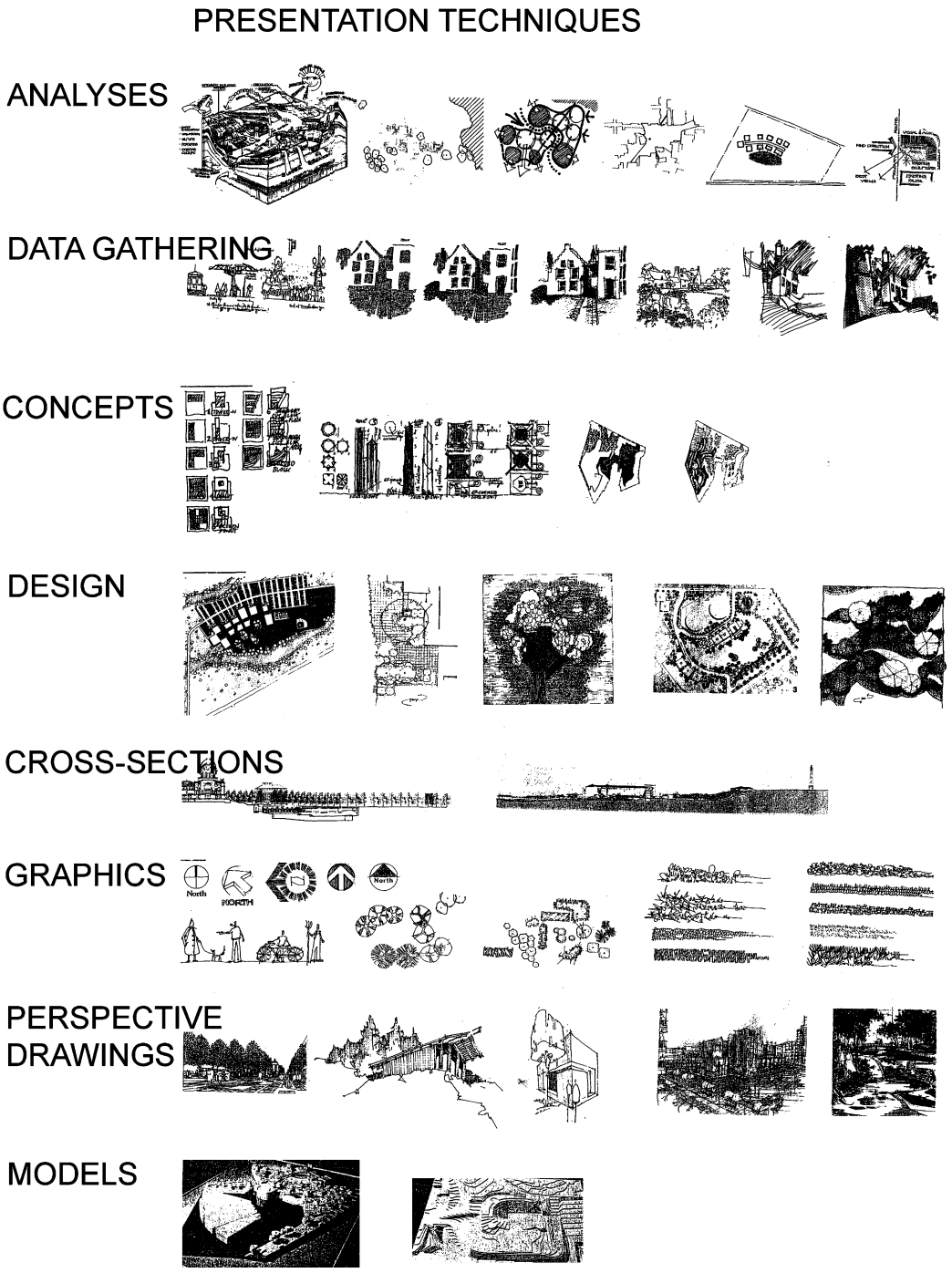

Fig. 10. A poster representing landscape design techniques was published in a student's newspaper. It's purpose was to show freshmen the characteristics of the profession they are entering. Interesting part is that the students showed a creative character of the profession rather than systematical one. They included into the presentation different stages of a project showing first landscape drawings (sketches), a development of a design idea and a final product (also in the three-dimensional presentation) (Časopis, 2000).

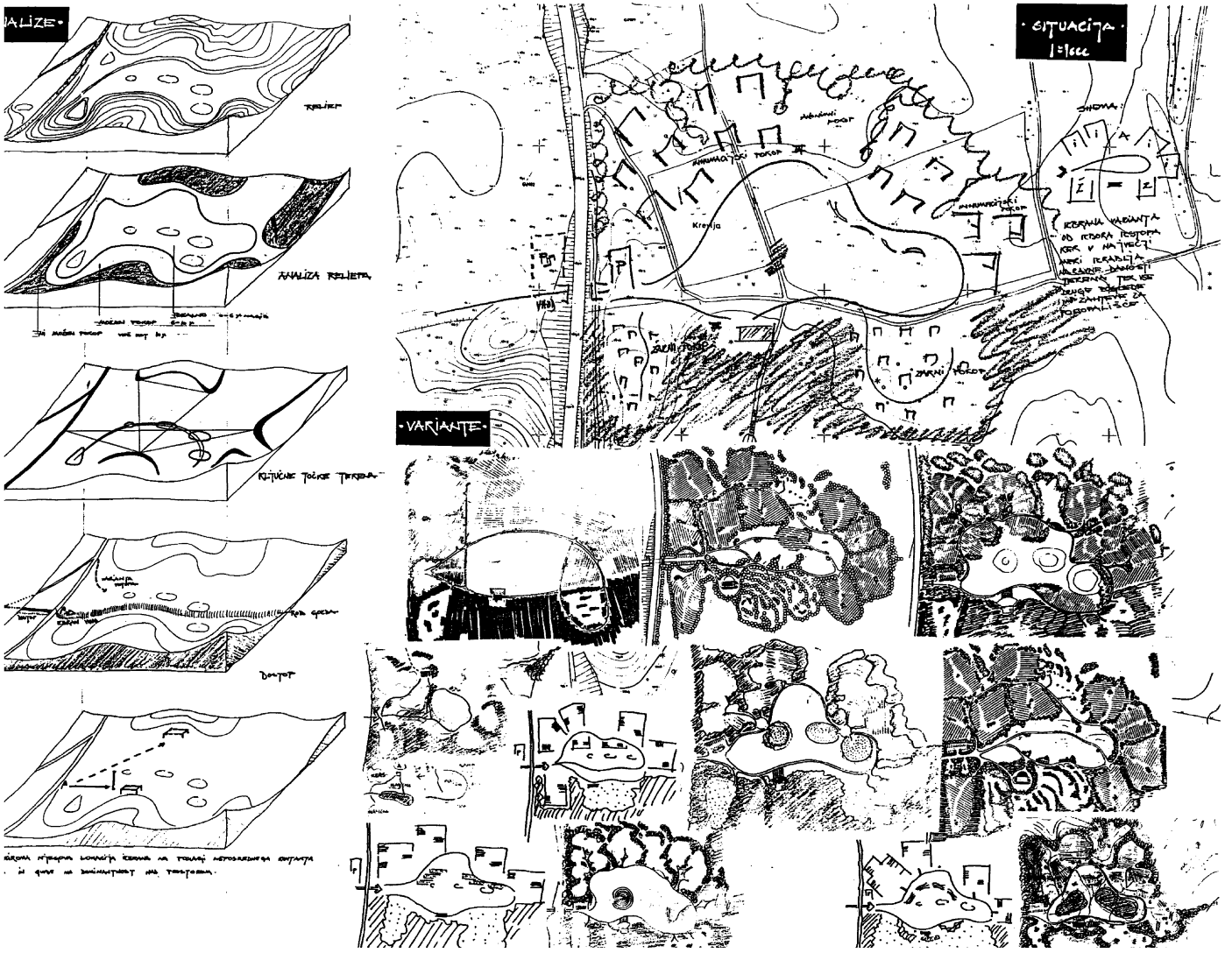

Fig. 11. This design for a forest cemetery is one of the best examples of what is landscape architecture. The drawing, which is originally one plate 70 cm × 100 cm large, shows landscape layers used in the analytical phase as well as in the creative part of the design process. The contour lines, vegetation, traffic scheme, concept drawings and final solutions are put on the plate in a creative designers way, but there is also 4 years of knowledge behind the creativity as well. The slopes are carefully measured in order to select the most suitable sites for graves, the soil is analyzed, the condition of existing vegetation is evaluated, etc. Source: Open Space Design Studio—studio works.

in a given political situation, whether the landscape professionals like it or not. Therefore, landscape planners must work on complex but understandable and clear presentations often supported by various diagrams and other drawings. That kind of result is directly usable in the teaching process as well. If the client (for example a representative in parliament) can understand the model and the final results (variations), then the understanding of the process should be easy for landscape students also (Fig. 9).

The process diagrams present the appropriate method we use in landscape design, but because of their dynamics they can also present the ongoing natural processes in every landscape. Landscapes actually live. That is something landscape architects must understand and carefully protect and cultivate. Natural processes can and must be presented in our final drawings, maps, and plans. Even a planting plan, for example includes temporal change—growth of plants—although it is shown as one final stage of the vegetation. The final map presents objects—plants in their optimal size and health condition. The landscape architect knows the plant characteristics in order to plant them at proper distances from other objects. The aggressiveness of plants must be considered as well, in order, for example to combine the right species in the same flower bed. Plants also change with the seasons and this can be an important challenge to be treated in the planting plan. Future maintenance is included as well. The planting map shows, for example trimmed hedge forms, as they will become after several seasons under rigorous maintenance. All of the above facts about planting maps are so common to the landscape architect, that we usually do not consider them as any special products. Nor do gardeners or landscaping firms who execute our ideas. We all take into consideration the natural processes characteristic of green space. On the other hand, the architect does not need to think in temporal phases when it comes to the final product. The execution of an architectural plan takes time but after the opening of the building it remains unchanged. Certainly, all of the built materials age, but the maintenance work on the building is far less frequent and important for the project than in the case of the landscape. After the planting is done, it takes 2–5 years before one can enjoy the landscape and often more than 20 years before trees reach their full size and shape Figs. 10 and 11.

4. Conclusion

An advantage of landscape architecture is its capability to solve problems in what is probably a broader range than any other related discipline. For that reason, landscape architects must be trained to master different working methods and techniques. Simply said, we must be creative when we run landscape design analyses and search for the best design solution and also be able to present our projects in proper graphic mode. To include all of the required elements into the teaching process, school programs must be flexible enough to combine the creative character of the profession as well as natural sciences. There is no need to develop special techniques to teach design. If the professional products are good (landscape designs), they must allow for a dialogue between all involved related disciplines, the public and decision-making parties. For that reason, professional projects often consist of diagrams and clear graphics that landscape architectural students can follow when they apply knowing the approaches to their own personal methods. When sufficient knowledge from the side of natural sciences, such as soil science, botany, ecology and many other related disciplines is added, landscape architectural students become capable of solving complex spatial problems.

The main problem remains how to follow the development of our profession, which leads towards very specialized branches, and yet keep a general landscape architectural education, which enables us to handle the landscape as a whole at the same time? Once schools start to develop specialization in a profession, the programs narrow down to that discipline and the core of landscape architecture is lost. Some programs have turned out in the spatial, regional planning, ecology and nature conservation way, while on the other hand, some programs follow architectural programs and handle landscape design only inside studios. Sometimes programs offer even sophisticated skills in the creation of artistic landscapes in which students often make wonderful land art installations which cannot be called landscape architecture as their creators have no clue of what is really going on in the space around them.

One may argue that dividing landscape architecture is the way in which we should react to the modern spatial problems we are supposed to solve. That this is the way in which our profession grows and develops. My personal opinion is that the core of landscape

architecture, which has crystallized in the last 30 years, must remain the same and special knowledge can be added on top of the basic one.

This can be achieved through the proper structuring of landscape architectural education, which will be a subject of future discussions are as follows:

- general knowledge—related disciplines (natural sciences and art) and basic methods of landscape design are taught at undergraduate level;
- landscape design and planning methods are added at the end of the undergraduate program and extend to the first years of postgraduate or master level;
- the master level finishes with a strong relation to practice through real life projects and with the help of teachers who practice;
- after having earned a master's degree in landscape architecture (general), landscape architects continue with 2 years of specialization according to the field they cover in their professional career (similar to the educational model of medical schools and later specialization of physicians).

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