

GRAPHICAL MATERIALS

AS TEACHING TOOLS FOR THE

CONCEPTUALIZATION OF SPACE

JERNEJA FRIDL



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R.A.V.E. Space
INTERREG IIIB CADSES programme

www.rave-space.org



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An aerial photograph of a village with a large church and vineyards. The village is built on a hillside, with a large church featuring a prominent tower and a red-tiled roof. The surrounding landscape is lush green, with numerous vineyards and fields. The text "VISUALIZATION OF REALITY" is overlaid at the bottom of the image.

VISUALIZATION OF REALITY

Achieving **sustainable spatial development** requires a positive attitude towards nature, people, the space we live in and the processes that have been going on in that space. Such an attitude can be supported and encouraged in the classroom or through direct experiences in the school's surroundings, by means of field trips, excursions, and similar. Observing nature in the field opens up new opportunities for understanding since it is through direct contact with physical space that all our senses are engaged and honed.



In order to encourage young people to become aware of space, its values, and its planning, it is important to teach them to **observe**, to **notice** processes, to **express** their thoughts and to **draw** the processes they have observed. Visualization of reality thus plays an important role in synthesizing the knowledge gained. One of the most important ways to visualize the real world – both visible and invisible phenomena – is **by using maps**.

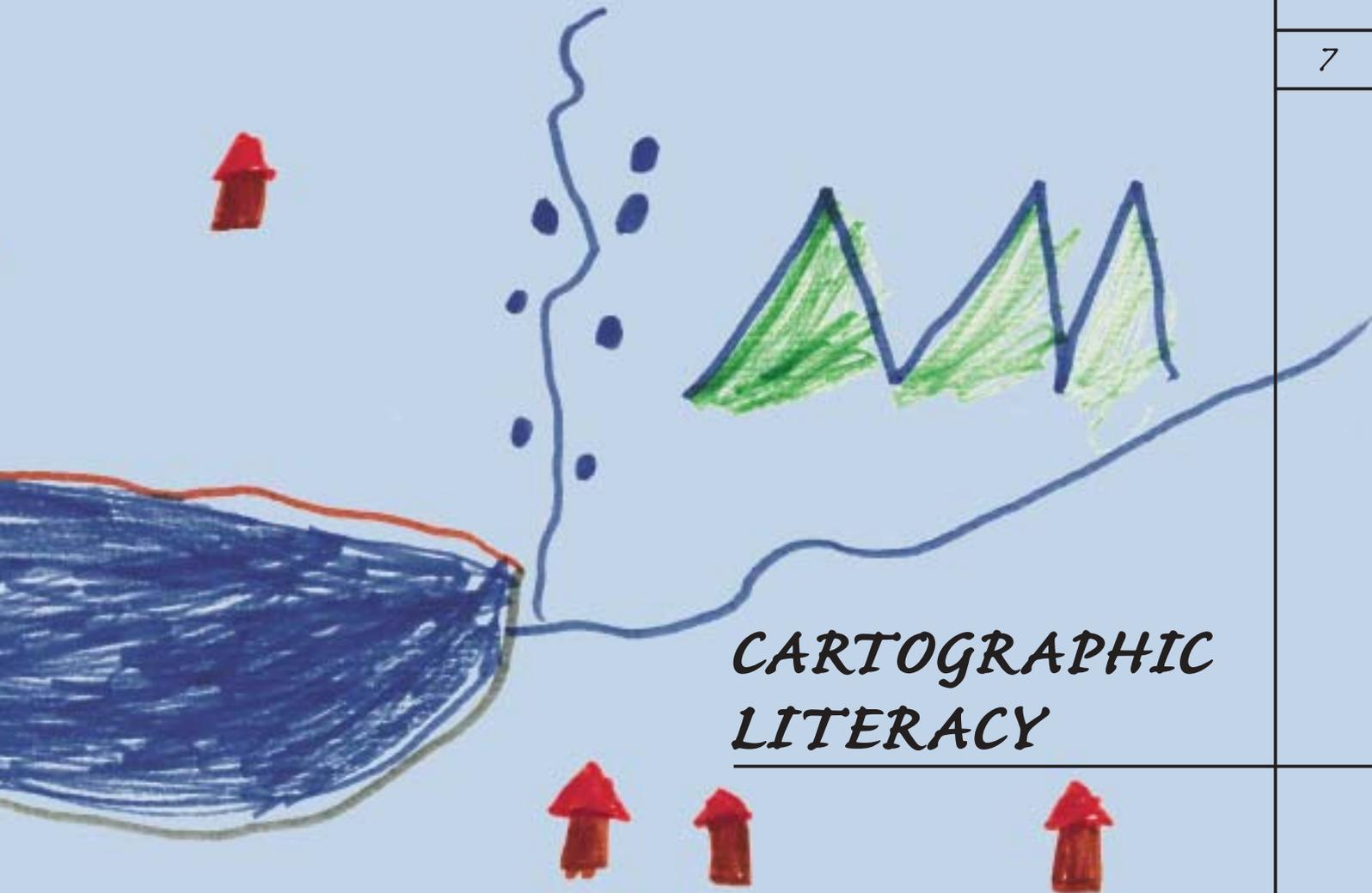


Maps help train pupils:

- to orientate themselves in space better,
- to perceive space and spatial features more fully,
- to present their interpretations of space more clearly,
- to comprehend the dynamics of conflicting uses of space more completely.

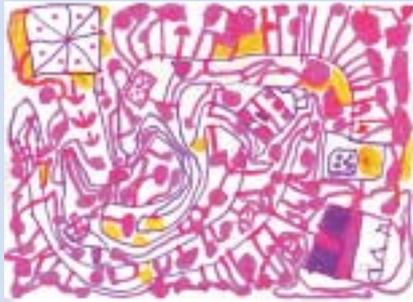
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The effective use of a variety of cartographic tools depends on the cartographic literacy level of pupils. Cartographic literacy begins in the preschool period: by the age of ten children achieve sufficient cartographic literacy for the use of all kinds of maps.

Special attention should be paid to how young people of various age groups conceptualize space and how they transfer certain conceptions of space acquired in the field to maps. The opposite aspect is also extremely important: how young people interpret spatial maps and what kind of conception of space they gain from them.



Map-reading ability by pupils depends on:

- their level of cognitive development,
- their past experience in using maps,
- the appropriateness of cartographic displays relative to their developmental level,
- the circumstances in which the maps are used,
- the ability of the cartographic information to be abstracted.

Map-drawing ability by pupils depends on:



- their understanding of perspective and projection,
- their familiarity with cartographic symbols and the explanation of these symbols in the legend,
- their ability to determine location in a coordinate system: relatively and absolutely,
- their ability to understand scale and associated relationships between distances and areas,
- their ability to understand the purpose of a map and its associated selection of content.





*MAPS AND OTHER GRAPHIC MATERIALS
IN THE PROCESS OF EDUCATION FOR
SUSTAINABLE SPATIAL DEVELOPMENT*

Sustainable spatial development is based on the properties of space as a natural public good. The state of the space and the changes that have occurred within in it over extended time periods can be most easily found out using a variety of graphical materials. Among these, cartographic and photographic materials, in classical or electronic form, stand out and form an indispensable tool in teaching young people about space and its importance for the continuing development of society. Graphical tools are preferable to textual materials in identifying and analyzing various elements of landscape through a case study.

We have presented a selection of cartographic and other graphical materials at R.A.V.E. Space seminars for teachers, showing how they can be used to teach pupils about the significance and role of space for sustainable development. We highlight in particular the use of different maps, aerial photos, three-dimensional and simulated models and photographs of an area from different time periods to enable:



- an easier spatial presentation of the regions studied,
- orientation in space,
- awareness of the values of space and the conflicts which arise in this space,
- a determination of the situation in the past and that of today, and an awareness and understanding of the changes which occurred over time,
- planning of future spatial development, and
- presentation of results.





ORTHOPHOTOS



Description

An orthophoto is an aerial photograph that has been geometrically corrected by the rectification process such that the scale of the photograph is uniform, meaning that the photo can be considered equivalent to a map. Unlike an aerial photograph, an orthophoto can be used to measure true distances, because it is an 'accurate' representation of the earth's surface, having been adjusted for topographic relief, lens distortion, and camera tilt.



Application

Orthophotos can have a dual role. In general they are important for orientation in space and for the marking of locations of observations in the field. At seminars we have drawn particular attention to this secondary meaning. When combined and enlarged they can be used as a »Gulliver's Map«, which places pupils in the role of a giant. The original idea of the Gulliver's Map methodology was developed by Spanish Professor Josep Llop Torné, director of »UIA-CIMES Intermediate cities and world urbanization.« The inspiring idea



of this methodology is very simple: We are giants who, like Gulliver, explore a territory. The territory is represented by a large-scale map: a city plan, a schematic drawing, a series of orthophotos, etc., but it's important that it represents just the area of the case study that will be explored. The dimension of the map allows us to physically perceive the space it represents, even to walk on it. In this way its users gain a more integrated sense of the space and the division of activities within it than through observations in the field.



After the field work all impressions and collected material can be put on the Gulliver's Map. In this way the »empty« representation of the space will be filled in with our details, observation, and content. Filling in the Gulliver's Map will help us to discover the interaction between elements of the space, sharing diverse point of views, to read the space in a more complex way and to envision new possibilities for the development of that space.



The »Gulliver's Map« not only offers a more integrated picture of the regions studied, it is also equipped with additional content perceived in the field, and it presents a new view of the relationships among spatial elements and offers a more complex image of existing and future spatial development.



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PORTSCHACH
AM WÖRTHNER SEE
BORNE OÖ
VIRČINEC

VITTRING
VETRIJNA
KLAGENFURT/
CELOVEC

TRISTRITZ IM ROSENTHAL
DISTRICA V ROŽU

FERLACH
BOROVLEJE

JESENICE

KOROŠKA BELA

BLED

LESCE

RADOVEJICA

TRZIC

DISTRICA
PRI TRZICU
PRISTAVA

GOLNIK



TOPOGRAPHIC MAPS

Description

A topographic map is a large-scale general reference map which shows the locations of a variety of different geographical features, such as relief, settlements, waters, roads, coastlines and political boundaries. They are usually made by public agencies using photogrammetric methods, and are issued in a series of individual sheets. The use of topographic maps requires a somewhat higher level of cartographic literacy than does the use of orthophotos, hence they are appropriate for the upper classes of primary school.

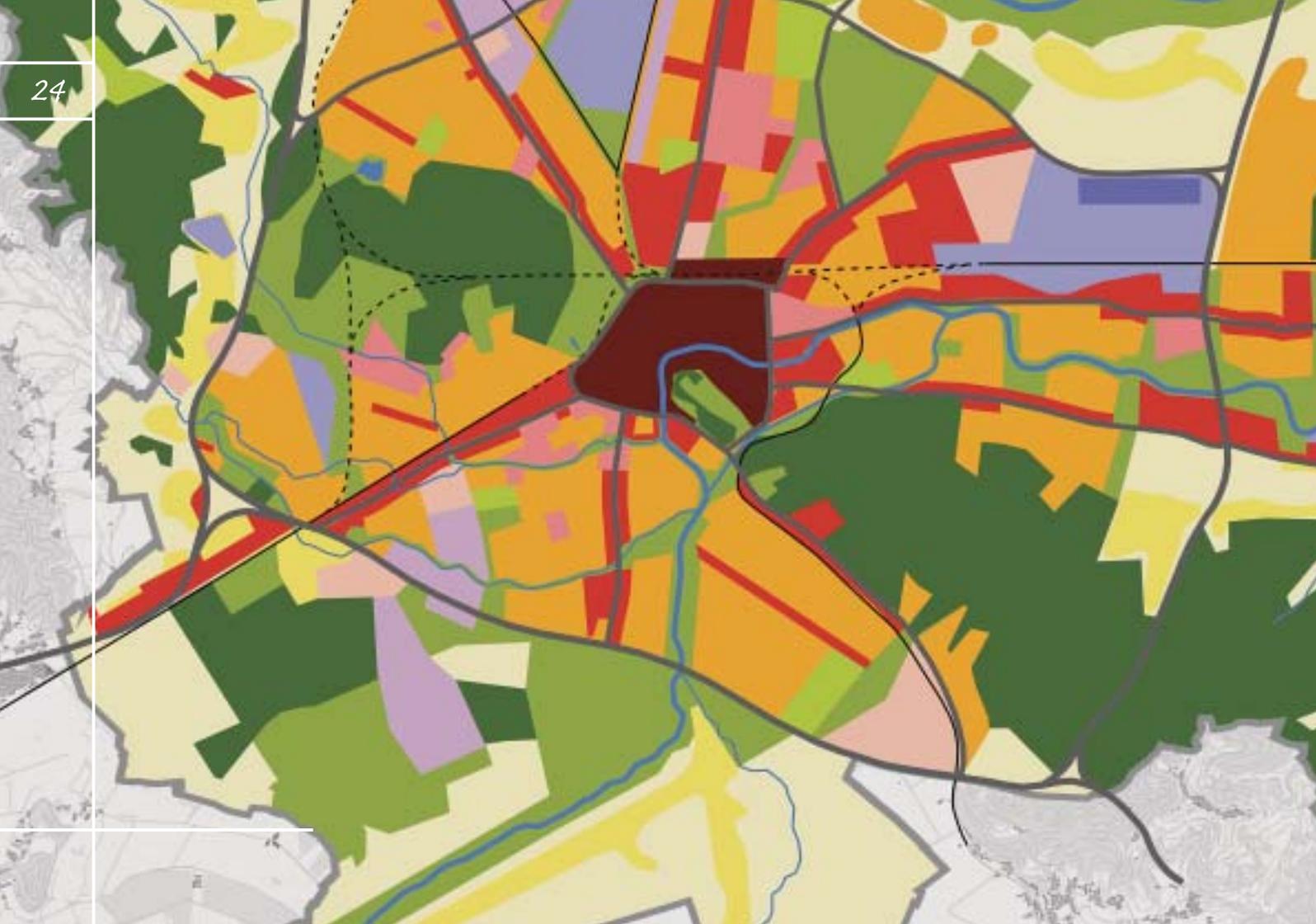


Application

Since orthophotos lack content such as toponyms (names of towns and villages, water bodies, and buildings), contour lines, road networks, boundaries, etc., these topographic maps were an essential supplementary tool for spatial orientation.

Large-scale topographic maps, for instance 1 : 5000, which are produced and updated for individual countries by Surveying and Mapping Authorities, are best suited for a more detailed study of the state of space.





SPATIAL PLANS



Description

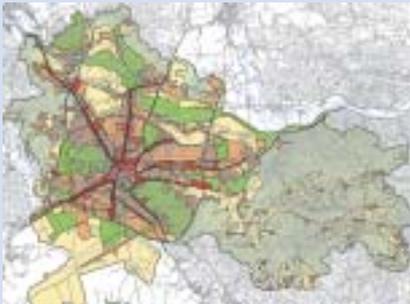
Planners most commonly display their vision of future development in the form of special plans for towns, their wider surroundings, region or country. Spatial plans are long-term plans for development and preservation in which building land, public spaces, land for municipal, energy and transportation infrastructure, and agricultural and forestry areas are determined. Spatial plans are a crucial element of spatial planning at the local and regional levels. Spatial plans for cities and major towns are often called urban plans.

They provide an especially detailed determination of socio-economic, architectural, infrastructural and environmental aspects of impacts on the urban space.

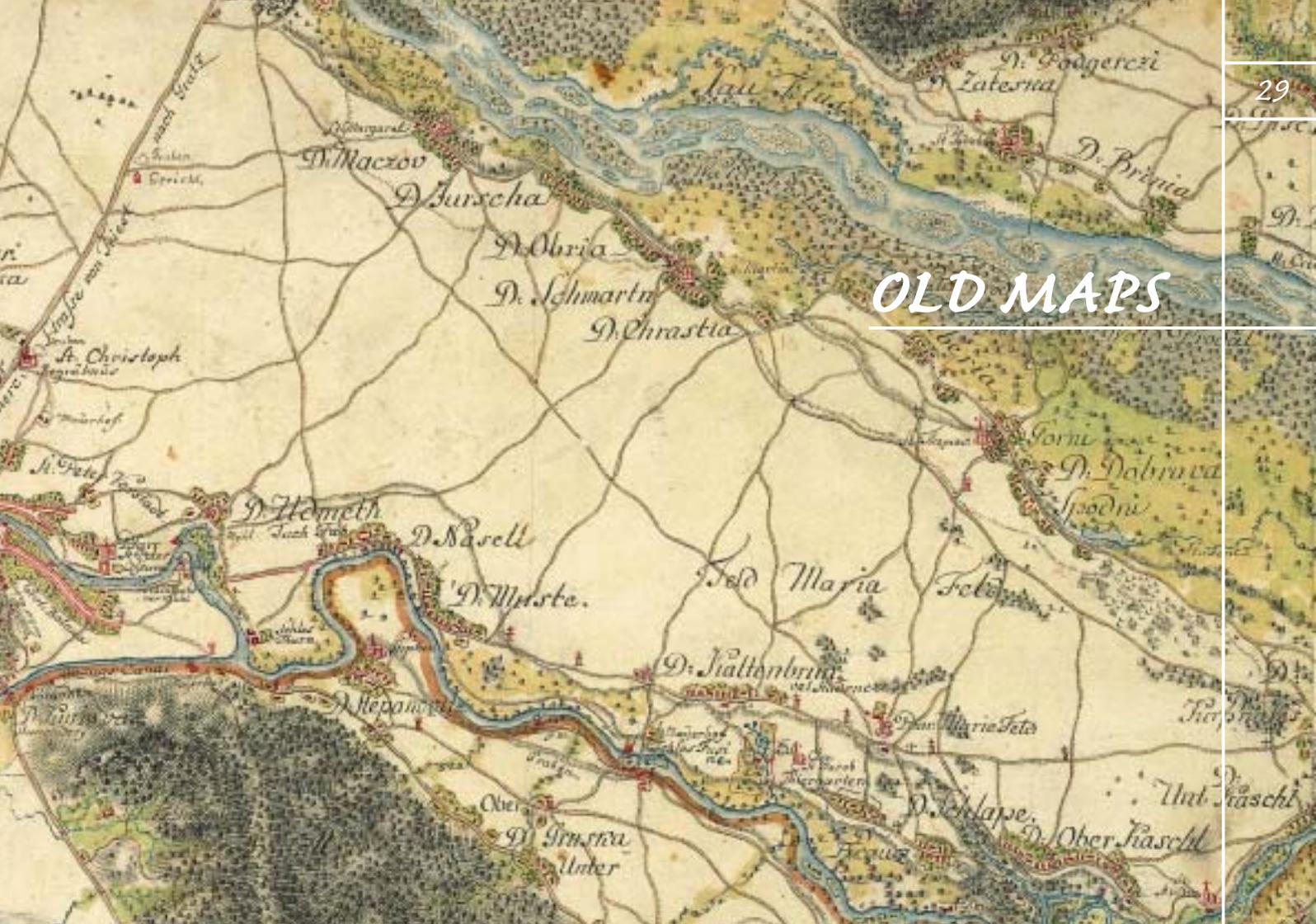


Application

Spatial plans prepared by expert institutions on request are usually not accessible for general use. It is, however, possible to find a number of instances of spatial plans of relatively poor resolution on the internet or in the different strategies of spatial development. It makes sense to acquaint pupils with their existence and purpose, especially if we wish to help them become future citizens who as adults will be more actively included in the process of spatial planning. Later on they will have the opportunity to encounter this type of plans at public unveilings of spatial plans.







OLD MAPS

Description

In order to determine the presence and organization of activities in space in past historical periods, maps from older periods are also a useful tool. We would draw attention to two important historical sources which are available in some neighboring countries. These are the Franciscan cadastral map and the Josephine military map. Generally cadastral maps showed the geographical relationships among land parcels and land use. The sheets of the Franciscan cadastral map from the beginning of the 19th century formed

a very accurate map, since it was produced on a scale of 1 : 2880. The measuring of a land took place over a fairly brief period of time given the conditions at the time, from 1817 to 1828. Somewhat older is the Josephine military map: Maria Theresa commissioned the creation of accurate, detailed maps for the needs of the military in 1763, and her son Joseph finished the cartography work in 1787.



Application

Sheets of the Franciscan cadastral map from the period 1817 to 1828 are accessible in all countries which at the beginning of the 19th century were part of the Austro-Hungarian Empire. Somewhat less accessible is the 18th century Josephine military map, since due to military secrecy it was never publicly available. Until recently it was stored in archives in Vienna. Some countries reclaimed it from oblivion. Thus facsimiles of sheets of the Josephine military map are appended to the series of seven books by Vincenc Rajšp and colleagues entitled »Slovenija na vojaškem zemljevidu 1763–1787« (»Slovenia on the military map«).

Both cartographic materials mentioned above were very important for understanding the previous land use and processes in the space. They help us comprehend and understand the economic and social situation in past time periods, the influence and scale of disasters, the traces of former landscapes, and the current situation. A comparison of maps from different time periods enables a historical perspective and provides insights into the changes of the landscape over time. In this way we can also more easily understand the changes in the values of space and recognize which values were more important in the past and which values are important today.





OLD PHOTOGRAPHS

Description

From the beginning of the 19th century onwards, with the development of photography black and white photos became increasingly widespread. After starting initially with portraits in the early history of photography, photographers gradually directed their cameras towards images of landscapes and people at work. Thus today many images have been preserved, which can be seen in museums and documentary films.



Application

Old photographs can frequently be an important source of information about the state of a landscape during periods in the past as well as about the life of the people there. In this way they can make a useful contribution in researching changes in a space over a long period of time. As a result of their nostalgic qualities, photographs often arouse in us a somewhat sentimental view of a space in the past.







3-D MODELS OF LANDSCAPES

Description

3-D models provide a better visual representation of space than two-dimensional illustrations. An appropriately shaded digital model of relief proved versatile and useful. Objects such as roads, buildings and similar were somewhat less suited to a three-dimensional portrayal. Google has made general access to 3-D models of the earth's surface much easier, offering users free access to the Google Earth application at <http://earth.google.com/download-earth.html>.



Application

3-D display is very useful tool in the classroom for presenting the test area. The computer application enables numerous operations. We performed a computer simulation of a flight over the region for a bird's eye view. We decided to use these means based on a survey carried out in an earlier phase of the R.A.V.E. Space project. The results of the survey showed that in the opinion of the teachers a favourite teaching/learning tool of pupils was computer animation and games. For this reason we looked at the tested areas from

a bird's-eye view using animation enabled by the Google Earth program. Using this kind of approach makes it possible to motivate pupils for further work.





2007



*SIMULATED DISPLAY
OF IMPACTS ON THE SPACE*

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Description

Appropriate programs enable the preparation of simulated displays to an increasingly wider circle of users. The purpose of such kinds of displays is to show the appearance of a building, space, or landscape after the completion of a planned development or change in the space. Simulated displays are used in large measure by architects to prepare conceptual plans, and many displays are accessible on the internet and in promotional materials.



Application

Simulated displays are becoming more and more accessible on the web pages of companies which plan new buildings or layouts, most often in urban areas. They facilitate our comprehension of a planned impact on a space and make it easier for us to express of our views, positive and negative, of the impact itself as well as the problems in the space that it will trigger.



SUST.

home | environment game | building game | resources

Step 1 of 4 - Location

Explore the scene then choose the location to build your house

options	info	select
Highland Location		<input type="checkbox"/>
Rural Location		<input type="checkbox"/>
Suburban Location		<input type="checkbox"/>
Urban Location		<input type="checkbox"/>

low high

home | environment game

Step 2 of 4 - Energy

Select three ways that could best save you energy around the house

options	info	select
Switch off the lights		<input type="checkbox"/>
Use energy efficient bulbs		<input checked="" type="checkbox"/>
Turn down your heating		<input type="checkbox"/>
Play outside		<input type="checkbox"/>
Have a shower instead of a bath		<input type="checkbox"/>
Close doors and windows		<input type="checkbox"/>

click to select

low high



COMPUTERS GAMES

Description

Among the numerous computer games which are freely available on the internet and developed especially for the needs of education, it is also possible to find some which teach architectural and urban planning principles. One such is »Urban Plan 2001«, which places the player in the role of urban planner. Drawing on a limited budget, the player must arrange housing, shops, schools, businesses providing jobs for residents, services, green space and so on in an empty space. When the game is over, the player is given advice on what he or she should have anticipated and what could have been done better. At the same time the player accumulates points for the number of people who live there, the anticipated level of crime, the number of jobs and similar.

Some games give greater emphasis to the formation of new behavior patterns which will influence our own existence as well as the lives of future generations. The computer game »My Sust. House« is an exciting interactive game exploring what sustainability means and how it relates to our homes. This program provides opportunities for developing knowledge and understanding, skills development and developing informed attitudes. As well as providing interesting information, it stimulates discussion, presents problem solving activities and provides a context for teamwork and decision-making.

Application

Computer games of course cannot replace the knowledge and experience gained from learning in the space itself. They are, however, an interesting supplementary tool for motivating pupils to begin to think about the challenges, demands, and problems posed by the planning and organization of space.



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Some interesting links

<http://www.rave-space.org/ravespace/homepage.aspx>

<http://www.geography.org.uk/projects/wherewilllive/>

<http://www.environment.gov.au/education/publications/nap/pubs/nap.pdf>

http://www.esdtoolkit.org/reorient_edu/default.htm

http://www.rtpi.org.uk/education_and_careers/

<http://www.gu.gov.si/en/>

http://www.fig.net/hsm/news/frans_1_2007.htm

http://sigov3.sigov.si/arhiv_en/root.html

<http://earth.google.com/download-earth.html>

<http://www.igra-igre.com/view/21159/Urban-Plan-2001.htm>

<http://www.mysusthouse.org/game.html>

<http://www.regalp.at>

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