

QUALITATIVE STUDIES WITH GIS-TOOLS AND HISTORICAL MAPS TO PROMOTE DEVELOPMENT OF PERIPHERAL VILLAGES IN HELSINGBORG MUNICIPALITY

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ABSTRACT

Town planners and landscape architects tries to detect and maintain characteristics in a qualitative oriented manner within processes such as physical planning.

The Norwegian analysis “stedtsanalyse” is designed to characterise the four spaces of “place objects”; - space of orientation, - identification of space, - space of memories and historical space. The methods are frequently used among Scandinavian planners but lacks computer assistance. This paper investigates how the GIS tool along with historical maps can be used to analyse the historical space of a “place object” in a qualitative manner in order to find the “genius loci” of a village. The authors are using software specially design for planning purposes. The components of this software ensure time-space simulation and qualitative consideration. Attempts are made to transfer an expert-oriented method into a widely use GIS-concept.

This paper is written by a senior lecturer that have made investigation around digital historical surveying document within physical planning. The findings have been reported in a serie of papers written together with a colleague, Mats Carlson. While both being technical map- and surveying-lecturers the previous papers have been focused on the technical aspects on GIS-handling of elderly surveying documents like rubber sheets transformation, reconstruction ancient measurements, and so forth. The latest paper set the focus on mere quantitative analysis of data from ancient maps; landscape metrics. The overall purpose is this development of GIS/cartographic methods has been an integration of this material into the physical planning process. This paper looks into the world of the planner and poses general questions like;

- in what circumstances are historical maps used today?
- how does the planner want to use the GIS-tool?
and specific questions like;
- how could GIS/cartographic tools help to depict qualitative value in the landscape?
- what is the value of historical records and immaterial values in physical planning?

This paper takes a beginning in a present project managed by Helsingborg’s City Planning Office in order to highlight, develop and secure the potential of the peripheral parts of the municipality. The ambition is to make all built up areas in the municipality attractive as dwellings for new inhabitants. This work use a Norwegian method called “stedsanalys” to pinpoint the so called “genius loci” of the site (village), this effort is describe along with a theoretical discussion on quantitative versus qualitative method in a cartographical framework. Before reporting of the results of the investigation the data and the software are discussed. There is also a brief reflection upon the topic “ the planners and their computer-assisted tools”. Remarks and ideas of further studies conclude this paper.

STEDSANALYSE

There is a lot of question asked when you start to plan the future in a particular site; villages, township or whole city. Social, cultural and physical consideration has to be made. Since 2003 the building department of Helsingborg municipality has been engaged in implementing the Norwegian method “stedseanalysemetoden” in the development work of peripheral villages. The core idea of the method is to find the particular characteristics for a site – the so called

“genius loci”. The analysis method comprises of a systematisation of knowledge about a certain site to understand its history, its present stage and its potentials. The analysis results in a matrix where you are able to pinpoint the “weak” versus the “strong” attributes of the site. When this is done, development and renewal will be promoted while preserving the quality in the site. The whole process involves planners and Citizens.

The Norwegian “stedsanalyse” comprises of six different methods; - landscape-analysis, cultural heritage-analysis, SAVE-analysis (Survey of Architectural Values in the Environment – a Danish method), esthetical site analysis, qualitative site analysis and a realistic site analysis. This paper as mentioned before, concerns the qualitative part of the method. In short terms the different methods are describe below;

Landscape-analysis – inspired by Kevin Lynch’s (the author of the book “Image of the City, 1960) model of the holistic study of space, especially the natural landscape with its recreational spaces.

Culture heritage-analysis – describes the historical development of the site, the purpose is to find the value of knowledge, appearance and appreciation in order to understand history and preservation for the future.

SAVE-analysis – an established Danish method to find buildings and other architectural elements worth preserving in a historical context.

Esthetical site analysis – some kind of analysis of the furnishing of the site to describe the visual appearance of the village.

Qualitative analysis – works with Norberg-Schultz phenomenological theory of site-analysis. The analysis is based on defining 4 different “spaces” in order to find the identity of the site, these “spaces” are;

- Positional space
- Identification space
- Memorial space
- Historical space

Phenomenology in this sense means to understand the presence of elements and their relation as qualitative units. The method tries to pinpoint qualities that are not measurable. An understanding of this kind can emerge from a historic map or record. These data will inspire the planner to grasp the “genius loci” of the site.

Realistic site analysis – analysis of the actual physical features of today seen with development perspective.

The historical sources are well recognised in all six methods and could well be a part of the planning axiom; “when you are planning for the future originate from the present with the past in awareness”.

This paper deals with computer-assisted methods (with GIS/cartographic tools) to define “historical space” emanating from Norberg-Schultz phenomenological theory of site-analysis.

Common quantitative approaches/analysis with GIS and landscape-studies are often made by and for experts, like the well-known landscape metrics. In a context of communicating with citizen the parameters and outcome from these analysis are very hard to account for and use in pragmatic planning. In the theoretical literature there is an intensive discussion whether these quantitative studies are useful or not. The ultimate goal of these analyses is to relate patterns in the landscape to processes in the ecological or social context. This paper does not use quantitative measures because of the huge pedagogic problem when explicable models are used in physical planning processes.

Qualitative methods in comparison to quantitative ones provide account and description rather than explanation. In a decision making situation, like physical planning, the interaction between the planner and the citizen are more favourable of description than explanation of the spatial context. Qualitative methods are seeking a more sensitive understanding of how people assign meaning and importance to various elements in their environment.

When you require historical material in your qualitative analysis, such as the norwegian “stedsanalyse”, it is well known throughout the World that Sweden has a huge map treasure in the archives of National Land Survey. Today this map treasure is being scanned and put into a big digital archive with access and distribution via the Internet. Previous studies made by the author have shown a preference from the planners, especially in Scania, to use the 200 years old map, the recognition map. The map series was made by the military forces and consist of a description of the landscape as it appeared just before population growth and industrialisation in the 1850’ies. The standard features of the landscape are mapped and certain details may well originate from medieval times or further back in time. The content of the map make it well suited for physical planning that have ambitions in including historical elements and structures. The scale of the map is also perfectible suited to the average map series used in today’s planning. The recognition map were drawn in 1:20 000 and cover nearly the whole of Scania and can be used along with the cadastral map in 1:10 000 or the topographic series of maps in 1:50 000. Predominant features of the ancient maps are; road network, land use (wood, dwellings of houses, wetland and so forth) and other topographic features.

The situations which the planner has to master in daily life consist of many tasks that can be GIS-driven. Compilation of inventories, maps, geodata and sketches together with spatial analysis of various kind are components that suits the GIS very fine. The communicative side of the planning including the pedagogic one; gatherings of professionals from different governmental bodies along with the strive to distribute the proposals and decisions out as far as to the ordinary citizens. Communication through spatial elaborated maps, diagrams, tables is a GIS’s predominant purpose.

Traditionally planners from the architectural side of the profession may be very restrictive when it comes to use computer aided systems. This has a lot to do with the technical origin of today’s planning tool. Technical transitions

from analogue to digital techniques have shown that a resemblance of appearance, handling, toolkit may divert the attention from the fact that the instrument is new and different (strange).

The probability for this group of craftsmen/women to adapt GIS as a tool is very high when you consider the tradition among planners to use cartographic means/languages constructing plans and projects. The way to use maps in communicating with the authorities and public is widely spread among this group of professionals. Graphical means to express and visualise ideas and vision is a major part of their academic training. In the daily work the architectural oriented planner manage information from different sources; it could statistics, hydrology, elevation and so forth, all type of data that fits in a GIS. Series of maps are used in building scenarios showing probable development of cities townships and villages.

ALLERUM/HJÄLMSHULT

The obstacles for GIS-awareness among this group is that CAD/GIS believes to give an answer to spatial questions that is to precise, along with the imaginary complexity of the tool.

This paper has an aim to use the strengths of the GIS-tools in a applied way so that the professional planners could in a familiar way appreciate the way it works

The studied area is the latest among the peripheral villages of Helsingborg City that has been chosen as object for the so called "stedtsanalys". This site comprises of two separately distinguishably units, one called Allerum and the other called Hjälmslult. The core areas lie within 600 m from each other. Allerum has a church and Hjälmslult is situated along the road from Helsingborg to Jonstorp, an important communication line between to regional centers. Historically the two sites were two different parts of the same parish where Allerum is the village with the church. Today when the local importance of status is gone, Allerum and Hjälmslult is considered one unity today.

Allerum, the church village, has a very specific appearance in the landscape. The village is situated on the back of a longshaped hill. This type of location is very common in south of Sweden where settlement preferred the high altitude site. The site was very important in the case of Allerum church whereas the terrain around the building was marsh-land. This part of Scania (the provincial unit of South Sweden) have had a wetland percentage of 25 before 1850 when the population grow and the land were shifted. Along with dwelling came communications that often can be dated a long time back, now we are talking 2000 years. The church is dated from the 12th century. Previous studies of historical map data made in the area have shown that the built up areas have moved from one side to the other. These detected changes might be interpreted as changes within cadastral administration of the parish made 200 years ago.

Hjälmslult has another story. Instead of origin from a sacral location, Hjälmslult is considered to emanate from a site of a Viking king mansion from the year of 1000. It is very common that the profane and sacral part of the local authority has a mutual spatial origin. The local organisation comes from the Viking built mansion (called "kingmansion" in Swedish) and after the church emanated as an local authority they located themselves as neighbours to the ancient power centre. In medieval times Hjälmslult was the centre in it's own county administration called Hjälmslult County.

The dominant structures in the studied area, both Allerum and Hjälmslult, are the coherence between everyday life with its footprints shown in the spatial organisation of dwelled area and the strong and vibrating nerve of communication spatially expressed in the road network. These factors have great influence on every "spatial-oriented" study of the area, especially the qualitative kind of studies (such as this).

TOOLS

This report uses MapInfo-tools when it comes to the analysis department. The choice of MapInfo as GIS-software comes from municipality administration; Helsingborg City is a MapInfo department.

More specific for this study the authors use a set of application tools packaged in a product called Simulab® and sold by a Swedish GIS-consultant, Sweco Position AB. The set of tools comprise of;

- Scenario-tool called SurfSim
- Network-tool called Route
- Isocrone-tool called Isokronbuffert

And the

- Spraying-tool called Spraytool (which is investigated and used in this study)

This package is designed to meet the requirements from the physical planner-side. The strength of the scenario-tool is the ability to simulate a specific process. The planner is very interested in how different spatially oriented developments would affect an object. The software uses ordinary desktop-GIS (MapInfo) to prepare layers and visualizing the result while Simulab® handles the function- and rule-based simulation over time. Even if the application is vector-based (MapInfo) there clear influences of grid-based operations of the involved data. Input to the system are 2 different grids

(objective and subjective grid) while a third grid containing forms that affect the outcome shown as a fourth grid known as the result of the analysis;

Objektive grid + Form grid+ Subjective grid=Result grid

The result of the analysis will be a cost-surface very much like analysis made in an ordinary Raster-GIS.

Instead of static representation of result as grids the Simulab® enables the users to create processes visualised in both space and time. The “form layers” in the previous figure is a kind of parameters which controls the time-space process of the grids. Simulab® enables the user to define;

Growth rate – central sites with their area can allowed a maximum growth of 12,5%

Central distance – the ratio of central sites and their influences on each other

Resolution – the size of the singular grid

Time – time for the start of the simulation and number of steps in the simulation

Hereby we have a set of tool for the architectural mined planner that wants to work with qualitative analysis of a process that has implications in time and space.

The route-tool in the Simulab-toolbox is a network analysis tool for approximate-studies along road networks and the isochrones-tool also work with distances over time and space.

The last tool, the spraytool, is the most interesting of all tools when it comes to qualitative studies in the context of “stedsanalyser”.

Spraying opportunities is common among the graphical software packages, such as Adobes PaintShop and Illustrator. In graphical software you often use brushes or spray cans with different size, Simulab® work with the same principles. Before you start spraying you are asked to define the area in which you want to use the spraytool.

When the spraycan has been chosen you are asked to define the behaviour of the spraying; colour, size, form (square or circular), flow, density, distribution and diffusion.

To note is that the flow is time related; that gives the user an opportunity to control the amount of colour that sprayed by time unit, besides this time control option there is a certain part of the control that relates to the spraycan movement. All this is gives opportunities to minimise the risk of generating spotting images if the computer is slow or constantly working on maximum performance. The density determines how dense the colour drops is sprayed according to form and size. With a low density you can choose to move the cursor slow and more controlled without covering the whole area with too much and too dense spraying. The distribution of the colour is also controlled by choosing between uniform, normal and even distribution. The distributional option has to do with numerical data which is included in the outcome from the spraying. The numerical data is nothing we use in this study, we only test the tool in order to find a way of producing qualitative cartographic data (but one should be aware of this option). Once chosen the normal distribution there is also a possibility manipulating the diffusion.

Next step in creating a “sprayed layer” is to convert the sprayed area into vectordata. In the process of converting the sprayed area into vectordata the user is able to determine the size of each cell that will be filled with numeric value from the intensity of the spraying. As with all data that are gridbased the cellsize will determine the time of generating the grid. There are 2 outcomes to choose between, either only the sprayed area or an areafilled grid (where only the sprayed area and its cells contain values.

CONCLUSION

This study is examining the use of the spraytool as a way to describe the “genius loci” according to Norberg-Schultz phenomenological theory of site-analysis. The description is made by the user of the spraycan. When to interpret the historical space the user spray the dominant features of the historical map. In figure nr the ancient road network is considered “a dominant feature” e.g. it follows the topography of the area, dwellings are reoccurring along the feature, it is connecting Allerum with Hjälmshult among other things. Once the features are chosen in the map, the interpreter sprays it. The spraying is done in the historical map as well as in the present map. Simple overlay (fig 1) shows a visible, qualitative present structure that can be traced back at least 200 years.

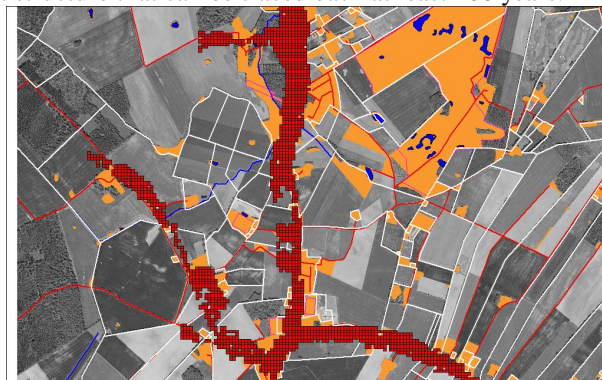


Figure nr 1 Genius loci of Allerum/Hjälmshult

When integrating with other data, such as cadastral borders, we have given the planner qualitative data suited as input in a “stedsanalyse”. Being a cartographer and geographer interested in historical documents used within physical planning process it is a great pleasure to introduce such a set of “planning methods” as the Norwegian “stedsanalyse” together with GIS-tools to a broader audience. It would be of great interest if the other tools in the Simulab® toolbox could be use for qualitative analysis such as “stedsanalyse”. The next trial session for Simulab® would be using the SurfSim-tool for scenario-building. The idea would be to let the two “input grids” showing the circumstances 200 years ago and the present status of the road network, built up areas, open spaces, wooded areas, etc. This would be the platform on which you build your scenarios. The form grid would consist of barriers, promoting features, frictional surfaces including other features that would either promote or restrain spatial development. The method with Simulab® scenario building would without no doubt result in the same output “genius loci” (fig. nr 1) as the simpler overlay method (spray-tool), but there is more to it than the result. It is how you get there and if the process is interesting publicly. For the professional planner/architect there is an interest to describe the spatial development with moving images with interacting possibility. In the case of SurfSim the interaction would using the play, hold, backward and forward buttons that comes with the application. Together with an increased use of Internet for public communication such a possibility would converge with the ambition increase public participation within the physical planning process.

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