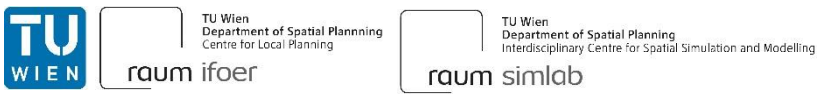
Methods of Spatial Research and Planning

Theoretical explanation of Planning Approaches and Methods



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Project-Based Learning - The Core of a University Education in Spatial Planning and Development

Bernd Scholl

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1 | Preface

Universities and technical schools educate today for the tasks in a planning practise of the future. Ideas about what tasks will be meaningful for spatial planning and development in the future must therefore be the central starting point of a university education. Research, education and practice are thus closely interconnected.

Though models for the acquisition and testing of solutions can offer valuable insights and foundations, seldom can they replace real space as a learning laboratory. That is especially true for understanding social, legal and political interactions. Therefore, cooperation with leading actors in practise is of central importance in a high-quality education. University education is in an upheaval. Far-reaching changes in the field of education (for example, the Bologna reform in Europe), new possibilities for learning that are independent of time and place (e-learning), expanded possibilities for experiments using models, and additional demands on graduates have led to new study programs and educational concepts. Project studies are more and more often being chosen as the core educational method.

Higher mobility of students and international exchange programs call for new offers and stimuli in spatial planning and development programs. On the doctorate level in particular, there is a need for additional impulses to expand both subject and personal horizons. Because the resources for appropriate programs are not available in many universities and colleges, cooperation across university boundaries is of increasing importance. However, it must not be overlooked that spatial planning and development are connected with the pattern of thinking, the language and culture of a nation in a special manner. This explains why there are different planning cultures and educational programs in the various regions of Europe and beyond.

This contribution discusses project-based learning as the core element of higher education in spatial planning and development in a more global perspective.

2 | Starting Point of Studies: Difficult Unsolved Planning Problems

Project-based learning was introduced in the new spatial Development and Infrastructure Systems master's program at ETH Zurich in 2006. During the preparation, it became clear that in planning programs leading to academic qualifications, activities that stimulate creative and strategic thinking and abilities such as conclusive argumentation, cooperation in groups and the presentation of difficult actual planning tasks could be a great enhancement. In this phase of the program and because, for most students, this is the first time working on projects, the tasks need to be manageable. In the master's program, and therefore in the advanced stage of study, students have the opportunity to work in groups for a full semester to develop solutions for complicated and real tasks.

A traditional postgraduate course in spatial planning already existed at ETH Zurich. This course of study, which was introduced towards the end of the 1960s, became a four-semester program for working professionals in the 1990s. Participants need to have an academic diploma and several years of professional experience in organisations relevant to spatial planning, of either a private or public nature. The basis of the course are two study projects, each with a two-semester duration: one in the area of local planning and the second in regional spatial planning. Within both projects, only the approximate scope of the study project is stated. As part of the task, the students must recognise which spatial conflicts and problems could be important for spatial development.

During a project study, students learn that in order to clarify and solve a spatially related task, they not only need professional knowledge, they also need to learn about the difficulties of arriving at a solution when working in a team, how to deal with uncertainties and how to present the results within a limited timeframe. In the end, the basic purpose of using project-based learning is to learn the art of learning, to be able to give and take criticism and to accept that many of the suggested solutions can only be of a temporary nature. The need for dialogue between those who learn and those who teach in a direct, open discussion is without question. For me, these are the core elements of a university education. The starting point is a difficult unsolved planning problem, which means that in the beginning the teachers do not know the solution either. This is in contrast to traditional exercises, where from course to course the particular ability to reproduce information is tested. As a rule, such assignments are sterile and can only communicate the solution of a problem and its important background information in a very superficial and subjective manner and hardly consider the need to acquire a purposeful approach to time as a resource.

A direct contrast to that approach is learning from working with unsolved problems within a realistic timeframe. The issue here is to help students look for a variety of ways to solve the problem and be able to judge the students' suggestions from the experience of one's own practise. The knowledge of how to process a problem is not imparted through reproducing past information, but rather through explorative learning.

This method of learning is unusual for many, because the start of every process is open and therefore an adventure-indeed, the adventure of learning. This method is accompanied by many questions and can develop into a culture of questioning. From Socrates we know the importance of the question before the answer. In some cultural circles, open questioning is often considered a sign of ignorance and is therefore absent, much to the disadvantage of the 'thirsty' student. As a practicing planner, I am well aware of the importance of a question and answer dialogue. It is one of my main responsibilities, for instance, as chairman of a special, time-limited planning process, to start the 'game' of question and answer and to see that it does not get lost among the conflicts and difficulties. In my experience, there has not been one case of a difficult task in which someone possessed the solution in advance, i. e., knowledge of the ultimate truth and wisdom. Solid and therefore lasting solutions are usually achieved only after long battles. A university education must also help prepare students for this reality.

We are trying to prepare the students by acknowledging this reality and by imparting knowledge through examples taken from important tasks, and most important, to show how to proceed in a problem-oriented manner. University learning, creative thinking, and learning-by-doing are not mutually exclusive activities. Because we have to understand, analyse and solve problems in an integrated manner, concentration on the essentials, the core of the problem, is a necessary precondition.

At the same time, this is, in fact, the true difficulty. The approach of making the unsolved problem central to a university education goes back to Humboldt, as do so many other things. The enormous flexibility in thinking and the many fruitful ideas that result from it are due to the openness to accept 'knowing about not knowing' (Wissen vom Nichtwissen) in the analysis and solution of difficult problems and to make it apart of further explorations.

We do not need to worry about this issue too much rather we can move within a framework of strategic guidelines of task presentation. When, for instance, inner city development should have preference over development of the surrounding areas, then assignments of this nature should be central. It would therefore make little sense to train students to plan and build in the open countryside with all of the subtleties of development planning. In teaching as well, the boundaries between special areas of study and disciplines must be overcome and opportunities for learning together must be created.

3 | Methodological Principles

The outcome of learning and teaching using unsolved problems requires an open approach. How do we choose the task or rather, the field of the task? For a start, it should be a task that will help illustrate typical difficult, important and future-relevant questions of spatial and infrastructure planning. On top of that, the task and planning perimeters should be relevant to the general development of a larger spatial catchment area.

Naturally, we do not exclude the fact that there already some (and some smarter) attempts at solutions. Such attempts are often an indication of the significance and difficulty of a problem. Doubtless, study projects are exciting when solutions can be investigated without having to make fixed plans, as in a laboratory. This also has the advantage that real practice can use the unprejudiced approach of project results for further work. The involvement of practicing professionals is therefore not only desirable, it is a major component for successful learning.

My conclusions will illustrate that far in advance of the study project semester thought must be given to the task that will be assigned. We are now going as far as having the colleagues who will accompany the project explore the area of the assignment through test planning, under the auspices of the Chair responsible for the procedure. A cycle consisting of exploration, preparation, execution and evaluation of semester projects covers approximately three semesters. Knowledge of planning methods gradually takes a central role, and not only during the project semester itself.

It would be disastrous to leave learning processes, also those of the teaching and accompanying staff, to coincidence. As the applied culture of competition has shown us in the field of urban development over the last several decades, the process of searching for the best solution has to be prepared in advance. To exaggerate: the more difficult the assignment, the less complicated the organisation should be. Tasks with an open outcome demand procedures with fixed deadlines, which is why it is necessary to make effective preparations for the development of the task setting and its process. This calls for minimal, but important methodological principles to be used as guidelines for preparation and implementation. These have proven themselves in study projects with groups of four to six students, which means that about twenty to thirty students could take part in an integrated project in one semester.

3.1 Clarity before precision

In most of the difficult assignments known to me, the credo 'Clarity before precision' plays an important role. Engineers, from training onward, are used to having reasonably structured problems. What is the assignment? What are the conditions? Which information is significant, and which is not? The formulas, norms, methods and procedures available have been established to standardise the search for solutions. For a variety of regular assignments this is useful. In addition, standardised and routine procedures are useful because, with the usually limited resources, they enable concentration on the essentials, and that usually means concentrating on analysing and solving difficult problems. But, when routine procedures are applied uncritically to solve complicated assignments, the situation becomes hazardous.

Behind the use of routine procedures is often the wish for certainty and security expressed in exaggerated precision. This escape to seemingly rational islands is a common approach in complicated situations. It is therefore important, and unavoidable, to point out this behaviour to students who want to be able to successfully encounter such situations in future, and then bringing attention to the thinking patterns behind these approaches and eventually handing out methodological principles for analysis and solving. 'Clarity before precision' is one of these principles. In his interesting book, *Unended Quest. An Intellectual Autobiography*, the philosopher Karl Popper (1974) considers these pragmatic rules, significant for many planning engineers:

Yet both precision and certainty are false ideals. They are impossible to attain, and therefore dangerously misleading if they are uncritically accepted as guides. The quest for precision is analogous to the quest for certainty, and both should be abandoned. I do not suggest, of course, that an increase in the precision of, say, a prediction, or even a formulation, may not sometimes be highly desirable. What I do suggest is that it is always undesirable to make an effort to increase precision for its own sake - especially linguistic precision - since this usually leads to loss of clarity One should never try to be more precise than the problem situation demands. I might perhaps state my position as follows. Every increase in clarity is of intellectual value in itself; an increase in precision or exactness has only a pragmatic value as a means to some definite end - where the end is usually an increase in testability or criticizability demanded by the problem situation. (Popper 1974)

One practical conclusion in giving clarity preference over accurracy is to train the ability to estimate. Another is to work out important knowledge about the solution based mainly on decision-making. In the next section, I will go deeper into the questions surrounding this issue.

3.2 The imperfection of knowledge - robust action and decision-making

One of the difficulties surrounding planning that needs to be recognised lies in the imperfection of our knowledge. We will never know for certain if we have considered every issue that needs to be considered in a particular task or decision. Despite that, we should know as much as possible about the task and the possible solutions. This dilemma, not to forget anything of importance, while restricting ourselves in gathering information, is brought home to us in two planning maxims: the rule of the 'Requirement of Total Evidence' and the rule of 'Sharply Focused Information'.

The rule of total information goes back to the philosopher Carnap (1950), who with his 'Requirement of Total Evidence' demands that in making a decision, decisive evidence on all important issues are to be taken into account. The rule from economists Modigliani and Cohen says: 'Don't devote resources to

estimate particular aspects of the future if, no matter what you might find out (with due consideration to what you might conceivably find out), you would not be led to act differently from the way you would have acted without finding out.' (Modigliani, Cohen 1961: 22)

The widespread approach in many schools of thought in planning, put simply is: inventory, analysis, goals, measures, and is therefore largely unproductive. The temptation is to elevate all sorts of things that could be important for the process of decision-making, instead of exploring the things that are necessary. Vast inventories are rarely time- and cost-effective. When after long pointless discussions of goals, one is finally able to get to the suggestions for actual measures, time is usually running short and the truly important information is still not available.

It is far more effective to start with the idea of decision-making: in simple terms: to transform all the spatially relevant problems into problems of decision-making. Who will do what, with what means, and by when, are the deciding questions. What needs to be taken into account is that there are always circumstances that cannot be influenced by the decision-maker. That's why one always has to deliberate what will happen in case of a mistake in making a decision. An example from the world of the Olympic Games: The chance of being chosen to host the Games is about three to five per cent today. The process of competing requires considerable private resources and investments, so it is worth considering which part of the planning will still be profitable when the Olympic Games are over or indeed do not happen. At the same time, the post-Olympic use is the main use.

The Olympic games are certainly a highlight, but they are also passing events in the life of a city or a region. Put another way, a concept that would also bring advantages to the town's development, even without hosting the Games, is to be preferred over one that only works with the event itself, and, is most definitely preferable to a plan that with or without the event would bring confusion, loss of time and vision to current, important projects. The first concept would lead to a robust decision.

A decision is only robust when the decision made will not be altered by changing circumstances. One could express this otherwise: When a decision is robust, the more uncertain the information available can be. When a decision is less robust, the more certain the available information has to be.

This fact, though appealing to common sense, is repeatedly dismissed in actual practise. In the false assumption that scientific reasoning has to be precise above all else, one would wrongly assume that precise information produces sound decisions. This assumption, which is widespread among many actors, can be dealt with in teaching by uncovering such false assumptions in the tasks at hand, particularly by not basing the solution of the task on the accuracy of certain information. From what I have observed, most of the students become aware of the fact that actions and decision-making in planning are always subject to a certain amount of uncertainty. This is a good basis for further work both inside and outside the university.

3.3 The importance of teamwork

The sustainable shaping of our living environment, at least in our latitudes, can only be realised through the purposeful cooperation of those involved. The more demanding the task, the more the need for adjustments in materials and time. Effective coordination and cooperation demand the right provisions for communication. Whether we like it or not, in a democratic system, spatially related tasks will not be solved in individual ways by individual people. However, many people are not used to doing goal-oriented work in groups. That is why we put great emphasis on creating these kinds of opportunities during the program.

Teamwork is learned through experience, i.e., learning-by-doing. For those who have experienced, at least once during their studies, how an effective, functioning team can be created through efficient self-organisation, how ideas can be born and discarded, and how individual personalities and abilities can be distributed within a group, the difficulties that will be found in actual practise will not come as a shock or an insurmountable obstacle.

3.4 Competition of ideas

It's a commonly accepted rule that the solution does not exist for difficult planning tasks. The range of possible solutions is much larger than commonly thought. Many experiments have shown that a group is rarely capable of exploring the entire possible range of solutions, for example, through the anchor effect. This is why a culture of competition has developed within the field of urban development and architecture that often leads to innovative solutions and breakthroughs. In the realm of engineering, the implementation of such procedures is rarer, and mostly used in building bridges or developing special ideas for supporting structures.

Also in the areas of city planning or spatial planning, competitions for ideas are rarely used, even though great success could be achieved by doing so. One example is the creation of the New Danube in Vienna in the 1970s. Problems of flood protection were solved and a central recreational area for the population of Vienna was created at the same time. Many solutions that were originally seen as impossible were later implemented. Among those was the creation of 'soft banks' and controlled flooding through the newly made, partly recreational Danube Island. In particular, problems of an interdisciplinary nature are suitable for an idea competition because the organising process in which the competition is imbedded is the one that starts the exchange of ideas between the disciplines. As the solution does not yet exist, the range of possible ideas can be explored. Which solutions are useful, or better put, which solution approaches are useful, can only be judged in light of the suggestions handed in.

During the study project, the Chair(s) involved in the Project-Study form the evaluation committee. With practical tasks, the evaluation committee consists of the leading representative(s) of the executive or administrator responsible for the task, whether this is a private or public organisation.

Solutions devised by the team are taken as hypotheses, scientifically speaking. The evaluation committee has the task of critical investigation. According to Popper, keen hypotheses demand a tough examination. For many, it is a painful experience to be harshly judged and to see how many ideas are considered useless, how many hypotheses are brought down by pointed criticism. After a while though, most participants will realise the value of constructive criticism, which often produces fruitful new approaches. Work that shows clear arguments as to why an approach that seemed promising at the start has to be thrown out can be brilliant.

To this, it should be said that we give just as much attention to the qualified rejection of a solution as to the development of more realistic approaches. Naturally, the approval of a solution is always connected to attachment and the desire for validation so important for one's self-esteem. Useful solutions, at least in my experience, are more often developed by walking through the fire of criticism at the beginning of the course or in practice. Learning also means being able to drop an idea, trying out a new one, benefiting from previous (learning) experiences and thus to approach realistic and defensible solutions step-by-step. As all groups are subject to this process, criticism does not single out one group or one person. The criticism of the approach of a particular group is usually also useful for the others. This way it also becomes clear who is

actively engaged in looking for solutions and who isn't. In individual conversations with the groups, every subject area group, such as landscape or infrastructure, checks whether the knowledge, essential from its point of view, is available and whether any gaps in it can be closed.

3.5 Time limitations

The integrated study project, including all required attendance certificates, has to be completed in one semester. At the beginning, we point out to the students that great emphasis is placed on being able to keep to this deadline. The difficult tasks reflect reality, in which there are never unlimited resources available for analysis and solution. At three points in the process, the workshop discussion, and the interim and final presentations, the state of achievement, open questions and further action are discussed, depending on the approach of each group. The students are given considerable freedom between these events. The idea is to create a rhythm that allows the groups to organise their teamwork independently. Without deadlines, it would be far more difficult to get into the rhythm so necessary for the analysis and solution of the planning assignments, and without deadlines, it would be impossible to work out in advance which results and key points need to be achieved.

The measures of time-limited planning procedures, creating meaningful rhythms and deadlines, which are also in reality important aids to problem solving, are of the utmost importance for the introduction of study projects. The main characteristic of study projects is their limited time and without deadlines most of the intended effects of these projects would remain only wishful thinking.

3.6 The Three Cycle Maxim

One could sum up this methodological principle in one maxim: create clarification processes in such a way that complex assignments can be processed in three cycles of roughly equal length. It is much more effective to start quickly with the first attempts at finding solutions, even with incomplete information, and test them afterwards, than it is to spend too much time gathering useless descriptive information.

Only those who try to solve a difficult problem by themselves can understand this approach properly. Further questions and information gaps become clear to them. For many, this is an uncomfortable process, while others are under the illusion that more information will give them more certainty in finding solutions. This, unfortunately, is not the case. On the contrary, putting off attempts at solutions usually leads to more time pressure and can lead to superficiality once the heart of the problem is reached. The above maxim invites us to develop a rough result (quick and dirty) in the first cycle and to think through the realisation of these suggested results, then to further explore the critical or fundamental parts of the results in the second cycle and during the third cycle to make corrections and improvements, in particular, to reserve time for the unforeseen.

The Three Cycle maxim stimulates learning through exploration. Exploring solutions is closely connected to the willingness to get involved in adventurous, playful ways of learning. When a creative hypothesis is given for the solution to a problem, there is enough time to test it and if necessary, to reject it in order to try a new approach. Children learn an incredible amount in a short time in this way. Trying several times must also be possible in an academic environment.

In this way, the Three Cycle maxim also fulfils the demand to be able, after sufficient incubation time, to carry solutions inside oneself, to be able to discuss it critically with a group and then, strengthened by criticism, to be able to present it to those outside the group. We encourage this way of working, dividing the

time available into three cycles, and at the end of each cycle creating occasions at which the progress of each team can be checked.

At the first event, the workshop discussion, it is mainly the students who put questions to the teachers. All questions are allowed. At the second event, the interim results of the teams are presented in the plenum. Approaches, suggestions for solutions as well as the presentation itself receive comments, critique and feedback from the entire teaching staff. At the final presentation, the student is, in a sense, acting more like in the real world since the evaluation stands or falls on the quality of the arguments. We call this the quality of planning argumentation.

3.7 Presentations, communication and critiques

We often have this experience ourselves: for occasions that are important to us, we willingly perform certain duties. The Olympic Games, the World Cup in football, world expos and the like are events that cannot be postponed, and force us to coordinate and organise. In our everyday existence, we create events, sometimes with the underlying thought that they would help us finally complete the things we have postponed for so long. In the academic world, seminars, symposiums and congresses tend to take on this role. One of the reasons the exploitation of the 'strategy of events' works must be that it seems easier to plan the steps that we need from the position of a fixed event. To 'project' (from Latin *projectare*) means to throw forwards in order to see how much time will be needed to complete an assignment. A project is defined by having a fixed time limit for its realisation. Where such conditions do not exist, planning creates considerably more difficulties and is more a wish than a plan.

There is a reason that the planning and realisation of big events, such as the competition for holding the Olympics, has created timing rituals that have proved worthwhile. It's usually ten to twelve years in advance that a city or a region decides to compete for hosting the Games, nine years before the event that the national decision is taken and seven years before the event that the winner is announced by the International Olympic Committee. The fact that it is apparently deeply rooted in human behaviour to only be able to complete tasks under time pressure or when sanctions threaten, cannot be ignored by the groups responsible for the creation of our environment. We have to consider them in our organisational concepts for the solution of difficult assignments, especially when many people are involved and the solution of the problems can have far-reaching consequences.

One way to implement this practically in study projects, is to mark the timeline with a few important events that create the specific cycles of the project. Our solution is the workshop discussion and the interim and final presentations, which create the important three cycles. The time periods roughly follow the order that has proven to be so useful in practical projects, for instance, in cooperative idea competitions or competition processes. Ideas have to be verbalised each time by the person who has produced them. In the workshop discussions, open questions are in the foreground, at the interim presentation, it's the discussion of the approaches to the solutions and the choice of which approach to pursue, while at the final presentation, it is conclusive argumentation.

Criticism is to be expected, especially during the presentations, which usually has consequences for the rest of the process. With the introduction of special presentation techniques, the effect has been achieved that feedback, suggestions and criticism on the presentation that is personal, and must be so, can take place in smaller voluntary groups. This allows us to focus on material criticism.

It seems to me that by offering this opportunity and the method described above, not only have the presentations improved, so has the level of work in general. I am often surprised how students succeed in making a difficult situation clear in twenty minutes and describe their approaches to the solution.

3.8 The Three Level Rule

The students in my department are expected to integrate solutions within an overall concept and to do an in-depth investigation on whether an element essential to the overall concept can be realised. Proposals for solutions should be able to be evaluated separately from the overview, as well as in connection to other significant overarching subject areas. At the same time, a central element of the solution must be tested to find out what difficulties must be overcome if the solution is implemented. This not only concerns material questions, but also questions of organisation and finances, for example. In order to prove the conclusiveness and feasibility of the concept, a change of point of reference is an absolute necessity. The three levels that need to be considered in this context are overview, concept and consolidation. One could call it the 'Three Level Rule'. Achieving the ability to move in different levels more or less simultaneously within one semester will help the participants out of the traps of non-committal generalities or of getting lost in the details.

3.9 Using different sign systems: Words, pictures and numbers

The starting point of academic project-based learning (this has been emphasised before) are unsolved problems in the form of tasks. The goal is to find a solution(s) within one semester. Because solutions in our field have to be submitted in the form of decision guidelines to the most diverse groups in the decision-making process, it is important that outsiders can understand the solution process and the solution itself through conclusive argumentation. In contrast to other fields, such arguments have to be without insider jargon. The more far-reaching planning decisions are, the more 'political' they are and must be able to be understood by lay persons.

Planning argumentation should therefore not only consist of conclusive and consistent reasoning, it should also render a translation service from jargon (expert language) into everyday speech. Research has been dedicated to this aspect of communication. Practically speaking, we suggest that our students not only use the written and spoken word with their argumentation, but also use illustrative graphic tools and present important numbers. In this way, the different perception senses of the audience are stimulated, which leads to more attentiveness.

To stay with this image, the speaker is encouraged to take different positions for analysing and solving tasks. During the project study semester, it becomes apparent that some statements, pictures, diagrams and numbers may not be understood by all those involved. Every form of coding has its own challenges. This is often obvious in spoken language, because it is the most immediate form of exchanging information: 'The limits of my language mean the limits of my world', delivered to us by the 'philosopher of language', Wittgenstein. Because of this 'limitation', we have created special opportunities for training and skill acquisition for the tool of language as part of the study project and have assessed our experiences in a special section of this paper. At this point, an observation may be inserted that actual events during the project studies are apparently very motivating as the students voluntarily participate in the exercises on presentation methods.

But, as said, spoken or written words are only one means of expression and in order to overcome these limitations, one should use other possibilities. In our profession, using pictures (e.g., as diagrams or

photographs) and numbers are the other most important ways to communicate (for the role of pictures and diagrams see Signer, forthcoming.)

Learning to create clear graphic representations to illustrate complicated topics is one of the more difficult elementary tasks in training for our field. Graphic tools and charts should not be too superficial, nor should they use too much, let alone unnecessary, information. Good graphic representations in the planning profession should have a level of abstraction that does not reduce the clarity of the message. What is important? What can be left out? What should be the focus of attention? These questions are reminiscent of basic methodological questions. Graphic representations therefore often reflect the current status of clarity. When the graphics are confusing, the planning argumentation usually is too. Therefore, it is worthwhile to pay close attention to the development of the graphical language. An important characteristic of simple graphics consists of thinking in 'forms' or as Dörner (2003) puts it: in 'unreduced totalities' in order to cope with complexity. Caution needs to be exercised here: abstraction is good for the overview, but it can reduce illustrativeness. Therefore, it is very important to organise the interplay between abstraction and concreteness. This example makes it clear that good graphic representations are always created on a fine line. Modern aids and tools allow the representation of groups of subject areas in different layers and at least make this task a little easier. These issues can be discussed with the students at the presentations. In any case, and this is not a natural assumption, the most simple rules have to be followed in creating graphic representations. One of them being that information has to be legible from a distance too.

It has been mentioned that argumentation using numbers should also be taught in the study project course. We expect the students to be able to produce the essential numbers for the task and from there onwards to be capable of estimating interesting figures. This training is especially useful as it allows the comparison of one's own solutions with those of others and to recognise that the emphasis is not on the second place behind the period, but on the numbers before it. How big is an arena? How much floor space for what kinds of use are needed? How much traffic could be expected? How many parking spaces will be necessary and lastly, what are the estimated costs of the individual arrangements? Quantitative information is needed to consider suggestions and make decisions for many spatial planning situations. We encourage students to regularly practice making estimations in daily life and by doing so to include the full range of observable and measurable facts in planning argumentation. Through simple simulations with programs for table calculation, most of the numbers needed for a complicated planning task can be quickly obtained. In this context, the danger of anchoring and adjustment has to be avoided.

Many readers of this paper will correctly point out that argumentation with time is mandatory by using words, pictorial representation or numbers or any combinations of them. I share this opinion and can only say that its importance is implicitly and explicitly emphasised in the study projects. A time limit set in advance can show the difference between an efficient and a less efficient use of time, highlight the difficulties in coordinating the various participants and bring home the fact that alternatives not only do not have eternal life, but may only be available in a specific timeframe. We also expect that students have to present the timeframe within which the implementation of the major phases of their concept takes place and that students will implement their solutions step-by-step and in coherent modules. Therefore, at all three levels mentioned above (overview, concept and consolidation), students learn through practice that time management, often the most limited of all resources, has to be addressed.

3.10 Dealing with conflicts

Conflicts in the clearing and solution of spatial planning tasks are unavoidable (Scholl 1995). By conflict is meant the clash of different interests. The different interests of participants in the use of the rare commodity of land are a major reason for planning conflicts. They can have a historical background or arise in direct conflict between the individual parties representing their organisations. It would be surprising not to have any conflicts in a planning process. The conflicts are mostly imperceptible, both at first glance and on maps and plans. Only at the point of trying to find a solution for a certain problem do the conflicts of interest emerge. Hence the high value of conflict management skills within spatial planning.

Our plans unfortunately do not give an overview of spatially related conflicts, although this kind of overview would be very useful. We encourage students to unravel conflicts, as this is the key to recognising important tasks. We instruct them to put themselves in the position of the other participants. The students experience direct conflict themselves, for instance, when certain participants refuse to impart information or only propagate the kind of solutions that would serve their own interests. Conflicts can also break out inside one's own group.

The recognition that the engineering approach to solving assignments can also have this deeply human side is not at all widespread. Many hold the, often erroneous, view that problem solving takes place in an antiseptic climate. The study projects reveal these deeper layers of planning and create awareness for the next occasion, and help in anticipating conflicts and quickly obtaining an overview.

3.11 Planning as process

Most of the students will have realised by the end of the semester that the solutions found for difficult tasks can only be of a temporary nature. However painful this realisation may be for many, it mirrors the reality of actual practise. How often has it happened that at an advanced stage of a project new solutions are introduced, which throw out everything accomplished up to that point and contribute to a waste of resources.

In planning practise, the awareness has spread that informal planning processes can streamline the exploration of difficulties, the analysis of problems and the search for effective solutions. Many students become curious to find out more about such planning processes and effective organisational principles, others discover such principles in the organisational framework of the study project. Both are good starting points for the coming study period and broaden the horizon for the operational efforts that lie behind the solutions.

4 | Outlook

Our experience with project-based learning has been very positive. Besides gaining professional knowledge in the participating disciplines, students also develop abilities in:

- Planning argumentation
- Presenting results
- Recognising dynamic group processes and the importance of organisational aspects
- Analysing and solving a task with limited means (time, people) in an efficient and team-oriented way

In particular, students recognise that there is no single solution for a problem, that we can only deal with parts of reality and that we have to agree on which of these parts we will deal with because we each

perceive them differently. Collective understanding of the questions relevant to a problem, agreement about the procedure and efficient cooperation are not a given. Developing the necessary abilities to enable these can, in my opinion, only be gained through the actual experience of the kinds of questions and difficulties involved.

Lectures in the traditional manner, seminars on special themes or consecutive exercises cannot provide this, even though this form of education is still as important as ever. The traditional methods will however probably start to move into the background in favour of gaining knowledge through study projects. Postgraduate studies have a special potential here, whether they are a certificate/diploma program or doctoral studies. The interdisciplinary cooperation possible within these study programs can be extensively tested in this way.

Using unsolved problems as a starting point requires even more personal responsibility and contributes to the development of both students and teachers. Personal responsibility is the companion of academic freedom, which in our fast-changing world is an invaluable asset and, at the same time, a great privilege.

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Embedding Education in Strategic Planning in Planning Curricula

Walter Schönwandt, Andreas Voigt

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1 | Introduction

These reflections discuss the need to strengthen research-based and practice-oriented teaching in the field of strategic planning as a means of facilitating the solution of complex spatial problems. Hands-on experience was gathered in postgraduate and graduate studies in the context of the International Doctoral College, Spatial Research Lab (Internationales Doktorandenkolleg Forschungslabor Raum, 2607-2011, cf. chapter 4) and in a trial five-day course on strategic planning (Strategisches Planen, IGP, University of Stuttgart) implemented at ETH Zurich (11/2009) and TU Wien (03/2010 and 01/2012), as described in section 3. Further considerations concern the framework conditions and possibilities of integrating strategic planning modules into planning studies.

Key sources used in this paper were the contribution Planning education put to the test: Measurably better results in solving complex problems (Hemberger, Schönwandt, Grunau, Voermanek, von der Weth and Saifoulline 2008) and the review by Charles Hoch, 2009, based on that contribution (unpublished).

2 | Planning

Actions have to be planned so as to make efficient use of scarce resources, such as space, time or money. Territorial authorities (including the European Union, national states, their constituent states or local authorities) engage in spatial planning whenever space-related public interests, issues relating to the common living environment or social issues with a spatial aspect are at stake. Spatial planning always includes aspects of space, time and society.

The focus of planning processes is on the systematic and methodical identification and solution of spatial problems or the prevention of their emergence. Planning problems are tasks as yet unsolved. The point of departure may be a state of affairs perceived as negative that is to be improved, or a situation which is viewed positively but assumed to require planning and action in order to persist (Schönwandt and Voigt 2005: 772). The clear definition of a problem is a prerequisite for improved problem solving (Hoch 2009). Planning usually responds to a need or unresolved issue and is based on a distinct underlying approach (see Schönwandt and Voigt 2005: 769).

Planning is a cognitive deliberation of future actions (Hemberger, Schönwandt et al. 2008: 1) with the aim of solving spatial problems or preventing their emergence. Interventions[1] in space are usually based on consensual agreement in collaborative working contexts and need to be backed by democratic legitimacy. Interventions often take effect with a considerable time-lag (decades in the case of transport infrastructure projects, for instance), they are usually cost-intensive and undoing them is impossible or would require a major effort. Hence, variants need to be carefully explored and assessed in a transparent manner.

[1] The term intervention (German: Eingriff) denotes any tangible action in the real world based on instructions (German: Anleitungen) received. Instruction includes information on all actions required for achieving a desired result (Schönwandt 1999: 3off).

Assessment frequently involves large time horizons. The funding, time and human resources available for planning processes are usually very limited. Given the complexity of the issues involved and the lack of time, parallel processing in planning teams and open dialogue are recommended.

Spatial planners (architects, urban planners, regional planners, etc.) often face complex problems of a transdisciplinary nature that are characterised by contradictory goals and thus require specific and appropriate strategies of action (Hemberger, Schönwandt et al. 2008: 1). Spatial planning strategies can be considered as guidelines marking the path into the future (Scholl 2005:1122).

Examples of complex, difficult issues include the management of settlement areas, progressive urban sprawl, spatial and infrastructural development, traffic congestion in agglomerations and sensitive transit areas, cross-border urban and rural development, excessive interventions in historically evolved cultural landscapes, and additional differentiation of functional spaces (Bundesamt für Raumentwicklung 2006: 15ff.)

3 | Teaching Curriculum, Module Strategic Planning

In order to cope with complex (spatial) problems and develop appropriate (spatial) planning strategies, planners need to receive systematic training.

3.1 Development of a curriculum

The Institute for the Foundations of Planning (IGP) at the University of Stuttgart has developed a method for solving complex problems that is designed to go beyond the learning-by-doing approach commonly practiced by other institutions. The goal of this methodological education is to help students develop more coherent solutions to problems, provoke them to exhibit greater flexibility in their thinking, and provide them with a larger and more expansive repertoire of actions and solutions on which they can draw in their work (Hemberger, Schönwandt et al. 2008:2)

This method has been integrated into the teaching curriculum of the University of Stuttgart for the past several years. Currently, three versions of the strategic planning module are available:

a) semester course
b) ten-day course
c) five-day course

The ten-day course was tested within the framework of an interdisciplinary research project which was funded by the Deutsche Forschungsgemeinschaft (DFG, www. dfg.de/) and brought together planning researchers from the University of Stuttgart in collaboration with work and organisational scientists at the University of Applied Sciences in Dresden (Hemberger, Schönwandt et al. 2008: 2):

Typically, the planning method evaluated is used to work on tasks such as complex[2] strategic questions and challenges, e.g., in the field of spatial planning. The curriculum places special emphasis on seven subtopics in the planning process, without losing sight of other relevant points: those parameters of a planning task that most influence the range of available solutions and hence also the outcome of planning. We refer to

[2] As a rule, complex problems a) consist of many variables that are b) mutually overlapping and c) autodynamic, which is to say they change without any external influences, as well as being d) obscure from the perspective of the planner, and e) characterised by a plurality of possible aims (poly-parts) (Dörner 1989: 58f: von der Weth 2001: 10ff).

these subtopics as the key seven.[3] They include (Hemberger, Schönwandt et al. 2008: 3f., Schönwandt et al. 2011) the following:

- Definition of the socially constructed problems
- Modification of (often provisional) problem definitions through a shifting of problems
- Testing of the empirical validity of the propositions on which the definition of the problem is based
- Explanation of the causes of problems
- Generation of measures to solve the problems at hand
- Definition of relevant key concepts
- Inclusion of various planning approaches and their utilisation for problem solving of different search spaces which are inherent to these various approaches

The DFG evaluated ten-day course is composed of two parts. During the first five days, the topics mentioned above are introduced to the students in a series of lectures, followed by the application of newly introduced concepts and ideas in the context of step-by-step exercises. Du ring the second five days, increased attention is paid to the connections between the individual stages in the planning process. While working on the exercises, each individual stage of the process is addressed several times and might be modified in the light of subsequent steps and newly emerging knowledge. The practice exercises in this second half cover issues such as energy supply, healthcare, unemployment, education, etc. The diversity of topics covered in this part of the course is intended to demonstrate to the students that the method they have been taught is applicable to a broad range of very different areas in planning. In addition to the usual mentoring and support from course supervisors, the second phase of our curriculum introduces increasing elements of peer-to-peer learning. According to this pedagogical method, students assist one another in achieving their training goals via critical feedback. This mode of teaching is designed to facilitate and encourage independence and self-motivation among students, which makes for a more effective teaching experience.

The five-day course has been successfully tested for example at ETH Zurich, 11/2009 and Vienna University of Technology, 03/2010. This curriculum includes the following teaching modules (for further details, please see 3,3):

- Problem definition
- Problem shifting
- Causes and measures
- Key concepts
- Propositions
- Planning approaches

The main elements of the course are half-day lectures and intense practice sessions in small groups or teams, interim presentations, discussions and open discourse, and a final plenary session.

[3] To avoid misunderstandings, it should be pointed out that testing the empirical consistency and conclusiveness of the underlying propositions on which a planning task is based has meanwhile been categorised as a seventh key subtopic (Schönwandt et al. 2011). Consequently, we no longer refer to the key six but to the key seven. This entails no change to the substance of the original concept, but is merely an outwardly visible upgrading of the importance of this step in the planning process.

3.2 Theoretical background to the planning method

In solving complex problems, the strategic planning curriculum is based on a planning model of the third generation in terms of systems theory (Schönwandt 2008). This planning model is distinct from the technical rationality of the first generation. In this, it resembles the communicative planning model of the second generation (Lindblom 1959; Rittel 1972; Fischer, Forester 1993; Healy 1997; Innes 1995; etc.). Like the communicative action model, the third generation model takes into account the fact that all planning is locally situated (Kuhn 1981; Bunge 1996) and that planning requires communication for planners to engage with one another's various viewpoints and ways of obtaining knowledge.

The communicative planning model does not specify any specific components that ought to be part of the planning process or how these components are connected. Furthermore, the second generation often ignores the distinction between the conceptual content of a planning task and concepts such as communication and discourse. Communication refers to the social, psychological, etc., conditions that make the creation, development, and transmission of conceptual content possible. It does not refer to content itself. For this reason, the third generation represents a 'turn to content' following the 'communicative turn' of the second generation (Schönwandt 2008, 46ff; Schönwandt, Jung 2006a, 364ff; Hemberger, Schönwandt et al. 2008: 2).

3.3 Content of the evaluated course

In the following, the key seven are briefly outlined in simplified form (Hemberger, Schönwandt et al. 2008, 3ff.; Schönwandt et al. 2011). It should be noted that the order in which the key seven are worked through can vary, and, as a rule, each individual component of the planning process must be addressed several times to align it with every other part.

Problem definition

In the first stage of the key seven approach to the planning process, planners begin by developing definitions of the problem at hand which are as concrete and well-founded as possible. It is important to realise that problems are not self-evident and certainly not objective. Rather, they depend on the perceptions of the actors involved and are therefore socially constructed (Koppenjan, Klijn 2004, 116ff). This emphasis on the definition of a problem may seem irritating since the actions of planners are always elicited by specific problems. However, the definition of a problem is rarely, if ever, pursued explicitly and with sufficient care (Schönwandt, Jung 2006b). Instead, it is common practice to abandon the analysis of a problem prematurely and concentrate instead on the application of traditional, usually discipline-specific, methods, goals, models, measures, and theories. Therefore, only the limited set of problems and solutions to which these common methods, goals, etc., are applicable is included in the considerations.

Problem-shifting

In the following stage, planners examine whether the (often provisional) definition of a problem ought to be modified by shifting. In shifting a problem, where the problem is understood as an undesirable circumstance caused by specific events which, in turn, brings about new events and circumstances, the problem is cognitively shifted back and forth along causal chains and nets. In some cases, it is relocated completely. The goal is to develop new search spaces for possible solutions. For example, if we define a problem such as 'there are not enough parking spaces in city x', we will consequently call for the construction of additional parking spaces. However, we could also 'shift' the problem back along a causal

chain and explain that the fact which leads to the problem as initially formulated is the presence of too many drivers in city x. As a result, new solution spaces open up. These include, for example, the introduction of tolls, the extension of shopping opportunities at the source of the traffic problem, or the encouragement of online shopping with delivery service, etc.

Causes and measures

Two further stages of the key seven approach are intimately linked. Here we ascertain the causes of a demarcated problem (third stage) and attempt to derive reliable measures to deal with that problem from these causes (fourth stage). It is only once the causes of a problem are known that we can develop measures to address the problem precisely. Conversely, if the causes are not well understood, a danger exists that only symptoms will be dealt with without addressing the underlying problem. In the course, we also discuss the inherent cognitive tendencies (or traps) to which we can fall prey when determining the causes of a problem that includes only looking for causes within a relatively narrow temporal and spatial proximity to the effects of a problem (Schönwandt 2008, 1986; Einhorn, Hogarth 1982). In addition, we demonstrate to the students how, with the aid of visualisations of the relationship between causes and measures, reliable and sufficiently broadly diversified suggestions for solutions can be generated. It is important to develop many multifaceted measures, to avoid monocausal, and thus inappropriate, approaches to a problem and to respond adequately to the many diverse causes that are usually inherent in complex problems (for more details on the subject of causes and causality see Bunge 1987, 1979).

Concepts and propositions

Another stage in the key seven approach is to define the key concepts (terms) of a planning task appropriately and with adequate precision. This stage is of central importance because concepts are the carriers of our knowledge and as such determine our actions in planning. The solution space available to us, as well as the concrete approaches we take in planning, depend on which characteristics are embedded in the definitions of our concepts. For example, we would not tap the full diversity of available solutions if we failed to include pedestrians and cyclists in our general concept of traffic. Concepts are neither right nor wrong, but simply more or less appropriate in the context of a specific problem (for further details, see Schönwandt, Adis 2005). Furthermore, every problem definition in planning is based on an underlying proposition, the empirical validity of which is essentially dependent on the substance of the concepts it embodies and whose validity can only be tested if the concepts in question are sufficiently precisely defined.

Planning approaches

An important stage in the key seven is to consider the paradigmatic patterns of thought (Kuhn 1981; Bunge 1996), the so-called initial planning approaches that are the foundation of all planning. Planning approaches consist of four components: a set of problems (problem views), a set of aims, a set of methods and defined background knowledge. These four components always interlock and depend on each other. There are many different planning approaches and they act like lenses through which we look at a situation. Hence, the initial planning approach we adopt is not dictated by the nature of things in and of themselves; rather, it is always possible to choose among a variety of initial approaches (Schönwandt, Voigt 2005).

It is helpful to question one's own planning in the context of different approaches and to view an issue from the perspective of different approaches. This helps to avoid tunnel vision and to include previously hidden perspectives and search spaces for possible solutions. In addition, the inclusion of different planning approaches helps all stakeholders in the planning process to understand one another's respective points of view, which will ultimately facilitate the acceptance of a plan and strengthen its legitimacy.

Research results

The results of the DFG (Deutsche Forschungsgemeinschaft) research project demonstrate that teams of planners who have been trained in this method are able to find solutions judged by experts to be superior in terms of their (projected) effectiveness, the efficiency of recommended measures, and the ease with which those measures can be put into practice (Hemberger, Schönwandt et al. 2008: 1). The research clearly showed that the method can be taught successfully, and that systematic training in solving complex planning problems is both necessary and beneficial: complex planning problems are more effectively solved with the help of explicitly formulated methods such as the one presented here.

In addition, focused and comprehensive training can help planners avoid unpromising approaches in their work. For example, they can avoid blindly gathering information about the relevant planning task without having sufficiently structured their own course of action. Furthermore, the results of the analysis demonstrate that, among other things, trained and successful planner s devote much greater attention to the definition of the problem to be solved. They also engage in more well-founded analyses of the causes that underlie a problem at the beginning of a planning task than their untrained and unsuccessful counterparts. This contradicts the common assumption that planners naturally focus their attention on the heart of a problem and therefore do not need to be trained to do so.

4 | International Doctoral College – Spatial Research Lab

Exemplary and inspiring insights into strategic planning in the context of postgraduate training were gained within the framework of the 2007-2010 (2011) curriculum Spatial Research Lab (Forschungslabor Raum. Entwicklungsperspektiven für Europäische Metropolregionen) at the participating universities (see www.forschungslabor-raum.info/). The main principles of the curriculum will be briefly described in the following (Scholl et al. 2009).

4.1 Profile

The International Doctoral College's Spatial Research Lab offers outstanding qualified doctoral students the opportunity to engage with spatially relevant issues of high societal relevance within the context of an interdisciplinary, cross-border exchange stimulated by addressing specific case studies as part of a common framework theme. The exchange is designed to encourage the production of independent, original academic contributions. The Doctoral College's subject matter and point of departure are difficult, highly complex and non-straight-forward problems of spatial development.

4.2 Framework theme for the 2007-2010 curriculum

The framework theme for the Doctoral College curriculum in the period 2007-2010 was the future development of European metropolitan regions. In order to explore and delimit their research topics, the doctoral students at the various universities and institutes of higher education analysed significant examples of spatially relevant issues relating to the development of European metropolitan regions in Switzerland,

Germany, and Austria. The objective was to explore concepts and strategies, test suitable tools and approaches and demonstrate the effects and consequences of spatially relevant actions and decisions by means of experimental simulations.

4.3 Aims

The international platform of the Doctoral College provides a framework for systematic comparative study in the chosen thematic field as well as critical discussion of practical, applicable concepts and strategies in collaboration with actors from the public and private sectors. In the course of the doctoral program, students not only have excellent opportunities to engage in intensive interdisciplinary discourse, but additionally have access to expert advice from all the professors and teaching staff involved.

4.4 Doctoral students

The candidates all have a master's degree or equivalent in spatial planning, urban planning, landscape planning, architecture, civil engineering or possibly in another spatially relevant discipline.

4.5 Curriculum

The underlying rationale of the curriculum is based on the simultaneous treatment, at several universities and institutes of higher education in the European context, of key thematic fields that are essential to an academic discourse on spatial planning and spatial development. These thematic fields include, for example, management of settlement areas, spatial and infrastructural development and cross-border urban and rural development issues.

4.6 Doctoral College Cycle

The doctoral program operates on a three-year cycle. The first year serves as a familiarisation phase, focusing on delineating and defining the research field and potential case studies. The second year is devoted to an in-depth analysis of the issues within the framework of study projects. The third and final year is reserved for evaluation, detailed study of selected aspects, experimental simulations and the writing of the doctoral thesis.

Thrice-yearly doctoral symposia held at the institutions where the college professors are based facilitate exchange and allow the students to acquire additional skills and expertise. The symposia feature guest lectures by well-known experts and joint seminars in the fields of planning methodology, drafting and design, and communication skills.

4.7 International exchange

International, interdisciplinary exchange is absolutely vital in order to classify academic contributions, recognise spatially relevant patterns and stimulate the academic discourse on issues of future importance. Six professors in the field of spatial development from Germany, Switzerland, and Austria have therefore seized the initiative to create a suitable framework for this exchange.

5 | Recommendations

Based on the experiences gained with the strategic planning teaching module, the authors would like to propose the following recommendations for adding strategic planning content:

5.1 Bachelor's degree program

Students should be made aware of the many-faceted complexity and the related spatial-temporal multi-dimensionality of spatial planning issues at an early stage. Hence the recommendation is to confront them with complex problems and strategic planning right at the beginning of their studies. This would suggest implementation in the Bachelor's degree program (orientation phase) as a compact compulsory lecture (combined with exercise phases and optional practical exercises for in-depth familiarisation). Apart from themes specific to spatial planning, this should also include general planning problems to enable students to develop a broad understanding of planning issues.

5.2 Master's degree program

At the Master's program level, there should be a meaningful continuation of this concept for those who follow the Master's program at the same university as their Bachelor's degree. In addition, all other students (graduates from other universities with a Bachelor's in spatial planning or a related discipline, such as architecture, landscape design, geography, etc.) should also have the option of a (first) intensive familiarisation with strategic planning issues. Possible variants include a semester class or an intensive 10-day or 5-day course (cf. trial runs at ETH Zurich and TU Vienna for the 5-day course). Teaching concepts that combine lectures with intense work and practice phases, in a morning/afternoon rhythm, for instance, have proven successful. It is important to limit the number of students (no more than approx. 20) and provide for working in small teams (3 people). Suitably equipped workrooms (flip chart, overhead projector, writing materials, PC/laptop with internet connection, etc.) need to be provided. The teams require intensive support with the possibility of open discourse in teams and reflection periods together with the teaching team. Hence the need to have a complete teaching team, which implies appropriate human resources and budgets. Taking part in a 5- or 10-day course is an immersive, insightful and enjoyable experience for students and teachers alike. It makes sense to ensure that no competing classes are offered at the same time.

5.3 Doctoral degree program/PhD

In the Doctoral degree program, students are expected to obtain an even more in-depth knowledge of the theoretical background. First and foremost, they are expected to master theoretical reflection levels. The authors propose the following seven levels of reflection in scientific study:

- Conceptual: Using precise terminology (reduce vagueness and imprecision)
- Logical: Making consistent statements (avoid contradictions)
- Methodological: Are there any gaps in the way an issue is presented that might lead to different conclusions?; Would additional information lead to different results?; challenging, offering critique, providing justification (proffering corroborating arguments or rebuttals)
- Epistemological: Ensuring empirical backing, avoiding assumptions that do not tally with prevailing scientific and technical knowledge
- Ontological: Having a consistent view of the world which is in accordance with prevailing scientific and technical knowledge
- Valuational: Aspiring to worthwhile objectives; making sure that the impact and consequences of action are acceptable
- Practical: Using appropriate means to achieve one's objectives; developing useful guidance (plans, etc.)

These seven levels build on and presuppose each other.

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The Planning World meets the Life World

Andreas Voigt

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Points of contact for spatial planning processes are concrete, socially relevant questions in the real world. These are either problems already solved, ones that can be handled in a routine manner, or unsolved problems for which solutions are required[1]. From the perspective of time, it is possible to distinguish tasks that are pressing now and those that are foreseeable, probable or at least conceivable in the future, given an overview and a forward-looking approach. Usually, the intention is to prevent the development of these problems or at least reduce their gravity. In a democratic context, it is necessary to obtain political legitimacy and societal acceptance in order to deal with both types. There are limited funds available to design planning processes and create possibilities for intervention in the real world and in the objects of planning processes - i.e. space and time -, which means that convincing emphases need to be set. When working on problems, different views[2] - shaped by politics and various disciplines - may often clash. At the beginning of the planning process, therefore, we need to create shared perspectives which should unite all those involved in each planning procedure. The "design of living space" to safeguard the existence of all living creatures may be viewed as one shared concept of planning.

Depending on the individual planning approach[3], the perspectives adopted to deal with problems, as well as aims, methods, and the necessary background knowledge may turn out to be very different. This chaos at the beginning of every thinking and planning process entails many diverse points at which to take up controversial debates within the planning world,[4] within the life world,[5] and between the two worlds. It makes things more difficult that - each influenced by our own discipline - we always adopt a specific approach to planning. We are unable to do otherwise. But it is also an enrichment when we can exploit the diversity of different approaches to planning in order to illuminate problems from various angles and thus recognise and understand them better. This is a solid foundation from which to develop feasible solutions, which can become reality when the actors responsible make corresponding decisions.

But when the worlds of planning and everyday life clash, causing friction, we need to be particularly attentive and proceed cautiously. The beginning and end of planning procedures, as well as other decisive interim phases represent key interfaces between the life world and planning. If we succeed in instigating open dialogue between planning and everyday life, as well as within the planning world, this may generate stimuli and so facilitate a successful planning process, from which creative solutions emerge. If processes do not succeed, we can expect considerable losses - costly in terms of time and money - due to friction, even to the point of complete failure. The basis for constructive dialogue is created by the attitudes and associated values of those involved in the planning process, which allow exchange and the reconciliation of differing viewpoints, aims, and approaches to solutions. The above-mentioned development of shared perspectives among all those protagonists involved in the planning process creates the necessary preconditions for a process of design, that should contribute to safeguarding our livelihood and the future sustainability of our living spaces. First of all, it is important to develop a shared comprehension of the situation and settings.[6] Which spatial challenges are particularly urgent? Which might become significant in

the future? What essential questions can be formulated collaboratively in order to clarify the situation? What central problems do they reveal? What objectives are associated with their solution, and what approaches are necessary and meaningful? What additional background knowledge might be necessary and helpful? What emphases have to be set due to a shortage of available funds and limited time? Within what time frames can and must steps be taken towards a solution and consequent action? These are only some of the questions that we need to bear in mind. In this. context, it is always important to distinguish the essential from the secondary, to obtain an overview of the problems faced, of associated perspectives and possible approaches to solutions - and to maintain this grasp of the situation.

Shared comprehension of the situation and its problems is a precondition for the design of spatial and temporal concepts with which to meet pressing challenges and avoid future problems. What solutions can be formulated? What are the likely effects in each case? Which are particularly suitable? First of all, it is necessary to allow for a diversity of solutions and then explain one's selection on the basis of logical criteria, to prepare decisions, and plan further procedures. Shortage of time and funds in the planning process and the complexity of the questions involved mean that we should tend towards thinking and planning processes that facilitate and guarantee a manifold increase in knowledge and parallel thought within a team, so that any good ideas can be combined and taken one stage further. The holding of competitions is a tried and trusted means of generating diverse approaches to solutions. The "Wiener Donauraum" (Vienna Danube Region) competition was an excellent example of innovative planning, due to its open, yet structured exchange between teams working in parallel. The experiences and insights obtained in this context have earned a place in planning theory, as the Vienna Model.[7]

An attempt to solve problems may also lead to the realisation that they have not been sufficiently understood and that we need to reformulate the problems per se. Step-by-step, sometimes difficult investigation of solutions and suitable approaches for the future leads to the elaboration of instructions[8] and requires communication about behaviour and how to proceed.[9] The essential elements of further procedure need to be combined into a planning strategy.

Whenever attempting to solve difficult spatial problems, their complexity must be dealt with in a suitable way.[10] The systematic generation of space-related knowledge and the subsequent development of a model create a further important basis for the solving of difficult problems. They allow for a reduction of complexity, which is important, and lead back to the heart of the problem via abstraction. Finally, it is possible to use spatial simulations to explore possible or desirable futures. These are only meaningful if they contribute to further insights and so improve decision-making and communication.[11] Spatial models and simulations need to be representative, precise, clear and vivid, attractive and comprehensible.[12]

As laboratory spaces, the various real planning areas form the foundation for spatial planning work. The interventions[13] into reality that develop from planning processes are often considerable - they are rarely reversible, or only with considerable effort. Therefore, decisions that lead to concrete interventions and actions should be tested very carefully in advance. There is a need for suitable laboratories[14] to create spatial models - as representations of reality - and simulations building on them, which permit a clear overview, as well as insight at various levels of scale and facilitate teamwork. The results of simulation should be available promptly; the ideal option is a simulation in real time. Digital simulation laboratories and associated planning information systems can provide state-of-the-art instruments for dealing with difficult spatial issues and ensure the success of dialogue between the world of planning and everyday life.

Glossary

- Life world: The life world includes everything beyond and surrounding the planning world.[15]
- Planning world: The planning world is the field in which plans or instructions are developed. As a rule, several players (from the planning world) are involved here, acting within specific forms of organisation or cooperation.[16]
- Settings: In very general terms, all those aspects of the life world that we wish to either change or retain through planning are known as "settings". In concrete terms, this concerns the part of the life world that is accessible to the players of the planning world for action and observation.[17]
- Comprehension of the situation: Comprehension of the situation is a matter of putting together a description of the planning problem so that the planning task is presented as validly as possible. This usually takes place via the interplay of empirical investigation, as the examination of given circumstances, and the interpretation and evaluation of one's findings. Developing a "comprehension of the situation" makes precise reference to the interface between the life world and the planning world.[18]
- Elaboration of instructions: These instructions show everything that needs to be done in order to bring about the desired result (plans, descriptions).[19]
- Communication about behaviour: Once instructions have been outlined, it is a matter of agreeing with those affected or involved about further procedures (...).[20]
- Interventions: The keyword "interventions" is used to refer to every concrete measure that is implemented in reality as a consequence of the instructions developed.[21]
- Planning problems: Planning problems are unsolved tasks. Their starting points can be existing settings, which are judged to be negative and are to be improved, or existing settings that are judged to be positive: here, the assumption is that they will not continue of their own accord and something must be planned and undertaken to ensure that they are maintained. The three other components of the respective planning approach determine what is regarded as a problem in this context (...). This means that no view of, description of, or solution to a problem is "objective", but is predicated on the underlying planning approach.[22]
- Planning approach: A planning approach can be understood as a set of problems (problem views) in connection with a set of aims, a set of methods, and specific background knowledge (...)[23] All four components have their own specific content, certainly, but they are mutually dependent.[24]

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Nine Levels of Scientific Work in Planning

Walter Schönwandt

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Introduction

Amongst other things, the realisation of a doctoral college requires exploration of the question of what constitutes scientific work or research in spatial planning. The understanding of research within the planning discipline often differs from that of scientists working at the heart of the traditional university business of science and research, which is oriented on generating knowledge. Even within some individual disciplines (and certainly beyond them) terms such as "science" and "research" are not uniformly defined, with sharp contours. Indeed, looking more closely, many scientists have their own personal definition of science and the practice of science. In the context of this essay, of course, it is only possible to outline roughly an answer to the question "What is scientific work in planning?" which may contain some gaps. Briefly, two fields of tension reveal the extent of this thematic field: the first field of tension covers the more "practical, manual" working techniques of a doctoral thesis, such as research into existing literature, managing of such literature and its evaluation, recommendations for scientific editing of the thesis -which comprises, among other things, an assessment of the current state of research - efforts to obtain fresh insights, comprehensibility, evidence for the ideas presented, separation of fact and opinions, the transferability of the results,[1] and discussions of the so-called problem of truth. After all, both laymen and scientists tend to equate science as almost identical to a striving for truth. They associate with this idea terms such as "intersubjective," "binding," "absolutely certain," "objective," etc., and attribute to the scientific undertaking a capacity to find, among a huge number of untested assertions, those that represent fresh insight; in other words, those that are "empirically true." However, it has emerged that this key aspect of the criterion "truth" goes hand in hand, paradoxically, with difficulties - fundamentally impossible to overcome - in finding that very truth: "So the conceptualisation of the term, truth, and of the criteria of truth creates so many controversial problems that some scientists now shy from ever using the word truth at all."[2] Between the two poles of this field of tension - i.e., the rather simple, technical questions of work on the one hand and the problem of truth on the other - there are many other themes in scientific theory that may play a part in the formulation of a doctoral thesis. Concentrated insight into this wide field of themes is provided, for example, by the eight-volume work Treatise on Basic Philosophy by Mario Bunge (published by Verlag Reidel, Dordrecht, from 1974 to 1989), although of course even this publication can only reflect the viewpoint of a single scientist.

A second significant field of tension emerges as a consequence of the planning sciences' set aim to work and research in an action-oriented manner. While the majority of research in other disciplines is oriented on improving our knowledge and can remain in the descriptive realm as a result, research in the planning sciences is usually directed towards developing recommendations for action from analysis and thus paving the way for decisions. However, this is an extremely political process, in the sense that it is full of evaluating decisions: it has little in common, therefore, with the "reflective distance" otherwise preferred in the case of descriptively oriented scientific work; a distance that scientists are expected to adopt with respect to the

object of their investigation. The two positions thus contradict each other to some extent. The two fields of tension uncovered here create a background and also an occasion to the subsequent investigation of nine levels of scientific work in planning. These nine levels, of course, represent the pragmatic simplification of a discourse on scientific theory that is more complex in reality. Their intention is to guide the doctoral candidates in their research work and give them an initial orientation in the fields of tension outlined above, but they do not represent a finished "recipe": it is true that all nine levels are fun-damentally relevant to scientific work, but it may be necessary to work on the different levels with more or less intensity depending on the individual questions posed.

Nine levels of scientific work in planning

The following will describe various stages of work, which generally build upon each other and define each other reciprocally. This presentation is based on a publication by Bunge dating from 1987 and the "Key Seven" according to Schönwandt 2011.

1. "Problems First!" - the definition of problems

In order to gain orientation within the complexity of planning themes, it was recommended to the doctoral candidates that they set out their work in a problem-oriented fashion. In this context, "problem orientation" means identifying what problems or poor conditions exist at the beginning of a work of planning and thereby agreeing on possibly differing views of these problems. "Problems" (or "challenges") are current or expected circumstances that people do not want because they are evaluated as negative; in this context, problems may also be circumstances that are positive as such, but which nevertheless cause people dissatisfaction. Such circumstances evaluated as negative are fundamentally different to aims; the latter being circumstances for which one is striving. Despite claims to the contrary, the problem-oriented starting point is still not customary in the profession of planners and architects. Our universities train (future) planners and architects to (i) start out from aims or general principles established in advance, (ii) suggest measures and solutions directly from their knowledge as experts, or (iii) make theories and methods specific to their discipline into the starting point of work. Only rare checks are made in this context as to whether those three starting points are actually suitable for the problems in question.

It is no easy task to approach assignments with more orientation on problems. The challenges to be met are obvious when one takes the following into account[3]: problems are not "self-evident" and certainly not situations that can be identified "objectively"; they are dependent on the perceptions of the relevant actors and therefore "socially constructed." In a problem situation, the perception of the problem may diverge considerably among the actors. Uncertainties related to content, therefore, are not only caused by the complexity of the problem to be handled, in terms of its subject and content, but also due to diverging perceptions of the problem or the values and interests of the players involved. When players draw their own conclusions, starting out from very different perceptions of the problems, and are simultaneously unwilling or unable to reflect upon such differences in perception, it becomes increasingly likely that their communication and interaction will develop into a "dialogue of the deaf."

One elementary prerequisite to the development of a convincing concept for a solution in a doctoral thesis is the most precise, well-founded definition of the problem possible - because those who do not adequately formulate the problem faced at the start of their work will be unable subsequently to develop a stringent chain of argument from the problem to its solution, simply because the problem to be solved has

not been specified and is thus inadequately identified. In this context, another part of the working process is to rethink and reformulate the initial problem repeatedly in the light of new insights.

2. "Conceptual" - the definition of key concepts

Planners never operate in the scientific context (or in practice) with things "as such", but always with more or less fitting descriptions of our environment. The heart of such descriptions as knowledge that can be captured by language always consists of concepts (terms) that are connected into propositions by means of interrelations. For example, in the sentence, "City districts with dense building and mixed usage facilitate shorter ways and create less traffic", the concepts "city", "dense", "mixed usage" and "traffic" are brought into a single context and so connected to form a proposition. Essential points that had to be brought home to many participants even in the context of the doctoral college are: first, concepts comprise the central, elementary components of any knowledge; they play a part, if not the central part in every sentence, every formulation of a problem, every planning recommendation, etc. There is no getting around it, either in science or in practice: concepts carry our knowledge and subsequently defines our acts of planning it is not an “academic game”. Concepts in this context are not "true" or "false" but based on agreements; they cannot ever be defined perfectly, but offer a core of meaning. Second, it took some time before the college participants really understood the fact that concepts (such as "city", "architecture", "landscape", etc.) are mental fictions that are impossible to observe, since they exist only in our minds. As such, they need to be defined in order to give them content and meaning. Without this definition of concepts, our statements have no content or meaning but are merely empty words without substance; consequently, any speaker or author is obliged to provide definitions of his or her concepts. Same time passed before this realisation was implemented consistently in the relevant presentations and texts: those who simply say or write a ward like "city", "landscape", etc. without adding a definition however brief and provisional are merely providing objects for reading or listening that lack meaning and content rather than propositions with substance.

The experience gained in the context of the doctoral college leaves us with the impression that there is still room for improvement in the awareness of this complex of themes within the profession of planners and architects. In our discussions, it emerged that the notion of “clarifying what you are talking about” was unfamiliar to many.

3. "Logical" - checking propositions for their consistency logic and lack of contradiction

In science as in practice, the logical construction of individual propositions as well as the logical structure of complete reports are important, not least so that the reader can understand the content and follow the argumentation. The aim is to reduce propositions' vagueness and Jack of precision and to increase their comprehensibility. Great importance is also attached to this aspect in practical tasks of planning, as the addressees of planning documents, as a rule, have very different knowledge backgrounds and may be more or less familiar with the reading and understanding of corresponding texts.

Scientific logic tests whether propositions made are consistent, logical, and free of contradiction in themselves and by comparison to other systems of propositions, and also whether the conceived plans for action have been developed stringently. In principle, theses can be supported or questioned argumentatively with respect to the matter in hand ("ad rem") or on the basis of inconsistencies in an opponent's argumentation ("ad hominem"). In the field of planning, however, this scientific logic rarely plays a key role.

This is because in the case of planning discourse, it is often not only a matter of the content discussed but of asserting one's own opinions as well. To this purpose, authors or speakers sometimes employ various types of (pseudo) logic ("artifices") in order to influence the outcome of the discourse in their favour. For instance: champions of the railway project Stuttgart 21 argued in autumn 2010 that the decision to build Stuttgart 21 had emerged during the course of a legal procedure and that concluded contracts already existed. For this reason, they maintained, the project could no longer be stopped because if this project were reversed, many other projects could and would also have to be reversed. As a result, there would be no more legal certainty in Germany, which in the end would endanger our social order and democracy. (Arbiter Dr. Heiner Geißler quoted this argumentation in a program by TV broadcaster Phoenix on 29th October 2010, saying that protest against the project Stuttgart 21 was also cited as an "attack on parliamentary democracy", although he subsequently distanced himself from this viewpoint.) The "logic" behind this is: what is done in a single, specific case inevitably ("logically") makes it necessary to do it exactly the same way in all other cases. However, this is an inadmissible and therefore by no means compelling generalisation. Every case, and this therefore includes Stuttgart 21 as well, can be seen as an individual case that must be dealt with using individually determined measures and evaluated according to individual criteria. A second example of such pseudo logic is the introduction of supposed authorities: in discourse, not only reasons relating to content are presented for or against a project; instead, we are referred to authorities that the opponent will (hopefully) respect. In the case of Stuttgart 21, the champions of the project referred to the EU, for example, categorising the project's realisation as important to the development of the European transport network. These two examples demonstrate that in planning processes scientific logic i.e., a statement's consistency, logic, and freedom from contradiction is often overlaid by a range of (pseudo) logic. This often shifts the emphasis of discourse from the level of facts to that of relationships.

In the doctoral college, the logical level emerged in discussion most frequently in conjunction with the phrase "but that is not thinking consistently … "

4, "Methodological" - selection of suitable methods

Scientists, like planners, need to select the methods that are suitable to handle (presentation, evaluation, etc.) a specific task or situation in planning. In this context, methods are approaches or techniques that generate an ordered rather than chance sequence of purposeful actions, which we assume capable of answering a question or solving a problem. By their very nature, there are a large number of methods. In the context of the international doctoral college, this topic of methods was discussed most often from the point of view of two aspects: on the one hand, as a problem concerning the interplay between method and outcome, and secondly using the key word Methodism.

The first named aspect indicates that every method can provide only some specific results and not others: for instance, it is possible to register concrete patterns of human behaviour with the aid of observation; but observation cannot show us the motives behind this concrete behaviour. It is equally problematic when the method of questionnaires is employed to investigate concrete patterns of human behaviour, since actual behaviour often differs considerably from declared intentions ("what people do, what people say"). This has emerged especially in connection with questionnaires on the subject of environmental conservation or, in general, on socially desirable behaviour. Another example of the influence of the selected method on the outcome is the use of geographical information systems (GIS), which allow us to present maps of quantitatively acquired, available data, for example, but do not admit the fact that people have subjective "mental maps" that often differ considerably from their geographical counterparts. Or, using the method of

document analysis one rarely finds out what has really happened during planning, as decisive argumentation in planning practice is not usually recorded according to the motto "the most important things in planning are not written down."[4] This all means that single methods facilitate investigation into and analysis of specific facts but exclude others. The so-called "methodism trap" also appeared in the doctoral college: one method is selected and the problem is forced into this method. Someone who makes an early decision to apply the method "geographical information system", for example, thus considerably restricts his or her possible findings from the very beginning.

5. "Epistemological" - testing: the empirical resilience of propositions

Scientific work and good planning practice both demand from planners and architects that they safeguard the propositions they have made empirically as far as possible: that is, they should present resilient proof and avoid suppositions that contradict existent scientific and technical knowledge. Six fundamental approaches used to test the truth of a proposition can be distinguished, which are (a) unanism, (b) pragmatism, (c) rationalism, (d) empiricism, (e) critical rationalism, and (f) critical realism.[5]

a) The assumption in unanism is that consensus among the experts involved is sufficient basis for regarding something as reliable and true. However, a classic example can be used to demonstrate that such evidence is insufficient: until the middle of the last millennium, all experts assumed that the earth was the centre of our universe. It was not until the beginning of the seventeenth century that Galileo Galilei with his astronomical investigations was able to confirm the heliocentric system conceived by Copernicus and so disprove the geocentric notion of the universe. Another example: until March 2011, experts in the atomic industry were agreed that the so-called "remaining risk" in the operation of nuclear power stations could be kept under control. Events at the Japanese nuclear power station Fukushima triggered considerable doubts over this assumption.
b) Pragmatism sees practical success or lack of it that is, the results of a process as evidence of a proposition's truth (" ... if it works?" or "the healers must be right"). However, another classic example shows that this applies only to a limited extent: NASA's Apollo program. Essentially, the flights of this program to the moon took place according to Newton's view of the world rather than Einstein's relativist world view, but today we know that the latter is the more fitting of the two views.
c) Rationalism regards a proposition as true when it coheres with specific background knowledge. If a proposition does not agree with the state of knowledge brought into play as a standard for comparison, or if it does not fit into a mental construct assumed given, it is not granted credibility. However, in this case the judgement of whether something is true or false is dependent on predetermined postulates, which are based on agreement. Therefore, an advance testing of the validity of these fundamental postulates would be necessary.
d) Empiricism views a proposition as true when there is positive evidence of it. In this context, however, the question is raised-how much positive evidence must be found in order to finally safeguard a proposition like "all swans are white", and above all, when can one stop searching? If this train of thought is taken to its conclusion, the search can only really be stopped when we are absolutely sure that we have checked every single swan. In practicable terms, however, this is impossible. It follows that no matter how much positive evidence one has, it does not provide conclusive proof of a proposition's correctness.
e) Critical rationalism draws the consequences from the dilemma of empiricism, so that the claim is made that a thesis can never be proven positively. It can only be proved false; that is, it can be

contradicted. Thus, a theory can only be upheld by the Jack of evidence weakening it. If we set out in search of evidence against our assumptions, contradictory evidence and do not find it, this speaks in favour of the theory put forward. There are two weak points in this type of argumentation: on the one hand, it leads to provisionalism in principle: "To date, nothing speaks against the theory that all swans are white." Secondly, contradictory data is not sufficient reason to abandon a theory because it does not agree with the available data. There may be at least three reasons for this: (i) the theory is not true; (ii) the data is inaccurate; and/or (iii) the external conditions have changed, i.e. the "ceteris paribus clause" (under otherwise identical conditions) has not been adhered to.

f) Finally, critical realism combines rationalism, empiricism and critical rationalism and so demands coherence with background knowledge-also changing-substantial positive evidence and a lack of significant negative evidence.

Although it combines various helpful methodical approaches in this way, it still cannot dispose entirely of their fundamental difficulties.

In the end, we can look at the matter from all angles but there is no ultimate, absolute evidence for the truth of propositions. The demand for "ultimate justification" leads to an inescapable situation, which philosopher Hans Albert has called the "Münchhausen-trilemma." The claim to prove scientific propositions resembles an attempt to "pull oneself up by one's own hair." In this context, Albert identified three alternative phenomena:

a) Infinite regress, which demands that we go on providing more and more reasons for the arguments/evidence given and can never arrive at a certain conclusion (and so at a final, "true" argument).
b) The epistemological circle, which already assumes in the process of argument whatever requires proof and cannot ever lead to an autonomous (final) foundation as a result.
c) Interrupting the process of argumentation at a specific (or any) point, whereby there is no further rational argumentation, as the interruption is arbitrary by necessity.

Austrian philosopher Paul Feyerabend derives the radical conclusion from this that, as there are no scientific methods with which to establish the truth and the dominant situation within scientific theory is one of anarchy, we can say simply that no theory is true or false and everyone may assume or postulate whatever he or she wants. In this context, "anything goes" is the motto that he proclaims: "Do whatever you want to do."[6]

These deliberations show clearly that every item of evidence can be questioned. If one wants to convince a conversation partner of a measure's quality to solve a problem, for example, one cannot provide more than (as credible and plausible as possible) evidence of one's own view of things. The other way around, the conversation partner's counter arguments can only represent an attempt to lend further weight to his personal view of the world. There is nothing in either case that is "objectively true" or "clearly proven." In this sense, the profession of planners and architects is far removed from planning truly based on evidence (in the strictest sense of the word). As Heidemann noted in 1992, therefore, planning is and will remain, "...judicious handling of suppositions and rumours."

6. "Ontological" - adopting a logical view of the world

Some basic concepts are always used when working on scientific (and indeed practical) tasks of planning, such as: process, nature, space, time, system, history, society, and various others besides. Such concepts, because they are very general, are not only used in some disciplines. Analysing and systemising them is the field of ontology; consequently, this field analyses the content of the world, what there is "out there." The essential foundation to scientific work is to ensure that the thought constructs on which the use of such concepts is based are logical in themselves. These four sentences alone indicate that the thematic field targeted cannot be dealt with, even to a limited degree, in this particular context. Let one example suffice, therefore.

One important, basic ontological assumption was outlined above, i.e., the fact that concepts are unobservable, conceptual (and thus abstract) fictions in our human brains (see above, point 2. "Conceptual" - the definition of key concepts). In addition, I (W.S.) assume in this context that the reader has truly understood that "primary number," for example, belongs to this category of concepts, just like "architecture" or "city." Whereas everyone will probably notice that there is something odd about the sentence "primary numbers perspire in the sun" even though it is grammatically correct, this is less obvious in the case of the proposition "architecture communicates." Both sentences are ontologically incorrect, as in both cases abstract entities (here: concepts) are accredited with characteristics possessed only by organisms. Organisms can perspire and communicate, "city," but etc. are abstract unentities such as "primary numbers," "architecture," and able to do so. Correspondingly, the sentence "architecture communicates" quite frequently causes much unnecessary confusion in the architectural world.

Another example is the statement "Nature does not need mankind." Here, a need is attributed to nature, which only man or other organisms can experience, not abstract concepts such as "nature." And so researchers developing a scientific treatise who have architecture "communicating" or attribute human needs to the concept of "nature" may stray quite easily onto mental paths that can hardly be followed to a profitable, logical conclusion.

7. "Valuational" - values as the basis of planning discourse

Values describe the relation between an object and an organism, whereby individuals or groups of individuals evaluate specific traits of people, objects, events, ideas, or relations as either positive or negative on the basis of their own subjective standards.

Planning processes are permeated by the setting of values, and values direct every stage of work in a planning process. They already play an important part in an early stage of this process, the stage of problem definition, as they influence which problems are perceived or not, what concepts are selected to describe the problems and the relations into which they are combined, what state of affairs is evaluated as bad, and what factors are made responsible for this or not. In the further course of a planning process, values shape the decisions made by the planner, the aims reached, what restrictions are accepted in the process, and what bundles of measures are chosen - or not - to fight the causes behind problems. Each of these decisions implies a selection, which is based on subjective evaluations (values). In each case, the planner could always evaluate objects or their characteristics in a different way and so come to completely different (evaluated) results. The results of planning, therefore, are never "without alternatives." These deliberations indicate that different values or systems of values define the course of every planning issue, and the way they do so. As the value systems on which a planning process is based are manifold and interchangeable,

the actors involved often adopt different perspectives as well - e.g., when weighing up the advantages and disadvantages of a planning solution.

The subject of planning discourse on values, however, is almost always some form of value conflict, which the planner needs to "negotiate" not only with himself but also, and almost always with other actors involved in the planning issue. In other words, value conflicts are the "daily bread" of all planning assignments.

One VDI guideline (3780, September 2000) that was developed with the advice of technology philosophers lists some typical (exemplary for the given context) value fields, all of which can be relevant to planning and each of which may come into conflict with the others: (i) personality development/ social quality, (ii) environmental quality (incl. aesthetic quality), (iii) health, (iv) safety, (v) ability to function, (vi) economy and (vii) (general economic) prosperity. In concrete cases, of course, each of these fields can be differen-tiated still further.

Two examples: the question was discussed several times in the doctoral college whether, and to what extent, it is planning's task to ensure "the equality of living conditions in different regions." Those supporting this thesis adopt (in relation, for example, to the abovementioned field of "social quality") a specific value system; thus they represent the standpoint of "social justice." This attitude sees it as the state's task to bring about a redistribution of prosperity; in this case, with the aim of supporting disadvantaged groups of people or regions. A counter position to this system of values is "liberal justice." Advocates of this position represent the thesis that the state should avoid such interventions as far as possible, as differences in distribution mirror the effective market forces, which ultimately means that the ongoing developments cannot be stopped anyway, and in the end the taxpayers' money would only be wasted unnecessarily.[7] This tense line between "more state" and "more market" is reflected in many other planning themes: e.g., provision of public transport, post offices, food shops, doctors, etc. in rural regions.

The essential point here is that the question "how much social justice can we actually provide financially, or in which fields do we want or need to provide it" must be re-examined, discussed, and negotiated repeatedly. In the process, evaluating judgements will always have to be made.

A second discussion evolved in the doctoral college on the concept of nature (a subject to be allocated primarily but not exclusively to the abovecited value field of "environmental quality"): while some regard nature as something with an intrinsic value of its own, which should consequently be preserved, others assumed that in Europe, for example, there was no longer any nature uninfluenced by man (wilderness) anyway, meaning that the whole area has already been "over-formed" by the hand of man and that consequently he may continue to shape it.

In order to do justice to the significant part played by values as a basis for planning activity, planners - particularly in scientific discourse- should always make explicit the values behind their propositions and recommendations for action. Only this kind of explicit disclosure makes it possible for other actors to follow and test their approaches, as well as the argumentation behind their statements and instructions for action.

8. "Practical" - working out suitable measures

Planning incorporates the development of possible active measures, which emerge from the insights and demands of the levels of reflection described above. The purpose of such measures is to realise targeted aims, representing the direct outcome of planning work. In this context, planners should already consider

the possible short- and long-term effects of the suggested measures, as well as their interplay with other action. As a general rule, at least the following four types of measures are available to spatial planning, which should be taken into consideration[8]:

1. the provision of spaces (e.g., commercial or housing areas, public and green areas)
2. the construction of facilities (for example, houses, squares, streets, parks)
3. adjustment of organisations (associations, public institutions, companies, etc.) that operate within these facilities (example: car-sharing is a type of organisation that does not change any aspect of a space or the facilities within it (buildings) but is nonetheless relevant to space and land use)
4. influence on behaviour of people using these spaces and facilities (for example, location decisions, preference for detached or apartment houses, traffic behaviour: use of public transport or individual traffic, and so on).

However, planners often concentrate on the first type (1) of measure: they make use of regional, land-use or building plans in order to provide spaces; that is, they attribute a specific use to specific areas. They employ the "customary" instruments of spatial planning for this purpose: central locations, axes, priority and reserved areas, green belts, but also area development plans. The constructing of facilities, the second type of measure (2), is generally the task of architects and civil engineers. Adjustment of organisations (3) and influencing behaviour (4), by contrast, are often neglected as types of measure in spatial planning.

But these measures often exert a considerable influence on how a space is actually used: location decisions, traffic decisions, use of the environment, etc. are based on the behaviour patterns of organisations and people. In addition, the types of measure (3) and (4) extend the players' arena beyond the classic addressees of planning measures; the focus is no longer on public addressees alone, but also private users of spaces or facilities. A prominent example of the third type of measure (3), the adjustment of organisations, is the so-called highly synchronised timetable. The innovation of this concept was to change the organisational form-i.e., the operation-of rail traffic by "synchronising" and connecting passenger train routes; very few changes were made to spaces and facilities in the context of this concept. To sum up: instruments of spatial planning are most effective when they work on all four of the abovementioned levels, as long as no contradictions are involved.

9. "Approach" - reflection of discipline-based planning approaches

Another level of reflection relates to so-called planning approaches. These are fundamental, paradigmatic patterns of thought, which, like "glasses", determine the way in which planners see things. The heart of planning approaches comprises particular views of problems, aims, methods, and specific background knowledge. These four components appear in various combinations and are interdependent. In this context, the "nature of the issue" does not determine which planning approach is employed; in other words, in planning, it is possible to choose and change between different approaches.[9] In planning work, therefore, it is a matter of sounding out the freedom of action associated with different planning approaches, and using them to solve problems.

Every planner employs are least one planning approach, which consciously or unconsciously influences his or her thinking and communicative and practical behaviour. The planning approach used is determined primarily by the planner's practised profession, by the body of thought in his "professional community" as a system of knowledge and beliefs. Because only a limited number of problem definitions, defined aims and subsequent solutions are possible with each planning approach, however, they inevitably lead to a

"narrowing of perspectives": as a rule, urban planners only come up with urban planning solutions, sociologists usually provide sociological responses, economists offer only economic solutions, etc. Hereby, they overlook the fact that viewpoints and methods from other disciplines may bring fresh perspectives and approaches to a solution.

Therefore, in the context of a planning process, different planning approaches should be incorporated into one's considerations as a test, in order to exploit the space for solutions associated with different planning approaches. In addition, this method makes it easier to understand the standpoints of other parties involved and affected, moderating them and integrating them into the planning process.

In the college, it was necessary to show the doctoral candidates that planning approaches are fundamentally interchangeable and that planners and architects themselves must decide which approaches they will select in a problem-oriented, responsible way. Here, it emerged that abandoning the lines of thought acquired in professional training and applied in practice is not always easy, by any means. Nevertheless, it was possible to create an environment of teaching and learning, with the international doctoral college, that made such changes in approach easier: the professors and associate lecturers participating in the college each apply several and various planning approaches, and awareness of this stimulated and promoted discussion of the advantages and disadvantages of different planning approaches.

Conclusion

The above reflections provide a contribution to academic debate on complex problems of spatial planning by elucidating nine levels of scientific work as elements of a school of thought "scientific work in planning." In this context, all nine levels determine each other reciprocally However, the interpermeation of the nine levels can be very different indeed, depending on the thematic emphasis of research work in each case.

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