INTRODUCTION

Educating Spatial Planners for the Age of Co-Creation: the Need to Risk Community, Science and Practice Involvement in Planning Programmes and Curricula

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Abstract

Planners are often billed as leaders and change agents of the (un)built environment. It is, however, important to recognise that they are in reality only one of many players in a sea of actors involved in shaping future developments and projects. Plans and interventions today are co-created and in fact co-evolve relying as much on the input, cooperation and actions of inhabitants, users, developers, politicians as on expert planners and a wide variety of other professions. In this introductory section, we, as editors of this special issue, posit that planners therefore require skills for co-creation drawing on science and working with other disciplines. In turn planning programmes and curricula need to incorporate learning and teaching approaches that prepare students in higher education for work in co-creation settings by purposefully exposing them to learning environments that involve community, science and practice. The collection of papers, which were presented initially at the 2014 Association of European Schools of Planning congress in Utrecht hereafter showcase curriculum developments and pedagogical research of planning educators from different world regions that in the round shed light on a variety of issues and challenges of embedding learning and teaching for co-creation and co-evolution. In particular, we elaborate on the tensions of employing transformational yet high risk pedagogies in higher education settings that are becoming increasingly risk-averse and streamlined and we suggest an agenda for planning curriculum development.

Keywords: spatial planning education; curricula; co-creation; university-community engagement; planning practice

Introduction

Educating graduates to become effective planning practitioners requires an understanding of the discipline of (spatial) planning, its specific characteristics and purpose. From this we can then deduce the competencies, skills and knowledge planners need for their day-to-day work. Norms, standards and traditions, and with them curricula content and teaching practices on how a particular discipline is conveyed and taught, can be categorized as discipline-specific pedagogical knowledge (e.g., Berthiaume, 2009: 215-16). Such knowledge is shaped by a mixture of the expectations of employers, the professions but also the visions of educators. The conceptions of any discipline, but particularly those in applied fields such as planning, are highly context dependent and socially constructed. Considerable variations across nations are commonplace as a result (Frank, et al., 2014; Rodriguez-Bachiller, 1988) with some favouring a design and physical planning approach, while other national conceptions position planning as a speciality of engineering or as social science. Moreover, as the urban environment changes, and societal and political contexts shift – so do the demands on the planning profession, for example, from designing urban extensions, to developing new towns, urban

regeneration and more recently facilitating smart and resilient cities (Keller, et al, 1996; Dalton, 2001; Stiftel et al., 2009; Timmeren, Henriquez, Reynolds, 2015). Planning curricula content and learning outcomes are thus regularly reviewed and updated to address perceived mismatches in skills and knowledge needs for practice (e.g., Frank, 2006; Friedmann, 1996; Carter, 1993).

Because of the said differences in national conceptions of planning and varying societal and urban conditions, competencies eschewed for the planning profession customarily span a wide spectrum from being creative, visionary and showing leadership via mastering data collection, analysis and interpretation, to an ability to communicate effectively with communities and stakeholders (e.g., RTPI 2012; PAB 2012; ECTP-CEU 2003). Whether one prioritizes the science and/or art aspects of planning or ascribes to the notion that planning is an art that should (or indeed must) be based on science (Bertolini et al., 2012), there is generally agreement that spatial planning is an applied, professional discipline unequivocally lodged in the "practical sciences" (textbox 1). And whether spatial planners are managing development or developing proposals, i.e., concrete plans for action and spatial interventions, the underlying knowledge questions remain: Will the plans work? Are they meaningful for society? Are the plans feasible: technically, financially, politically? Will they really solve the problems at hand? Or, in the words of Klaasen (2004: 32): "is effective action in specific situations possible on the basis of this[1] knowledge?" These questions differ starkly from the leading questions in the fundamental sciences disciplines which are: 'is it true/false?'[2].

The empirical sciences are based on statistics and follow the empirical cycle as a basis for working: observation – theory building/hypothesis – prediction – result. For spatial planners, for whom the object of study is not even there at all – it is still a plan! - the empirical cycle cannot answer the relevant knowledge question, i.e. predict with any certainty whether the plan is good and will work in its specific socio-spatial context.

The inability to solve spatial planning problems through mere rational problem solving has been alluded to over forty years ago by Rittel (1972) identifying planning problems as 'wicked' and arguing that there is never a single, optimal solution but only better and worse options. Later theoreticians have built on this work (e.g., Roo, et al., 2012; Schönwandt, 2008) without however changing the fundamentals of the originally rehearsed proposition that the nature of planning problems requires interdisciplinary, collaborative working that facilitates on one hand the development of a variety of possible solutions and on the other a discourse of deliberated judgements to select the best possible solution within a given context. Progress has been made in discerning different tools and methods that can facilitate and support such deliberate, collaborative planning processes, through which solutions co-evolve and which enact co-creation.

Nevertheless, spatial planning should draw on all kinds of knowledge. Planning tasks can be derived from empirical analysis, and planning decisions and solutions can be informed, underpinned and supported by empirical data and evidence. Data and how we interpret them contributes much to the definition of a problem in the first place. Different disciplines will inevitably define a problem from their point of view and thereby pre-empt a particular solution. A classic example is traffic congestion

[1] By 'this knowledge' is meant: the available knowledge

[2] The fundamental sciences consist of the so-called formal sciences (such as mathematics, logics, systems theory et cetera), and the empirical sciences (such as sociology, psychology, chemistry, physics, history, language et cetera).

which can for instance be ameliorated by expanding road space or by cutting the number of vehicles travelling. In the end, plans or policies that are selected are never the direct outcome of any empirical study. Spatial plans, visions, strategies and policies need to be developed, designed and constructed; they usually are results of both analysis *and* synthesis and draw on a pool of experiences of what has worked in the past and is presently considered politically and socially acceptable, and technically possible.

In sum, following De Jong (2012) (Figure 1), disciplines from the fundamental sciences have their main focus on the world of probabilities and on probable futures ('is it true/false?'). Their way of thinking and working is causality oriented. All probable futures are – by definition – possible (otherwise they would not be called probable), but not all possible futures are probable. Disciplines from the practical sciences focus predominantly on the world of possibilities and on possible futures ('does it work?'). Their way of thinking and working is conditional. Additionally – and also highly relevant for developing and implementing spatial proposals – politicians and decision makers focus in their professional activities first and foremost on the world of desirabilities and desirable futures. Their way of thinking and working is normative.

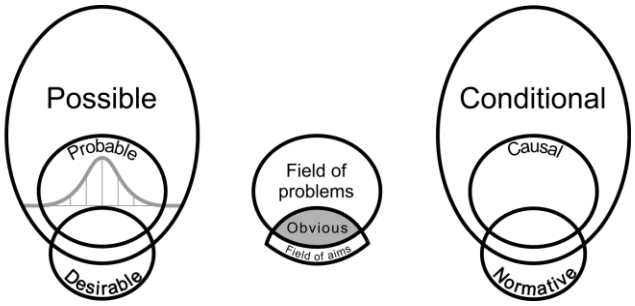

Figure 1 Thinking about the future for designers, planners and engineers (the possible), fundamental scientists (the probable) and politicians (the desirable) (De Jong, 2012: 17)

How do spatial planning and the activities of spatial planners fit in this scheme? For spatial planners, but also urban designers and engineers, the 'real' problems can be found in the set of probable futures which are not desirable. For these kinds of futures, society is in need of solutions, because without plans and interventions, an undesirable future will emerge. The intersection of probable, possible and desirable futures is the domain of the 'obvious', and does not need (a lot of) attention from planners; these futures will happen most probably anyway, even without any plans and interventions. Crucially, the 'real' aims for planners are to be found in the set of desirable and possible futures which are not probable. When futures are desirable, but not probable, they need to be planned and designed!

So, for spatial planners it is highly relevant to understand the 'laws' of the possible, the probable as well as the desirable futures, as all of them play a role in their professional activities. Spatial planners typically face highly complex issues in interdependent social, economic, environmental, technical and political systems which yield high levels of uncertainty and pluralist perspectives while being charged to plan for an essentially unknown future. This raises the question of how one can prepare future planners and what kind of programme structures and pedagogies may be helpful and appropriate.

Towards a meaningful academic profile for spatial planning education

In contrast to previous efforts of re-defining and updating spatial planning curricula based on discipline specific content and skills we wish to step back and consider some of the underlying ideologies of the spatial planning field and profession. Considering that planners are dealing with 'wicked' problems, which require a particular type of (scientific) approach that is distinct from the empirical sciences we endorse an integrative – comprehensive education model which conceives planning ideologically as a distinct independent discipline[3] (Frank et al, 2014: 84) with its own academic profile. We furthermore propose, that, independent of national specificities, spatial planners need to develop three overarching competencies alongside the acquisition of spatially relevant knowledge. These are:

a) an understanding of different knowledge creation approaches and scientific traditions,

b) an understanding of co-creation strategies and the evolutionary nature of planning goals; and

c) a disposition and ability to act positively in the face of complexity, uncertainty and unknown futures.

While (a) and (b) are useful and necessary competencies to facilitate inter- and transdisciplinary working, (c) is essential for students to persevere, and create meaningful and fulfilling careers for themselves. This means that spatial planning educators face a three-pronged challenge.

First, the challenge to introduce students to the multifaceted scientific profile of the field of spatial planning, and therefore the values, limitations, similarities and differences of three different traditions: the empirical research (approaches and methods), the solution-driven research (approaches and methods) and the decision-making (approaches and methods). While the solution-driven and decision making traditions dominate the field of spatial planning and design, the empirical one should not be ignored. Scientific research and studies on urban heat islands, for example, have provided information on how to reshape urban morphology to reduce the problem, and route modelling can help optimize waste collection and so forth. Planning students will most likely not be able to excel in all of these sciences because of the limited time budgets in degree programmes, but a clear understanding of the starting points of different scientific traditions is essential to derive maximum benefit from interdisciplinary collaborations and working. This forms the basis for the ability to effectively disentangle conflicting problem definitions and shape agreed viewpoints to facilitate the co-creative problem-solving necessary in cities and city regions.

Second, educators need to facilitate co-creation skills development. Cities and city-regions all over the world face challenges of sustainability. They have to address issues including resource scarcity, food security, mobility and logistics, water and waste management, and health and wellbeing (AMS, 2016) and are more than ever in need of plans, designs and solutions. No actor or stakeholder can do this alone. Achieving sustainability requires co-operation and co-creation between all kinds of societal actors: practitioners from a variety of disciplinary fields (such as urban design, transport and infrastructure planning, landscape architecture, real estate developers, engineers etc.), NGOs, think tanks, civil servants, politicians, consultancies, scientists, civil society and individual citizens (see e.g.,

[3] Independent and freestanding as opposed to being a specialism within an architecture, engineering or surveying degree or a top up postgraduate degree building on a first degree in the empirical or fundamental sciences.

Mclaren and Agyeman, 2015). Thus, the cities of today and tomorrow are in need of trained professionals, who can work across disciplinary as well as 'community' boundaries, i.e. not just in multidisciplinary but transdisciplinary environments and develop and implement plans and policies for sustainable and just cities (Table 1). This means professionals who have learned to co-create, building on complementary sets of knowledges in a democratic, just and equitable manner.

Third, and finally, there is the challenge of supporting students to cope with uncertainty and planning for an unknowable future in a pluralist society. Gaining a deeper understanding of the complexities of urban problems and issues can be overwhelming. As our knowledge grows, uncertainties grow likewise. Barnett (2004) argues that in a world of (super)complexity problems cannot be solved with and through knowledge nor skills. Instead students/planners literally need to learn to 'live' with uncertainty and make decisions with incomplete data and evidence, or with an abundancy of conflicting (big) data. As this is nowhere more true than for planning, we suggest that the learning environment of planning programmes need to facilitate the development of a disposition to live with the anxiety of not knowing (Barnett, 2004: 252). Openess, flexibility and adaptability as well as self-reliance are some of the 'characteristics' that may help individuals thrive in such complex environments. These are – to nobody's great surprise –the attributes that employers increasingly seek in new recruits. But how can such attributes or 'dispositions' be taught? These are no skills or values in the classical sense and Barnett (2004: 257) argues that their development requires transformative and 'risky' pedagogies that expose students to dilemmas and uncertainties.

Table 1 Multi actor approaches (based on: Davoudi, 2010)

A **multidisciplinary** approach is a way of working, in which the professionals from different disciplines contribute to the same design and/or planning task.	**INTERACTION**	
An **interdisciplinary** approach is a way of working, in which the professionals from different disciplines together and integrally define the design and/or /planning task. All involved disciplines are encouraged to cross their disciplinary boundaries, because all actors 'understand' that the problem at hand is too complex to tackle with the separate disciplinary concepts and/or methods.	**INTEGRATION**	
A **transdisciplinary** approach relates to the co-operation between scientists and other actors from society, such as practitioners, policy makers, civil servants, companies et cetera in order to solve complex societal design and/or planning tasks.	**CO-CREATION**	

Educating for co-creation and unknown futures

While planning curricula around the world integrate a wide range of pedagogies which in parts already develop the three competency areas identified above: a) different scientific traditions, b) co-creation and co-evolution strategies, and c) an ability to cope with uncertainty and complexity, we believe that it is both timely and necessary to evaluate the contributions of existing and emerging pedagogies in this respect. Such evaluations will then enable the planning education community to actively refine and further develop pedagogies and study programmes that offer a coherent and comprehensive education for co-creation and shaping unknown futures.

A cursory review of the literature on planning education reveals how visionary academics have time and again experimented with various didactic formats and innovative programme structures in efforts to facilitate multidisciplinary and interdisciplinary learning (Frank, 2006). There have been more or less successful attempts at introducing foundation years and interdisciplinary projects where architects, surveyors, engineers and planners are taught entirely or in parts together to foster interdisciplinary thinking. Such approaches have gained new currency particularly as a means to improve skills and knowledge for sustainable development (Hart et al., 2009). Reflecting on an experiment that brought together medical and planning students for a project to explore improvements to highway safety, Ellis et al. (2008) detected considerable innovation potential in interdisciplinary collaboration. However, inter- and transdisciplinary education is complex and going beyond rhetoric is not straight forward (Wagner et al., 2014; Ellis et al., 2008). It is also comparatively more resource intensive than single discipline approaches and requires substantial institutional commitment if it is to be sustained over time (e.g., Hart et al., 2009).

Moreover, spatial planning education degrees have a long tradition of integrating experiential learning opportunities (internships, placements, workshops, consultancy training) and engaging with community and disadvantaged groups in society (e.g., Forsyth et al., 2000; Angotti et al., 2011; Bose et al., 2014; Porter et al., 2015) through service learning, live projects or studios. Different didactic approaches have waxed and waned as the planning discipline has evolved. At present, studio and workshop pedagogies as well as work placements and service learning are experiencing a renaissance (Heumann and Wetmore, 1984; Freestone, et al., 2006) as their value in contributing to student learning (skills and knowledge) and personal development (e.g., adaptability, self-reliance, global citizenship) become more widely documented and valued.

Experiential learning and inter- or transdisciplinary competency development are not mutually exclusive; they can be combined through projects that bring together different disciplines and stakeholders. Scholl (in Bertolini, 2012: 480-82), for example, elaborates a pedagogy that embraces both transdisciplinary and co-creation competency development in project-based learning using *work/study* combinations in which students develop responses to difficult, real and unsolved problems. Both, interdisciplinary activities as well as live or 'real' projects tend to excite but also to challenge students. In fact, these learning situations frequently provoke consternation and anxiety by students as they differ considerably from traditional exercises and concomitant tests where correctly reproduced knowledge leads to correct answers (and good grades).

Teaching in these setting means not merely conveying knowledge; rather students require assistance in developing processes which help them to create possible and desirable solutions, while also coping with the fact that there is no right or wrong answer. In the process of problem solving, learners and teachers will be transformed growing in confidence and ability to address uncertainties. Such transformative pedagogies are risky (Barnett, 2004: 257) and learning outcomes are less predictable and controllable compared to more traditional modes. The best setup and intentions can occasionally go wrong (e.g., Winkler, 2013; Winkler in Porter et al., 2015). Rosier et al. (this issue) as well as Hart et al. (2009) therefore recommend that students are exposed successively to more and more complex situations while also providing supportive 'scaffolding' to help students develop relevant coping strategies.

In recent years, some new and ambitious pedagogical approaches have been introduced. These approaches aim to link up not only academics and students with communities via an expert model, or students with practice (typically an apprenticeship model) but rather they endeavour to establish true partnerships for co-creation that also involve industrial sponsors, think-tanks and research institutes. These experiments acknowledge that although planning solutions are ultimately socially constructed, relevant scientific findings must not be ignored. Other innovative approaches seek to employ institutional level engagement with places drawing on a range of disciplines to instigate holistic research studies and transformative solutions to challenging societal problems.

One example, falling into the former rubric, can be found in the Netherlands, where the cities of Amsterdam and Rotterdam have initiated platforms (textboxes 2 and 3) to connect higher education and academic research to [1] urban policy development, [2] urban policy implementation and [3] business and industry. An example for the latter rubric is the sustainable cities initiative (SCI and EPIC Network, n.d.) which started in 2009 and since has developed into one of the most successful and comprehensive service-learning programs in the USA. The objective of this program is to focus student projects and research from different disciplines on a city or place for an entire academic year and thereby helping to provide new insights and transformation toward sustainability for the selected study site. This is done as part of the normal curriculum. The overall result can bring together studies for example by transport engineers on road congestion, by landscape architecture students on green infrastructure and an evaluation of biodiversity by ecologists. The initiative raises sustainability awareness amongst students and citizens and across disciplines.

In a meta-analysis looking at university-community interactions, Trencher et al. (2014) identify 39 partnership initiatives between universities and cities, communities / civic organisations and industry to foster place-based co-creation of knowledge for a more sustainable future of these places. 18 of these examples are in Europe, 5 in Asia and the remainder are based in North America. Each of the partnerships are different but claim a transformative agenda for the places they work on, engaging empirical studies and using the communities or neighbourhood as living labs or test beds to gauge what 'works' and what doesn't.

To date, a comprehensive overview and assessment is lacking, however. The dynamic nature of the higher education sector means that establishing such overviews is difficult if not impossible. Nevertheless, this special issue makes a small contribution to rectify the fact that to date many cases of bottom-up and individual activities outside the larger institution-level initiatives captured by Trencher et al. (2014) remain unpublished.

Disseminating pedagogic innovation and research

In 2014, the Association of European Planning Schools congress hosted jointly by University of Utrecht and Delft University of Technology (July 9-12) had adopted the theme "From Control to Co-evolution". This presented a unique opportunity to explore how this conception of planning was reflected, embedded and problematized in the planning curriculum. In an effort to examine emerging pedagogical development in co-creation and transdisciplinary we asked presenters in the planning education and practice track to consider what planning as a co-creation and ongoing endeavour without a clear beginning and end would mean for the education of future planners. And in light of

the fact, that planning is no longer (if it ever was) controlling future developments and projects how should educators translating the conceptual and practical challenges of connecting planning and planners to other stakeholders who help, influence, stimulate and steer, but also sometimes frustrate spatial development, transformation and governance into the curriculum. We were also curious how planning educators connect their students to the practitioner community whilst insisting and integrating scientific rigour. Specifically, we were looking for papers presenting research findings on spatial planning courses, curricula and student work focusing on for example on:

- How students of planning are introduced to inter- and transdisciplinary co-operation and co-creation;
- How academic research is effectively used in courses and studios, in which students have to develop proposals, plans, designs, or policies for future interventions;
- How student work is meaningful for actual, real spatial planning tasks and the professional debate about them;
- How today's real inter- and transdisciplinary socio-spatial planning tasks are effectively integrated into an academic education curriculum;
- How the didactic concept of spatial planning courses, studios, or curricula effectively reflect the transdisciplinary nature of today's and tomorrow's practice.

This issue brings together five papers from four nations (Switzerland, United Kingdom, Australia, and the Netherlands) that addressed these issues in some form or another. As these countries of course have different higher education regimes and spatial planning cultures, the papers illustrate on one hand a shared interest for integrating community and practice but also different pathways to achieving this.

The first contribution "The benefits of embedding experiential learning in the education of planners" by Rosier, Slade, Perkins, Baldwin, Coiacetto, Budge and Harwood focuses on documenting the value of a variety of active, engaging pedagogies (i.e., experiential learning) that bring students in contact with real planning tasks and professional discourses. The second contribution by Pieters, Kellett and Wight titled "Practice, reflection and learning – aspects of the education of spatial planning professionals in the making" presents results from a study examining students' level of reflective learning (ability) in work placements. Together the papers illustrate that deep learning in such contexts cannot be necessarily expected as 'automatic' and requires 'practice' and guidance. Repeated exposure will be effective as will be specific guidance on how to reflect or creating spaces and opportunities to reflect.

The third paper by Frank and Sieh explores specifically the opportunities of integrating teaching of community involvement in the planning curriculum in the UK context where such pedagogy is increasingly being introduced. While situated in the UK, the authors offer a valuable framework and typologies that can act as guidance for educators developing curricula and courses that seek to engage with communities in true co-creative partnership for any kind of planning related project or problem.

Oonk and Guliker's paper seeks to assess the development of collaboration and co-creation competencies developed by students in an innovative, multi-stakeholder and region oriented learning environment that is being piloted in the Netherlands. The paper elaborates a truly innovative approach that fosters transdisciplinary working employing cutting edge methods adopted from professional development such as 'coaching'.

The final contribution by Schretzenmayr and Casaulta-Meyer on learning from communicating with the public shows how a unique opportunity can be exploited to engage students in transformative development and learning. An exhibition about planning is used as an opportunity for students to participate and explain their chosen field of study to the public and in defending it they are forced to reflect on the public and their own values around space, place, the environment and aesthetics and all that may be positive or negative about planning the built environment.

All papers suggest that there are a vast range of opportunities and pedagogies that allow students and educators to engage with professional practice, the community and the general public. However, except for the final paper all authors make the point that using such pedagogies is not without a price (workload, uncertainty of learning outcomes, et cetera). In turn this means that embedding such inter- and transdisciplinary, transformative approaches can be difficult for a variety of reasons. In terms of placements, the arguments have been those of economic feasibility, lack of control over learning outcomes and rigour and difficulties in ensuring equality in assessment and more. Interdisciplinary teaching faces challenges of different disciplinary expectations (see above explanations of disciplinary research approaches as one aspect), different subject specific pedagogies and traditions, but also time tabling and institutional barriers.

This means that institutionalising these approaches stands against tendencies of rationalisation, bureaucratisation of higher education which might be inevitable in light of the sectors' massification. However, there is also evidence that in order to compete in a globalising world, and institutions also seek to re-position themselves not only as offering unique educational experiences but based on the adopting missions that are collaborative in nature and contribute actively to place-based on the understanding that solving the complex urban issues of today and tomorrow can only be done by working together and across disciplinary boundaries.

We cannot and should not educate and prepare students for a chaotic world full of uncertainties in an environment that is entirely controlled, predictable and uncertain. There is sound pedagogic research on the fact that individuals learn most when stretched (albeit not to breaking point). Barnett argues forcefully for developing learners' disposition to cope with unknowable futures (Barnett 2000; 2004) and certainly we concur that planners are in need of such characteristics.

Planning education: the way forward

Through the collection of papers in this special themed issue we seek to explore new developments in teaching and learning in the field of spatial planning that touch upon the idea of educating for co-creation, transdisciplinarity and university-community engagement in one form or another. As such the issue aims to contribute to the body of knowledge on educating spatial planners and developing an academic profile that fits present demands. Still many questions for future research remain.

For one, we think that spatial planning educators, both teachers and programme leaders, will be helped by more educational knowledge on *how to effectively integrate different scientific paradigms and traditions* in spatial planning curricula which face – by nature – limited time budgets. Moreover, how should for example a 'Methodology' course look like in such a programme? Teaching about a variety of methods, their origins, values and limitations, will be a start but insufficient.

Second, to date, transdisciplinary teaching approaches are still relatively rare and often experimental. A strong theoretical underpinning and well-founded, evidence based teaching models for transdisciplinarity are lacking. We hope that through sharing our ideas in this respect we can *enhance on future attempts* and by doing so build knowledge on these kinds of learning environments more systematically. We know that such attempts have been met with scepticism or even hostility in some universities, both in the past and present. We are convinced that transdisciplinary teaching approaches can contribute to both the development of professionals-to-be and the universities' societal service mission and are thus worthwhile to pursuit despite higher costs.

Third and last, we have argued that 'risky' learning environments are highly relevant for spatial planning students. Yet there are also signs that students exposed to such learning environments often *experience considerable amounts of stress*, because of the uncertainty about the amount of work they need to do (expectations and study load), about the quality required to pass their project or to finish it with flying colours (appraisal/when is the project finished?), or because they do not want to be the weakest link in their project group (ambition), and so on. How can we help students to learn for (super)complexity yet without structurally high stress levels? Much has been tried such as clear project introductions, assignment definitions, coaching strategies, and providing assessment criteria and formative feedback with limited success. It seems that students now crave increasingly more certainty as pluralism and complexity in the world appears to grow. Yet, the mistake is thinking that there is an antidote to uncertainty. More research is needed in to how to make students more at ease with the idea that nothing is solid or permanent, and that it is ok to make mistakes and not to know everything.

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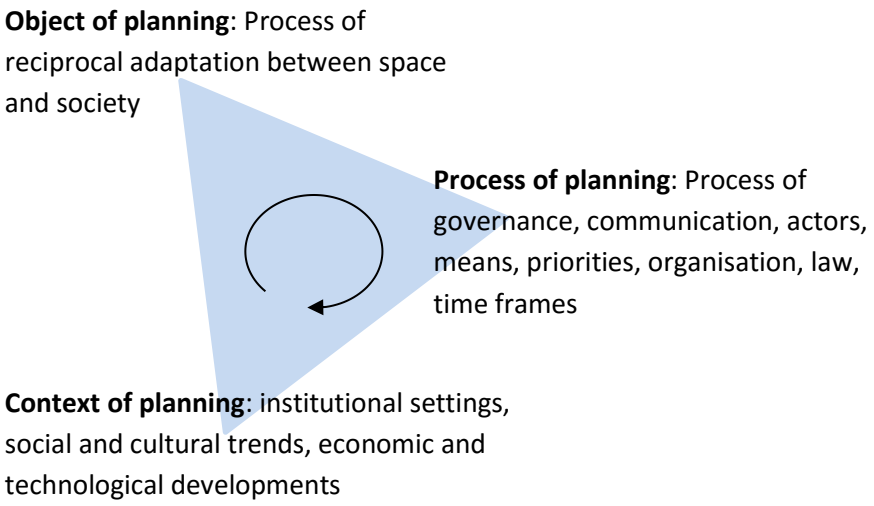
Textbox 1 Defining the spatial planning discipline: the planning triangle



We can further explain our perspective on the spatial planning discipline, and differences between practice and university, based on the spatial planning triangle 'object of planning - process of planning – context of planning' (based on Hidding, 2007; Spit and Zoete, 2006). The objective of spatial planners in *practice* is to develop –together with the relevant stakeholders- coherent ideas, visions, strategies, designs and/or plans for steering and interventions in the process of reciprocal adaptation between space and society in order to realise public goals, values and meaning. The objective of spatial planners in the *university* is to study these elements, processes and actors involved. At the same time, the processes of developing spatial plans and realising, implementing and executing them bring their own challenges to the fore: legal issues, communication with other stakeholders and plan actors, the availability of means (like money, time, energy, know how), different and conflicting priorities and interests of actors, and time limits. And thirdly, planning contents and processes take place within a societal context. Economic, demographic, environmental, political, institutional, and/or technological trends can have a large impact on how we can or should plan our cities.

Textbox 2: Amsterdam Institute for Advanced Metropolitan Solutions (AMS)

Under the umbrella of the Amsterdam Institute for Advanced Metropolitan Solutions (AMS), Delft University of Technology and Wageningen University are developing[4] a two year MSc programme *Metropolitan Analysis, Design and Engineering* (*MADE*). It focuses on the identification and analysis of metropolitan challenges and the design, engineering and implementation of solutions. Students will learn to use the latest technologies to acquire, analyse, represent and interpret (big) data at city-region levelas a means to optimise urban functions and processes.

AMS brings together engineers, designers, planners, digital engineers and natural/social scientist to jointly develop and valorize interdisciplinary metropolitan solutions. AMS is centred on applied technology in topics such as water, energy, waste, food, data and mobility, and their integration. AMS develops a deep understanding of the city – sense the city -, design solutions for its challenges, and integrate these into the city. The city of Amsterdam will serve as its home base and test bed.

Because of the connection with AMS, in which many industrial and societal actors are involved, a unique inter- and transdisciplinary learning environment is created for the MADE master programme, which brings together scientific research, academic education and practice (both public and private). The Amsterdam societal and industrial partners offer concrete case studies from the field, for which students will develop – in close co-operation with stakeholders – so called metropolitan solutions. The city of Amsterdam presents itself as a Living Lab.

www.ams-institute.org

[4] Planned starting date for the programme is September 2017.

Textbox 3 Field Academy Rotterdam

The Field Academy. These words literally represent the essence of this knowledge platform: an academy in the field. It functions as a neighbourhood knowledge centre and works from its own visible location(s) in the city districts. The Field Academy facilitates and organises the co-operation and communication between inhabitants, entrepreneurs and professionals. Together they work on sustainable solutions for today's and tomorrow's urban design and planning tasks.

The Field Academy connects these concrete urban planning tasks to academic research trajectories, in which a variety of students can participate, with all kinds of disciplinary backgrounds. They also offer internships and project topics for students. They challenge and use the creative and intellectual potential of students and researchers. Their future professionals are trained in an inter- and transdisciplinary setting by working on the city's complex urban challenges. Students are tutored by teachers from the various higher education institutes.

The Field Academy sets the platform's research agenda for students and guarantees the professional connection, coherence and synergy between the different challenges which the students focus on. In this way academic education and research are directly connected to policy development and implementation.

The Field Academy operates as platform, where clients and problem owners can get in touch with knowledge institutes, researchers and students, and (other) local actors. The initiators of the Academy are the municipality of Rotterdam and Vertex Architecture+Urbanism. Their clients are for example governmental bodies, NGOs, housing corporations, health care institutes and developers. The knowledge institutes connected to the Field Academy are the Delft University of Technology, the Rotterdam Erasmus University, the Rotterdam Higher Professional Education Institute, and research centre TNO.

www.veldacadmie.nl