VARIOUS MORPHOLOGICAL ANALYSES METHODS APPLIED IN TEACHING ON BSC AND MSc LEVEL

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ABSTRACT

Many disciplines have text books with operational analyses methods. However, in urban studies such a comprehensive overview is lacking. Often the references for the various urban analyses methods are scattered around in book chapters and articles. In this paper some elementary analyses methods with examples are presented suitable for bachelor as well as master students. The challenge is to find a common platform suitable for those with and without software skills.

For both BSc as well as MSc level, insights are given on some elementary analyses methods based on the urban morphology tradition, place phenomenology tradition and the urban network tradition. Concise definitions of urban space and urban form are given. The first part of this paper presents various BSc level analyses methods, such as 2-steps analyses, street function (street profiles), building density and building morphology, The Mixed Use Index (MXI), The city image analyses from Lynch, and the urban micro scale tools (the building - streets relationship). All these analyses can be done by hand with the help of Google Earth and Google Street view. The students are asked to compare two different areas with one another. One urban area is function well and the other not. Another option is to compare a traditional neighbourhood with a modern one.

A full space syntax course is given on MSc level. All MSc students get a crash course on the above mention methods before starting up with the Space syntax method and theory. First the logics behind the calculation are shown. Then the students have to draw an axial map, which they have to use in Depthmap. Axial maps for large urban areas are provided. During each step of the teaching, results from research and theory building are demonstrated.

The aim is that students learn from the comparative analyses of the two urban areas and to make strategies for improving one area with all the methods they learn. Moreover, the students have to test out the before and after situation of various design proposals, and to understand the results of the analyses. Pedagogical descriptions, examples from exercises and some examples of student work are given throughout the paper.

KEYWORDS

Teaching Space Syntax, spatial modelling, urban theory, spatial methods, didactic methods
1. INTRODUCTION

Many disciplines have textbooks and articles with an overview over operational analyses methods. However, in urban studies a comprehensive overview is lacking. Often the references for the various analyses methods are scattered around in book chapters and articles.

Yet another problem is that software skills are required for conducting spatial analyses of the built environment. GIS is a useful software, but has a large barrier to overcome for getting started. DepthmapX is simpler to use than GIS. Providing a simple software manual for DepthmapX combined with a demonstration helps the students getting started. The challenge is to find a basic platform for introducing students to the various spatial analyses methods.

The main teaching aim is to get the students be aware of the spatial properties of the built environment. For this reason, precision is needed. In some cases, the focus is on the shape of the physical objects and in other cases it is about the spaces and their spatial interrelationship. In the bachelor as well as in the master thesis, the students get the assignment to transform a centrally located, but poorly optimal used urban area into a vibrant lively urban area. In order to do so, the students need to identify the various spatial properties on well-functioning urban areas or neighbourhoods. For this reason, the students need to have a set of spatial analyses methods for analysing two different areas for discovering, making comparisons and diagnosis on what the spatial problems are at issue.

For discovering the degree of objectivity, testability and applicability in urban research, students get the assignment to analyse two different urban areas. The areas the students are analysing and comparing with one another are mostly one well-functioning and one poorly functioning urban area. The knowledge the students get through this assignment is then to apply it on improving the poorly functioning urban area. Later, when the urban plan of the poorly functioning area is ready, students apply the same analyses methods for showing the spatial impacts on the new improvements.

In chapter 2 some elementary analyses methods with examples are presented suitable for bachelor as well as master students. These methods are given for BSc students in a course on urban transformation at the department of Civil Engineering at Western Norway University of Applied sciences. Moreover, these methods are also given as a one day crash-course for Master in Land Use and Property management students at the same university. It gives the basis for the next step, discussed in chapter 3, to learn the space syntax method with the DepthmapX software. Chapter 4 will discuss the outcomes of this teaching method.

2. THE METHODS SUITABLE FOR BSC STUDENTS

For the BSc students, the software use part is left out. The teaching aim is that the students can focus on the logics and the thought behind the various spatial tools. Google earth, google maps with their satellite photos, and Google street view are useful sources to carry out these analyses inside the classroom. The tools used are tracing paper, colour pens, maps of two different local areas, laptop or pc with internet access for using google satellite maps and street view. Students that are familiar with various drawing software, such as the Adobe illustrator, auto cad, vector works, GIS, sketch up etc. are free to use them.

The session starts with an introduction lecture with a short history of the various analyses methods on built environments and with some definitions of urban space. Clarifications on the differences between extrinsic and intrinsic properties of space are given. Then the various methods are explained supported by examples from research. At the end, some theories are shown, such as the theory of the natural movement economic process and the theory of the natural urban transformation process.

2.1 The 2 steps analysis

15 years teaching experience has given the experience that the 2 steps analysis method is a good beginning to understand the elementary basis of the Space Syntax method. Here people can learn the principle to represent the urban street and road network as sightlines for only a few streets and roads. Moreover, carrying out the 2 steps analysis gives the students a first feeling about what is meant by direction changes or topological distance based on axial sightlines.
The 2 steps analysis is a method to visualize the local catchment area of a street segment (Hillier 1999). Figure 1 shows how it is done for two different streets. The upper street is a short dwelling street and the lower street is a curved shopping street. First, take the street at issue and colour it in red. Here in this case the curved shopping street is coloured in red. The colour the sight lines that are directly connected to the red street is green. These green streets are the first topological step, or direction change from the red street. As soon as these green streets ends, or start to bend slightly, then the next direction change starts. These street or sight lines are coloured in blue. The same accounts for all streets that are connected to the green streets. Thus, the blue lines show two topological stets, or simply speaking, two times direction change from the red street. Therefore, this method is named “two steps analysis.” The 2 steps analysis shows a “two topological step street grid” from a particular street segment or street segments visualising their “local catchment area”. As the results on the right side of figure 1 shows, the dwelling street has a low catchment area in comparison with the curved long shopping street.

Students are also asked to make a 2-steps analysis at the same time from several streets. One way is to take a 2 steps analysis at the same time from all the main routes running through or between a neighbourhood. The purpose is to reveal how poorly or how well connected a neighbourhood is to its main routes.
The usefulness of this method is to show how accessible the direct surrounding street or road network is to a particular street. Examples on where to use the 2-steps analyses is to test the local catchment area of various types of shopping streets (van Nes 2005), to test how various local neighbourhoods are accessible from the main routes running through or between various areas in the city, or to the local accessibility of squares. The method is also useful to test how ring roads are connected to their vicinity and how accessible various centres are from ring roads (van Nes 2003).

2.2 Street function based on street profiles

The analysis of the street function depends on street profiles. The method is based on Job van Eldijks work on investigating the spatial framework for a social housing area in Sweden (van Eldijk 2014). He distinguishes between four categories of street functions: 1) streets only accessible for pedestrians and bicycles, 2) a balanced use of streets for vehicles, bicycles and pedestrians, 3) streets or roads dominated by vehicle transport with pavements on both sides for pedestrians and bicycles, and 4) roads only accessible for vehicle transport. The legend in figure 2 shows these four categories applied on the Grefsen area in Oslo. The pedestrian and bicycle streets and the vehicle only roads are easy to identify. Sometimes it is difficult to distinguish the balanced streets from the vehicle dominated roads/streets. A rule of thumb is that most of the balanced streets have buildings directly connected to the pavements, whereas most vehicle dominated streets have no buildings or buildings turned away from the street/road.

Figure 2. The street function analysis based on street profiles

The usefulness of the street function profiles analyses is to show where the car dominated or balanced the street network are located in an urban area in one glance. Here in the Oslo case, the car dominated built environment is in the northern part of this area, where a balanced use of pedestrians and vehicle transport is found in the southern part.

2.3 Building density and morphology

The latest contribution to the urban morphology approach is Johan Rådberg’s contribution to quantify building density and building form at the same time in one method. In the 80’s and 90’s Rådberg made a matrix where he correlated the Floor Space Index (FSI) with the Ground Space Index (GSI). Through using this matrix, a classification of various types of building morphology can be made (Rådberg 1996). Some other measurements, such as Open Space Ratio (OSR) and Layers (L) can also be measured in this matrix. The OSR shows how much of the plot is used, and L shows how many floors a building has on average in a lot. Later on, through the application of this method in a PhD research, it is named Spacematrix (Haupt and Berghauser Pont 2010).

The categories of building density are classified into low-rise, mid-rise, or high-rise depending on the number of floors. The categories of building type are separated into point-type, stripe-type, or block-type depending on the building’s form. The entire built environment can thus be divided into nine categories: 1) low-rise point type, 2) low-rise strip type, 3) low-rise block type, 4) mid-rise point type, 5) mid-rise strip type, 6) mid-rise block type, 7) high-rise point type, 8) high-rise strip type, and 9) high-rise block type. Figure 3 above shows a simple illustration how types of building volumes in
relation to their plots are placed in a Spacematrix scheme.

Most of these building types can be found in every large town or city. This analysis can be done easily on hand with the help of Google Earth and Google Street view. Figure 3 below shows a Spacematrix analysis of Bergen centre done by hand.

Spacematrix thus quantitatively describes the combined intensity, compactness, pressure and non-built space and height, which can therein be used to differentiate urban forms more efficiently than before (Rådberg 1996). The method is useful for showing an accuracy of the building morphology and degree of density at the same time. Moreover, Spacematrix is a quantitative description of building form and building density based on both FSI and GSI.

Figure 3 The principle of Spacematrix with an example on its application in Bergen centre.
2.4 The degree of land use diversity

Recent van der Hoek made a triangle matrix where it is possible to quantify degree of mono-functionality versus multi-functionality. The method is named the Mixed Use Index (MXI). Urban areas that have only one function, such as either dwellings, working places (industrial areas or offices parks) or amenities (leisure activities such as sports, shopping etc) are defined to be mono-functional. Urban areas are bi-functional where two of these three functions are present and they are multi-functional when all three functions are present (van der Hoek 2009).

The original MXI model measured the percentage of housing, working space, and amenities occupying urban blocks. The function “housing” included various residential dwellings, such as apartments, condominiums, and townhouses. The function “working” encompassed offices, factories, and laboratories. The function “amenities” covered commercial facilities such as shopping centres, schools, and universities in addition to leisure facilities such as sporting arenas, cinemas, concert halls, and museums. Hereby, the MXI is defined as: MXI = (%Housing / %Working / %Amenities).

As a method developed by an urban designer, it is easy to integrate into a design process. The weakness of this matrix is that the border between leisure functions under the “amenities” can also be working places. Moreover, shops and cafés can both be working places and leisure places. Improvements are needed for fine-tuning this definition for the MXI method. In spite of its shortcomings, the MXI method is useful for describing urban areas’ degree of mono-functionality versus multi-functionality. Figure 4 shows a MXI matrix with Google Earth images with various types of mono-functional areas at the edges. The multi-functional areas are shown in the middle of the triangle. Historical town or city centres tend to have a balance with a mixture of dwellings, working places and amenities.

Figure 4 below shows a map with a manually registration of functions of Bergen centre. When comparing this MXI map with the Spacematrix analyses, areas with high building density on FSI and GSI level has also high degree of multi-functionality. Hence, the degree of land use diversity depends on high building density.

The method is useful for visualising the degree of mono-functionality versus multi-functionality in urban areas. In other words, a MXI analysis shows the degree of land use diversity of urban areas.
Figure 4 The Mixed Use Index triangle (above) applied on Bergen centre (below)
2.5 Analysing the image of the city

There exist few analyses methods from the place phenomenological tradition. There exist several writings based on the work of the philosopher Martin Heidegger. However, objective and operational analyses methods are lacking. Some attempts are made, inspired on the work of Christian Norberg-Schulz, such as the work of Thomas Thii-Evensen and Anne Maria Vagsten. So far, the most applicable contribution in carrying out place analyses is Kevin Lynch’ method.

Kevin Lynch’s book *The Image of the City* searches for a physical qualitative which relates to the attributes of identity and order in a mental image (Lynch 1990, p. 9). He is not only concerned with urban form, but also with the form in which an urban order is perceived by its inhabitants (Lynch 1990, p. 3). The analysis of an environmental image is supposed to depend on three components: identity, structure and meaning. The identification of an object, e.g. an urban environment, consists in the possibility to distinguish it from other objects and to recognise it as a separate entity. An object’s image hence must include the pattern of its relation to an observer and to other objects. Meaning is a subjective matter, on which physical manipulation has less influence than on identity and structure (Lynch 1990, p. 8). Lynch uses a number of other terms such as an environment’s legibility and visibility and thereby indicates his intention to provide an analysis of urban form based on perception.

Figure 5 Examples on Lynch 5 elements from Oslo (left) and an example of analysis based on Kevin Lynch’s book “The image of the City” (right) of Oslo centre.

The acquisition of an image is a reciprocal development between the observer and the observed. According to Lynch it is possible to train observers by presenting to them a set of elements and make them use these elements in their analyses of urban environments. In essence, Lynch introduces five basic elements:
paths which are channels through which people are moving

districts i.e. sections of the city conceived to have a two-dimensional extension with or without a particular character

landmarks points of reference inaccessible to the observer

Lynch uses these elements to set forth orientation maps. The images of urban environments are composed on the basis of such maps.

Figure 5 right shows some examples from Oslo used as examples representing Lynch’s five elements. The relative importance of these criteria for a “good” image will vary with different persons in different situations; one will prize an economical and sufficient system, another an open-ended and communicable one (Lynch 1990, p. 9).

Lynch’s analytical tool is a method derived from perception psychology. The different observers are presented with the introduced five elements to draw an identification map for a particular city. It is a significant advantage of Lynch’s method that it provides a means to analyse urban form. Unlike many other abstract methods, his analysis is based on a theoretical concern with the relationship between the user and the artefacts of the city. Moreover, he pays attention to visibility and movement in a city where people orientate themselves with reference to specific physical objects.

A weakness of his method consists in the unjustified choice of elements an observer is supposed to take into consideration when analysing his/her image of an urban environment. Lynch does not discuss as to whether most persons, strangers as well as inhabitants, orientate themselves based on these five elements. Yet another problem of Lynch’s method is that different observers might perceive some of the five elements differently. For some observers, a ring road for example might count as a path while others take it to be an edge. Therefore, observation maps can vary between observers. Moreover, a transformation of interviews of a city’s inhabitants into orientation maps is not free from individual judgements (Karimi 1998, p. 47).

The method is useful for identifying the image of urban areas. In spite of its shortcomings, it is at present the best operational method for identifying urban image regards the place phenomenology tradition. Students carry out these analyses methods in groups of 3 to 4 persons, in which generate discussions and common agreements on identifying Lynch’s various elements on specific sites.

2.6 Urban micro scale tools 1: Street inter-visibility and entrance density

The urban micro scale tools is useful to analyse the spatial relationship between private spaces inside buildings and public streets (van Nes and López 2010). The rule is to reveal how doors and windows on ground floor level are positioned towards streets. Google street view is a good tool to get fast the necessary data for doing these analyses. The average value for each street segment is used in these analyses.

There is a difference between the density of entrances and the degree of inter-visibility of entrances. Measuring the degree of street inter-visibility is about to what extent entrances and windows are located on one side of the street and on both sides of the street. This should not be conflated with street density. Figure 6 left shows a diagram showing the principal differences between street density and street inter-visibility.

In general, one makes two separate maps, where the degree of inter-visibility is on one map and density of entrances on another map. Figure 6 right visualises the degree of inter-visibility (above) and density (below) of entrances from Pompeii. For the degree of street inter-visibility of entrances and windows, the following 3 different categories are used: low, medium and high density of entrances and windows. For the analysis of entrance (and windows) density case, 5 different categories are used.
2.7 Urban micro scale tools 2: Topological depth between private and public space

An analysis of the topological depth between private and public space shows the number of semi-private or semi-public spaces between private space inside dwellings, offices and shops. Figure 7 left shows the principles on how to register the spaces between the private space inside buildings and public streets.

Figure 7 top right shows how to visualise it on a map for an urban area or a small village. Often four categories are used: Zero steps (when building entrances are directly connected to a public street), one step (when there is a front garden between the building entrance and streets), two steps (when the entrance is on the side of the building), three steps and more (when the entrance is on the buildings’ back side or when one has to walk through several semi-private or semi-public spaces). It is the average value for each street segment that is taken into account.
2.8 Urban micro scale tools 3: Street constitutedness

Analysing the degree of street constitutedness is to show to what extent streets that have entrances directly connected to them (Hillier and Hanson 1984, p. 134-138). If a street segment has only one entrance and it is directly connected to the street, the street is constituted. If the street has no building entrances connected to the street, the street is un-constituted. Figure 7 below right shows some principles on when a street is constituted or un-constituted. A typical example on un-constituted streets are tunnels and pedestrian subways. Figure 7 below left shows how it can be visualised on a map for a local neighbourhood. The red lines are the constituted streets, whereas the blue lines are the un-constituted streets.

The usefulness of the micro scale analyses is to show the various degrees of the spatial framework for the social control mechanism between buildings and streets. In particular in research projects on street crime, sexual violence, space and gender the urban micro scale tools have contributed to knowledge on how various building – street relationships affect the perception of safety and degree of street life.

3. THE ADVANCED SPACE SYNTAX ANALYSES WITH DEPTHMAPX

No software skills are required for conducting the methods presented in chapter 2. For Master students, the methods presented in chapter two is a one day workshop when including the exercises.
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For bachelor students, the methods are presented over three half days. For master students, a full space syntax course is given with three to five half days workshops for master students. In between each workshop, the students need sufficient time for making the axial map, process the spatial analyses and to reflect upon the results. In some cases, where the available time is limited, an axial map is provided.

The whole space syntax course is based on learning by doing, supported by lectures, tutorials and demonstrations. The aim is to show which kinds of spatial parameters space syntax is using or not, what the results from the various space syntax show, how to correlate the results from the spatial analyses with place bounded socio-economic data, give ideas on primary and secondary data gathering, existing theories on space, movement and economic development (Hillier et.al. 1993, 1998, Ye and van Nes 2014), and theories on spatial combinatorics (Hillier 1996, chapter 8)

The introduction lecture consists of an overview over existing spatial analyses tools, and definition of the various spatial elements used in space syntax. Issues such as the difference between extrinsic and intrinsic properties of space is revealed, and explanations on how various calculation in space syntax are done. Examples on space syntax analyses of cities most people know is shown. This is useful for explaining what the various calculation show. The best is to use an axial map from the city where the course takes place. When for example giving a course in Delft in the Netherlands, the axial map of Delft and Rotterdam is used, and when giving a course in Bergen in Norway, a map of Bergen is used. Likewise, when for example giving a space syntax course for archaeologists, an axial map of an excavated town is used.

The following seminars consist of lectures where results from research regards spatial integration and spatial segregation where the spatial data is correlated with various socio-economic data. Topics such as centralities, road building and urban change, space and crime, space and social segregation, street life and dispersal of shops, and urban sustainability are dealt with. During these lectures presentations of space syntax’ contribution to theory development are shown. Where it is required, seminars are given on how to use space syntax in GIS and application of space syntax in design and strategic planning are given. It all depends on the kinds of students attending the space syntax course.

After each lecture, software demonstrations are given. Github is a useful platform for students to download the DepthmapX software and the Depthmap manual for Dummies. After each seminar, students have to make an assignment. These assignments are made stepwise in the following way:

Assignment 1: Draw an axial map of a neighbourhood you know and make a space syntax analyse of it with the DepthmapX software. Describe the results.

Assignment 2: Compare the results from the space syntax analyses of a traditional and a modern neighbourhood with one another.

Assignment 3: Make micro scale spatial analyses on the relationship between private and public spaces of the main shopping streets and a side street of the two neighbourhoods from assignment 2 (here the students are using the micro scale tools presented in section 2.6 – 2.8)

Assignment 4: Connect the results of the space syntax analyses with socio-economic data and with the results from other spatial analyses of the two neighbourhoods you made in assignment 2 and 3.

Assignment 5: Test out the before and after situation of your design or strategic planning project. Describe the spatial and social impacts of your design proposal.

The students have to use the theories in design. The question they have to ask themselves is “what happens if I do this?” Theory of the natural urban transformation process and the theory of the natural movement economic process imply that the structure of the street network needs to be solved first. Therefore, the first step is to make proposal on the street network structure. Then the next step is to test out various proposals with DepthmapX.

The results from the space syntax analyses give indications on where it is suitable to plan multifunctional or mono-functional land uses, the type of building density, and to choose street profiles based on their function. On a micro scale level, requirements for buildings facades with windows and doors can be made in the legal descriptions of the plan.
4. RESULTS

In this section, the results from the master students at Western Norway University of Applied sciences will be shown. The task they get is to transform the Kronstad area, located 2 km away from Bergen city centre into a vibrant urban area. The Kronstad area got a light rail stop in 2010, the main building of Western Norway University of Applied sciences was opened in 2014, and now the municipality is planning a second light rail stop for line 2 at Kronstad. At present, the area is not optimal used. The area is surrounded by dwellings and some industrial areas. A local centre is lacking. Bergen is experiencing a large population growth at this moment, and the land is scarce because the city is squeezed between seven mountains. Therefore, it is a challenge to optimise the land use in the city.

Figure 8 Two different solutions of the same area in Bergen made by master students in 2018.

The first task the students get is to compare the Kronstad area with Bergen centre. The students have to use all the tools presented in this paper. Through this assignment the students find out quickly what Kronstad is missing, and what the spatial features are for a vibrant urban area. Therefore, spatial improvement strategies can be made for the Kronstad area.
In line with the theory of the natural urban transformation process, the students have firstly to solve the spatial structure of the street network. Figure 8 shows the angular segment analyses of two of solutions for the Kronstad area made by master students from the urban planning course from 2018. In the angular choice analyses with a low metrical radius (500 metres), both proposals contribute to make a new local vibrant centre in Bergen (figure 8 above). It is not enough to have a dense fine-grained street network on a local scale. The Kronstad area need also to have possibilities for random visitors to travel through the area. The angular segment choice with a high metrical radius (5 km) shows that a main route is running through the area (figure 8 below). Both proposals show that adding some new streets that are connected to the integrated main route to surrounded dwelling areas contributes to transform Kronstad to a second centre of Bergen city.

When a proposal for the street network is made, then decisions can be made on building density, land use and street profiles. Figure 9 shows one plan, made as group work of four master students from autumn 2017. On the top, stepwise approach on how Kronstad can be urbanised is shown. Below, the final proposal is shown, with a 3D image.

Figure 9 One example of the final plan for Kronstad area, made by master students from 2017.

At the end, the students have to make a legal plan of a small part of the area to ensure that the area will transform in accordance with the intentions. These plans are made with the requirements from the Norwegian planning and building law from 2008. A legal valid planning document consist of a map showing detailed public road and street functions (pavements, bicycle paths, streets, tram rails,
parking spaces etc.), land use and building density. In addition to the map, a text document with legal regulations is provided with detailed regulations on building facades, maximum or minimum building heights at each block, requirements for car parking spaces, minimum requirements for playing grounds and outdoor spaces, order provisions on implementations, requirements for building materials etc. Figure 10 shows an example of a legal land use plan made by master students from 2017.

Figure 10 One example of the final plan of the Kronstad area, the legal plan, based on all types of analyses, made by master students from 2017.

After finishing this course, the students are skilled in conducting various spatial analyses methods. The next step is to apply them in a research project in their further studies and in their master thesis. During this course, examples on how to correlate spatial data with socio-economic data is demonstrated. Due to time constraints, practical exercises in the field are not carried out. Anyway, students are stimulated to be innovative to gain primary data on space use by finding new ways of using the gate counting, static snapshots and the snail trailing methods. It all depends on their research questions for their final thesis. We have examples on students that are following bicyclists for identifying the bicycle routes through the snail trailing method, and students that are registering nightlife activities or how children use urban space through the static snapshot method.

5. CONCLUSIONS

The main aim of the urban analyses method course is to raise the awareness of urban space as something active influencing the transformation of urban areas and the socio-economic life of cities. There exist several text books on urban sociology and urban geography for students. The focus is mostly on activities of various social groups. However, these text books lack methods on how to analyse the physical or spatial aspects of the built environment.

In both BSc and MSc courses, the students have to apply the knowledge gained from the spatial analyses into improvement strategies of an urban area. All the analyses, planning proposals, and evaluation of their proposals the students do in groups of 3-4 persons. At the end of the course, each student is individually accessed by a home exam lasting for two days. For the BSc students, they can choose between three assignments. One is a theory question where the students have to reflect upon and apply knowledge from the course literature on a relevant topic (such as sustainable development, walkability etc.). Another task is to compare two different city centres with one another with all analyses tools and to write a reflection on the results. A third task is to make a diagnosis of an existing urban areas with all the tools and come with suggestions for improvement strategies. The aim of the home exam is not only to give marks for each student, but also start a thinking process for the students for raising awareness of the physical aspects of the built environment.

After finishing their BSc and MSc degrees, students start to work in municipalities, consultancy firms and architect offices. The students bring the knowledge gained from this MSc and BSc course with
them into working practice. Mostly after 4 years, the awareness and interest of space syntax and other place analyses tools start to spread into working practice, in both Norway and the Netherlands. Even though students experience or struggle with scepticism from senior employees throughout their jobs, the interest for space syntax and other place based analyses tools are steadily growing. Various stakeholders are slowly acknowledging that there is a need for spatial analyses tools for diagnosing or upgrading urban areas, and tools for testing our planning proposals. Already we have got a first proposal to make an operational manual on how to do place analyses for Bergen municipality.

REFERENCES


