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**DOI**

[10.4324/9780429290268-26](https://doi.org/10.4324/9780429290268-26)

**Publication date**

2021

**Document Version**

Final published version

**Published in**

The Routledge Handbook of Regional Design

**Citation (APA)**

Gilliard, L., Rooij, R., Alaily-Mattar, N., Zonneveld, W., & Thierstein, A. (2021). Interdisciplinary pedagogies for regional development challenges: The re-coupling of planning, design, and the social sciences. In M. Neuman, & W. Zonneveld (Eds.), *The Routledge Handbook of Regional Design* (pp. 377-393). Taylor & Francis. <https://doi.org/10.4324/9780429290268-26>

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# Interdisciplinary Pedagogies for Regional Development Challenges

## The Re-coupling of Planning, Design, and the Social Sciences

*Lukas Gilliard, Remon Rooij, Nadia Alaily-Mattar,  
Wil Zonneveld, and Alain Thierstein*

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### Introduction

Since the early 2000s, the regional scale has gained increasing attention amongst policy makers as well as planners. Reasons are manifold but first and foremost is the emergence of the city-region as an increasingly important scale for resolving social, economic, and ecological challenges. The growing importance of coordinated regional development, the inability to re-scale regional governance structure appropriately, and the emergence of regional design practice call for a rethinking of how regional development is practiced. Since the mid-2000s, a wide group of authors has indicated over the course of years that a more strategic approach to regional development is needed for which in turn some kind of spatial vision is also needed (Albrechts 2004, Healey 2006, Newman 2008, Oosterlynck et al. 2011, Balz 2019). The complexity and often contradictory nature of current and future challenges call for 1) an integrated, inter- or even transdisciplinary way to address them and 2) professionals who are educated how to approach such integrated way of working (Gilliard and Thierstein 2016, Rooij and Frank 2016).<sup>1</sup> Therefore, it is necessary to assess how regional design practices and regional design education relate to other, more established development approaches in planning and planning education.

Given the revived interest in regional development, this contribution aims to link three theoretical discourses on regional development in planning, design, and the social sciences. Various disciplines have been concerned with the development of cities, infrastructures, and landscapes: design sciences, such as architecture,<sup>2</sup> as well as a number of social sciences, most prominently human geography. Spatial planning<sup>3</sup> in most countries emerged as an independent discipline in the second half of the 20th century. Today's societal challenges call for approaches which engage and enable urban and regional stakeholders while at the same time facilitating and stimulating urban and regional development.

As educators, we are particularly interested in understanding how universities can implement design training for regional development and how it can be complemented by approaches from planning and social sciences. Delft University of Technology (TUD) started to develop design studio courses on the regional scale already decades ago while Technical University of Munich (TUM) only began to explicitly work on that scale with the establishment in 2005 of a Professorship for ‘Landscape Architecture and Regional Open Space’ as well as the Master of ‘Urbanism – Landscape and City’ study program in 2011. This chapter compares how both courses combine elements of design, planning, and the social sciences. Our reflection aims at understanding the difficulties of combining knowledge and methods from these three different disciplinary traditions. As a result, we have developed a method of assessing regional design and planning studios, in particular to which level they integrate these disciplinary traditions in their studio pedagogies. The aim of the chapter is therefore twofold: 1) to present a didactic rationale for preparing planning and design students for tomorrow’s socio-spatial challenges on the regional scale, and 2) to present a method for assessing regional design and planning studios in particular to which level they integrate disciplinary traditions (planning, design, social sciences) in their studio pedagogies.

Due to our particular interest in how to integrate regional design with regional planning and social science education, we base our analysis on hypotheses that are concerned with pedagogical questions. The pedagogical approach of TUD builds on findings on how to teach design in (landscape) architecture and urban design (Van Dooren, Rooij, and Willekens 2013). TUM takes inspiration from a systems approach based in the social sciences (Vester 2012) and a design approach (Alaily-Mattar and Thierstein 2014).<sup>4</sup> Hence, the underlying assumptions and hypotheses differ between both courses. The chapter is therefore structured along opposing hypotheses (see Table 21.1).

The research reported in this chapter is based on a comparative evaluation of two studio courses taught at TUD and the TUM between 2011–2018. The evaluation model and criteria are established based on the knowledge of the interdisciplinary team of authors, supported by a variety of key literature. The assessment itself (of the TUD and TUM studios) is based on the self-reflection of the lecturers supported by qualitative feedback from the students, and a critical peer-to-peer discussion between TUD and TUM.

*Table 21.1* Hypotheses for integrating design, planning, and social sciences as part of regional development education

	<i>TUD Studio</i>	<i>TUM Studio</i>
	<b>Integrating regional design, regional planning, and regional studies requires...</b>	
<b>Hypothesis 1</b>	... giving students of one disciplinary background (i.e. architectural or urban design) enough insight into other disciplinary fields.	... bringing together students from different disciplinary fields, namely architecture, planning, and social sciences.
<b>Hypothesis 2</b>	... the connection of academic ways of working (including the use of scientific knowledge) to the questions from stakeholders from practice.	... a paradigm shift in practice from discipline-based communities to cross-departmental, interdisciplinary cooperation.
<b>Hypothesis 3</b>	... putting central the products of integration (i.e. the design of a spatial vision and the design of a spatial strategy).	... passing through the entire process from developing an own design brief based on analytical evidence to exploring design options.

Source: Authors.

The remainder of this chapter is structured as follows. The next section presents our understanding of regional development as an integrated activity at the intersection of planning, design, and the social sciences. The section thereafter provides a synopsis of the two regional design studio courses at TUD and TUM. We present the setting, the learning objectives, the pedagogical approaches, the learning activities, and the modes of examination. In the next section we assess how those pedagogical decisions incorporate our theoretical criteria for good regional development practice. The following section provides recommendations on how to improve both studio courses, and on how to implement and combine design, planning and the social sciences. Based on our empirical evaluation, we discuss the implications for interdisciplinary education for regional development in the final section and how our learnings from teaching can be translated into regional development practice.

### Regional Development: An Interdisciplinary Practice

Historically, we find three major disciplinary branches that are concerned with the development of cities and regions. First, there is spatial planning as an independent discipline that was established in 20th century – first in the Anglo-American hemisphere, later in other European countries. Second, there are fields of spatial design and the physical sciences – such as architecture, urban design, landscape design, and civil engineering (e.g. water management, and transport, mobility and infrastructure) – that have shaped the form of our cities for many centuries and are still one of the most dominant educational pathways into urban and regional development practice. And third, there are the social sciences that have produced some of the most influential theoretical pieces of research in the fields of urban sociology, urban economics, and urban geography. In the first section, we compare the three disciplinary branches and their perspectives on spatial development based on a distinction between five key aspects: disciplinary focus, understanding of space, understanding of future, outcome orientation, and work mode. In the second section we discuss our research approach.

#### Contributions of Planning, Design, and Social Sciences to Regional Development

*Disciplinary focus* – Each discipline has a natural (disciplinary) focus, for which a distinct set of knowledge and methods has been created over time (Figure 21.1). Design is focused on the

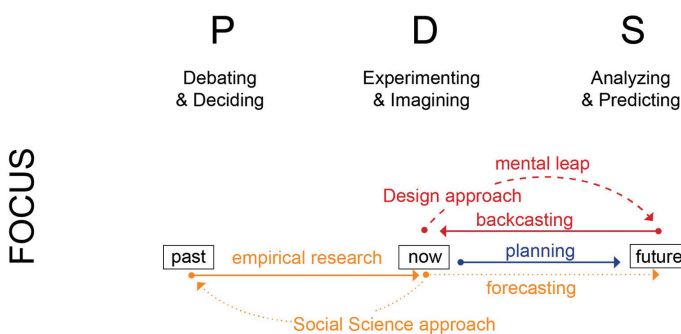


Figure 21.1 Disciplinary focus in planning, design, and social sciences  
Source: Authors, based on Stolk (2015).

resulting product of the development process, for example the shape of a building, the network of a transportation infrastructure, or the location and materialization of green spaces. Regional design is a process of experimenting: exploring and deciding, diverging and converging, analysis and synthesis. Regional design is about learning about the consequences and implications of these experiments, a continuous process of developing alternatives and their ex-ante evaluation. Planning, on the other hand, looks at the *process* towards implementing design solutions. Planners have various statutory and non-statutory instruments on hand to force, persuade, and motivate relevant actors. Planners bring along communicative skills and methods of decision making. Social scientists provide an analytical understanding of the current and the past, which informs the development process. The social sciences provide quantitative and qualitative methods for forecasting by analyzing today's *problems*.

*Understanding of space* – Cities and regions are spatial entities that can be defined in various ways (Figure 21.2). Urban and regional planning as an administrative activity follows a territorial logic. Political borders separate municipalities, counties, and states and allocate competences among various administrative bodies. Each unit of administration plans for the area where it holds planning competence. The *territorial logic of understanding space* is of great importance for regional development as political borders rarely match the functional delimitation of regions. 'Fluidity, openness and multiple time-space relations of relational complexity ideas' (Healey 2006, 534) mess up the territorial concerns of the administrative apparatus and the contained borders of the various disciplines. Thus, implementing plans and policy on the regional scale requires the involvement of multiple (public) actors with often conflicting interests. In regional development, adopting a *relational notion of space* means favoring relations between places, identities, functions, and so on over the focus on the static physicality of contained space (Healey 2006, Davoudi and Strange 2009). The relational notion of space does, therefore, not only differ from territories but often also from the morphological extent of cities and regions.

Regional design requires working at and across a variety of scales. While it will never be possible to design an entire region like a building or an individual plot, interventions which stimulate regional development reach from small-scale strategic key projects to large-scale infrastructures. The urban and regional morphology is defined by a series of interrelating scales. A building may be designed in a scale of 1:20, an urban quarter in 1:2000, and a local road network in 1:20000. Regional designers, therefore, need to work with the *inter-scalarity of space*.

*Understanding of future* – The most obvious future-oriented disciplinary branch of regional development are the design disciplines. Architects and urbanists design *possible futures* by giving

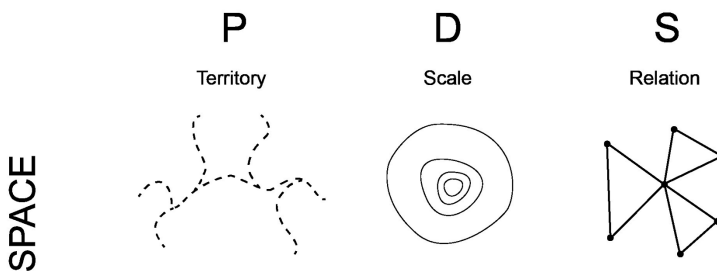


Figure 21.2 Understanding of space in planning, design, and social sciences  
Source: Authors.

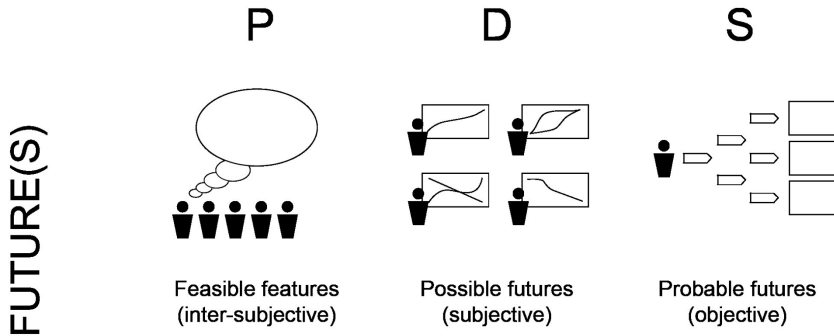


Figure 21.3 Understanding of future in planning, design, and social sciences  
Source: Authors.

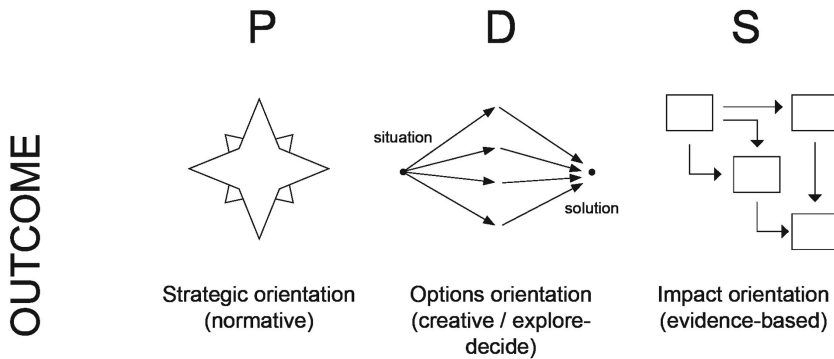


Figure 21.4 Orientation of outcome in planning, design, and social sciences  
Source: Authors.

cities and regions a physical shape and functional meaning. Design is a speculative activity, in which something is invented or a new idea is put forward (Ghavami 2014). Dreyfus and Dreyfus (1986) label the design process ‘unstructured’. Lawson (2005) sees it as a ‘prescriptive job’, creating (features of) the future. Designing is a complex, often personal, creative and open-ended activity. Design is to a large extent subjective. Assuming a design perspective on the future allows us to understand that there is no one single future.

The least future-oriented disciplines, on the other hand, are the social sciences. A key problem for social scientist is the indefiniteness of the future. While design is based on the possibility of multiple futures, research results of social sciences should be unambiguous and falsifiable. The multiplicity of possible futures makes it therefore impossible to predict a future. However, social scientists can forecast future developments based on current or past trends (Sardar 2010). Forecasts are based on objective measures: while a predicting is either right or wrong, forecasts provide a range of *probable futures*. Scenario techniques are the most common methods of future studies in social sciences.

Neither the possibility nor the probability alone make politicians decide upon regional plans or policy. Decisions are based on what actors want to achieve, and what people think is desirable, feasible, and legitimate to achieve. Urban and regional planning looks at the future from a

normative perspective. Since the communicative turn in planning, planners define a *feasible future* inter-subjectively: a negotiated future that is based on the values of the planner, the politicians who make the decisions, and various actors and local communities. Owing to the ‘wicked nature’ (Rittel and Webber 1973) of planning problems within the regional urban domain, both the goals and the process for achieving them are open for debate.

*Orientation of outcome* – Based on the different understandings of futures, each discipline works in a different manner in dealing with the future (Figure 21.4). Feasible–desirable futures provide a normative compass for regional development, for which strategic decisions need to be made; not only decisions regarding regional policies, but also regarding local plans. Unlike the military or corporate sector, adopting a *strategic orientation in regional planning* is not about increasing profit or winning the battle, but it is about selectivity of action and developing a coherent narrative along the time axis, enabling and engaging stakeholders.

Decision making in regional development is, however, not only based on norms and values but is also required to follow evidence-informed approaches (Davoudi 2006). Scientific forecasting can potentially provide such evidence. That means that the potential impact of development proposals must be considered early on in the process. Developing regions from a social science perspective is therefore strongly *impact-oriented*.

Designing is working within an endless number of possibilities to come up with, in the end, an internally consistent whole. To be able to do that, a designer needs an inspiring direction, a vision, an order, a guiding theme or a coherent set of intended qualities, aims or ambitions. The spatial vision is the way in which the regional designer sees the design situation at hand. We can describe a vision as a ‘train of thought’, developing in time. The selection of a proper, relevant or fitting vision, is influenced by judgments shared with others as well as more subjective judgments. In that sense, vision and strategy making is not a science, but is based on normative perceptions of a complex reality. It is based on experience, on design *options* and explorations (and their ex-ante evaluation) and on the choice of what is seen as (most) adequate and legitimate in a particular context.

*Mode of work* – Regional development is a cross-sectional activity dealing with spatially highly relevant domains, such as transportation, environmental and landscape planning, housing, and water management. Other policy sectors which at first sight may look less spatially relevant nevertheless claim space like health, economy, education or sports. So in theory, development practice plays the role of a coordinator, negotiating between all sorts of interests through a spatial lens. This particular cross-sectional role of development is reflected in each disciplinary branch in different modes of working (Figure 21.5).

Spatial knowledge is multidisciplinary by nature. Analyzing spatial conditions and claims requires therefore a *systemic perspective* taking into account various spatial domains. Systems

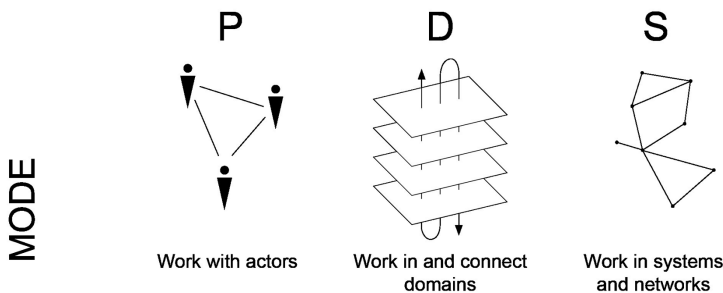


Figure 21.5 Mode of work in planning, design, and social sciences  
Source: Authors.



theory and more recently various forms of network analysis are the dominant modes of working across disciplinary boundaries. Systems thinking is of special importance on the regional scale as regional development processes are long term and based upon a series of interventions and projects. It allows us to assess the impact of individual proposals on various scales on the regional system.

The regional system consists of a large number of elements, both links and nodes, such as water and green networks, transportation infrastructure, urban centralities (leisure, shopping, culture), residential, industrial, business areas, to name but a few. These elements are part of different, sometimes even highly separate domains. Working exclusively within such a domain is the dominant mode of practice as there are specialized engineers and decision-making arrangements for each domain. Urban and regional design has however the task of *integrating domains* as part of a consistent design proposal. Designing is a method of going back and forth between analyzing a design situation and synthesizing towards an integrated solution (Lawson and Dorst 2009, Carmona et al. 2010). Design, therefore, bridges the boundaries between multiple specialized domains (Needham 2000, Brown 2008, Hocking 2010).

However, spatial knowledge is not only multidisciplinary, but also distributed unevenly across stakeholders. Different departments of public administration, for instance, focus on different issues of regional development. Firms have investment strategies with regional implications. Local communities associate meaning with places that are often hidden to outside experts. It is therefore crucial for regional planning to constantly coordinate across *actors*.

### *Assessing the Integrative Nature of Regional Planning and Design Studio Teaching*

Regional development can benefit from an integrated approach combining the analytical skills of social scientists, the coordinating skills of regional planners, and the creative and synthetic skills of (regional) designers.

Following a long period of de-coupling, architecture and planning probably need to embark on a process of ‘conscious re-coupling’ in many institutions.

*(Gallent 2015: 83)*

Consequently, a rethinking, perhaps revision, of the teaching of regional development in universities and planning schools is needed. Is it possible to combine architectural design pedagogy with established teaching approaches in planning? Architecture and planning are historically linked, but drifted apart in many European countries when after the Second World War dedicated planning programs were established. Linking planning with social issues and social sciences led to the introduction of topics in curricula such as policy studies, spatial economics, urban sociology, environmental psychology, environmental management, and urban and transport geography (Frank et al. 2014).

More recently this strong coupling between planning and a range of social sciences – human geography in particular – has led to a new type of criticism, which is of key relevance for the argument presented in this chapter.

Geography, as a social science, provides tools for analysing and understanding structural issues in society, but it falls short in providing answers. Architecture has a clearly focused creativity, but lacks a deeper understanding of the structural issues at hand (diversity, climate change, social justice etc.). Hence my plea for ‘independent’ planning schools which provide links to, among others, architecture, social sciences and geography.

*(Albrechts 2015: 23)*

Table 21.2 Assessment scheme – integration of planning, design, and social science perspectives in regional planning and design studios

<i>Case Name</i>	<i>Planning</i>	<i>Design</i>	<i>Social Science</i>
<b>Disciplinary focus</b>	Process	Product	Problem
<b>Understanding of space</b>	Territory	Scale	Relation
<b>Understanding of future</b>	Feasible	Possible	Probable
<b>Outcome orientation</b>	Strategic	Options	Impact
<b>Mode of work</b>	Actors	Domains	Systems
<b>OVERALL per discipline</b>	Representation of planning in the studio	Representation of design in the studio	Representation of the social sciences in the studio
<b>Variety of students – disciplinary background</b>	BSc Urban Planning	BSc Architecture, Urban Design, Landscape Architecture	BSc Geography, Sociology
<b>Variety of teachers – field of expertise</b>	Planning expertise	Design expertise	Social Science expertise
<b>Supporting education</b>	Description of supporting education on interdisciplinarity and the integration of planning, design, and the social sciences		
<b>OVERALL for integration</b>	Level of integration between planning, design, and the social sciences		

Source: Authors.

We conclude that the independence of planning degrees has resulted in either the domination of social sciences in countries such as the UK and Germany (Frank et al. 2014), or in (too) strict boundaries between the social sciences and architecture in many other places. Nevertheless, the argument holds today that social scientists, planners, and architects alone are ill-prepared for the challenges which urban regions are facing. However, re-coupling design approaches, social scientific approaches and planning approaches requires a careful consideration of methods in all three domains.

The understanding of the three disciplinary branches and their perspectives on spatial development brings us to the core of the argument: the analytical assessment framework for regional planning and design education. Table 21.2 shows the five assessment categories discussed above. We chose five assessment levels for each category, giving the assessors room for expressing the presence and importance of a category in the specific course or studio: *Weak*, *Weak/intermediate*, *Intermediate*, *Intermediate/strong*, *Strong*. Additionally, the analytical framework gives room to describe the disciplinary backgrounds of students (i.e. an assessment in percentage of the backgrounds of the student cohort), the expertise of the involved teachers, the supporting courses (if applicable), and an overall assessment of the integration of planning, design and social sciences.

## Evaluation of Regional Development Studios at TU Delft and TU Munich

The analytical framework for assessing regional planning and design education is used to evaluate two regional development studios taught at TU Delft and TU Munich. The following section analyzes both studio courses separately. We provide general information about the institutional

setting, the learning objectives and content of the course, the pedagogical approach, and the examination procedures. We will then assess both courses in a comparative manner by using the analytical framework.

### *TU Delft – Spatial Strategies for the Global Metropolis*

*Studio description* – In the core curriculum of the two-year MSc Urbanism program,<sup>5</sup> all students work on a 10-week, 10 credits regional research and design project, *Spatial Strategies for the Global Metropolis*, in their first year. In this course students (in teams of 4–5) analyze an urban region somewhere in the Netherlands and design a regional vision and strategy (with a scope of about 25 years).<sup>6</sup> Students are given an umbrella theme for their research and design focus.<sup>7</sup>

The regional design process starts with an analysis of the regional spatial structures, networks, and planning policies in the region in week 1. Analysis is carried out by individual team members who contribute to a larger and shared knowledge base. In week 2 initial design ideas and concepts are developed on the ground of this knowledge base and by groups of students. In the weeks thereafter, ideas and concepts are further developed into a vision, based on (further) analysis and diagnosis. After the mid-term presentation at the end of week 5, the teams focus on the making of a development strategy, which includes a timeline, a stakeholder approach, spatial policies, and a set of key interventions and strategic projects.

From the beginning on, students are asked to analyze the design situation and develop proposals simultaneously. This is based on the assumption that when they start designing as soon as possible, the right questions for analysis and research emerge, and that the analytical work helps students one-to-one to underpin their design decisions.

Studio meetings are scheduled twice a week (4 hrs per session; 15–20 students per two mentors; about 60–80 students in total). Mentor teams consist of a design-oriented mentor as well as a planning-oriented mentor. Additional thematic seminars, *Spatial Development Strategies* (SDS), are an integral part of the studio approach. Knowledge about theories and methods of regional analysis and design are provided via lectures and are applied during short 1–2 hour workshops.

A 10-week 5EC course *Methodology for Urbanism* runs parallel to the regional research and design studio. This course enables students to do academic research that supports the work in the studio, and teaches students how to organize and write an academic report. In this course students concentrate on connecting traditional forms of academic research to less traditional forms of research, like ‘study/research by design’. This connection between traditional and non-traditional (design-based) forms of research is one of the characteristics of education and research in the Department of Urbanism of the TU Delft. The Methodology for Urbanism course helps students to:

- *explain* what a conceptual framework is;
- *build* a conceptual framework that will sustain the studio research and design work;
- *identify* a community of authors and practitioners who write about the core ideas of the conceptual framework;
- *write* an academic report, in which students describe the main questions and the methods attached;
- *explain* the values connected to and the ethical issues involved in the activity of planning;
- *design* for people and explain what *public goods* are created with the regional design and strategy.

Table 21.3 Integration of planning, design, and social science perspectives at TUD

<i>TU Delft</i>	<i>Planning</i>	<i>Design</i>	<i>Social Science</i>
<b>Focus of work</b>	intermediate/strong	strong	weak/intermediate
<b>Understanding of space</b>	strong	strong	intermediate
<b>Understanding of future</b>	intermediate	strong	weak
<b>Orientation of work</b>	strong	intermediate	weak/intermediate
<b>Mode of work</b>	intermediate	strong	intermediate/strong
<b>OVERALL per discipline</b>	<b>intermediate/strong</b>	<b>strong</b>	<b>weak/intermediate</b>
<b>Variety of students – disciplinary background</b>	10–25%	>75%	<10%
<b>Variety of teachers – field of expertise</b>	strong	strong	weak/intermediate
<b>Supporting education</b>			
strong			
SDS seminars, Methodology course, Individual team performance			
<b>OVERALL for integration</b>	<b>intermediate/strong</b>		

Source: Authors.

An important sub-goal of the R&D studio is to have students learn to design in teams effectively. Students are introduced via a 30-mins lecture in week 1 on some background literature on team work, team processes, intercultural communication and individual team performance. Students are asked to do an individual team performance self-assessment in week 1. After the mid-term presentation in week 5 students do an online self- and peer assessment.<sup>8</sup> The assessments and the group performance in general are discussed in the studio (per team). At the end of the quarter, students again are asked to do a peer assessment. They send their assessments to the mentor team. The results – when they show consistency among the team – might influence the grading in both bonus and malus for individuals.

*Evaluation* – One of the claims of TUD is that urban planners and designers sometimes have an irrational belief in the effectiveness of their own ideas, often without decent evidence. This often leads to false claims about the effectiveness of plans and designs. By enabling students to reflect on the relationships between research, design, and planning, we experience that students become more rigorous and responsible in practice. We also expect students to be able to reflect better on their role and position in society, and on the ethical dimensions of the urbanism profession. We want students to address problems of urbanism by adopting an evidence-based, creative-innovative, and solution-oriented approach.

Table 21.3 presents the assessment of the level of integration for the TUD research and design studio. TUD regional design studio has a strong future and solution-oriented focus. The pedagogy allocates a lot of time to vision and strategy making, and the development of the research questions which come with those design and planning choices. It should not come as a surprise that the social sciences are less visible in the program. The supporting methodology course, the SDS seminars, and the combination of a planning and a design teacher add to the overall level of integration.

### *TU Munich – Urban and Landscape Transformation*

*Studio description* – Two main ideas underlie the first-term, 15-week, 12-credit studio project of the 2-year MSc Urbanism–Landscape and City program at TUM.<sup>9</sup> First, as planners acknowledge

the ‘wicked’ nature of regional spatial planning problems (Rittel and Webber 1973) they are beginning to question the usefulness, appropriateness, and impact power of their current repertoire of spatial planning instruments and tools. Second, the practice of planning the changes and transformations of spatial environments draws on the endeavors of the social sciences, while the practice itself is not a pure scientific exercise. Rather, spatial planning is a political process that continues to be embedded in existing normative ideals while being informed by spatial expertise.

The main learning objective of the TUM studio project is to train students to master appropriate skills that are necessary for addressing planning as well as urban and regional design problems. This includes enabling the students to adopt a critical stance towards the very same practice they are expected to master. Students enrolled in this course come from various disciplinary backgrounds. Therefore, the development of the students’ capacity also depends on what ‘baggage’ of skills these students possess when they enroll in the course. The challenge in this course is to enable: 1) multidisciplinary exchange of skills; and 2) the development of interdisciplinary design proposals. Students who are trained in disciplines with a design focus (e.g. architects, landscape architects) engage with students who come from disciplines with strong analytical focus (e.g. geographers, sociologists, civil engineers). As a result, both the analytical and design capacities of students are developed and subsequently strengthened.

The studio project is structured around three consecutive assignments in which students work in groups: group work is a vital aspect for the success of this project. The first assignment of the project is dedicated to analyzing the focus area. It encompasses: a) physical spatial analysis which all groups carry out; and b) domain-specific analyses which cover several interrelated themes and for which each student group is assigned one theme according to its ‘expertise’. At the end of this first part of the course, students are able to organize and innovatively visualize their comprehension of domain-specific strengths/weaknesses, categorize these at different scales, and understand the linkages of different scales of analysis.

In a second assignment, new student groups are formed, in such a way that each group is a mix of ‘experts’ from the preceding assignment. These newly formed groups work together until the end of the semester. The second assignment brings the time dimension to the fore. Regional urban development is a dynamic process that projects into an unknown future. The objective of this assignment is to derive evidence-based, possible, and desirable alternative futures for the focus area under investigation. Each group proposes one alternative future set at a temporal distance of about 30 years. By alternative future, we mean a narrative of future functionalities alongside schematic visualizations of the spatial dimension of this identified future.

The third and final assignment is focused on working out the selected alternative future concept spatially. By now the student groups, which remain the same as for the second assignment, have identified the key issues that the focus area faces, and have developed a conceptual proposal of an alternative future that addresses these challenges in a desirable manner. The objective of this assignment is to move from a concept to a spatial development strategy. How can we make this future happen? The challenge in this assignment is to move from ideas conceived in numerical and narrative forms to images, and then from images to plans. This entails thinking of the urban region in terms of connections, networks, relationships, and mobility, rather than only static land uses.

*Evaluation* – TUM’s regional development studio has a strong analytical focus based on the principle of ‘problem-finding before problem-solving’ (Table 21.4). The pedagogy allocates at least 50 percent of the semester’s time for analysis during which students should not think about potential design solutions. This approach is deemed necessary because the design brief (including the problems) on the regional scale is largely unknown. Architectural design education can combine analysis and synthesis as parallel processes because the purpose of the analysis is to test if a

Table 21.4 Integration of planning, design, and social science perspectives at TUM

<i>TU Munich</i>	<i>Planning</i>	<i>Design</i>	<i>Social Science</i>
<b>Disciplinary focus</b>	strong	intermediate	strong
<b>Understanding of space</b>	weak	strong	strong
<b>Understanding of future</b>	weak	strong	strong
<b>Outcome orientation</b>	strong	strong	strong
<b>Mode of work</b>	intermediate	intermediate	intermediate
<b>OVERALL</b>	<b>intermediate</b>	<b>intermediate</b>	<b>strong</b>
<b>Variety of students – disciplinary background</b>	25%	60%	15%
<b>Variety of teachers – field of expertise</b>	strong	strong	strong
<b>Supporting education</b>			
Intermediate lectures, workshops, and excursions as parts of the studio module; other introductory modules in planning, design and social science			
<b>OVERALL for integration</b>	<b>intermediate/strong</b>		

Source: Authors.

design proposal fulfils the design brief. The purpose of the regional analysis here is to define the design brief itself.

The analysis is further split into two parts: The first assignment generates a domain-specific understanding of the region and the second assignment integrates them systemically. The analysis largely neglects administrative boundaries and rather focuses on functionally interrelated spaces. The analysis is spatially not comprehensive for this purpose, because it concentrates on places and areas of various scales where interventions have significant impact on future development. The aim of the analysis is to show what futures are achievable. TUM's pedagogy, therefore, largely draws from social scientific theory and methodology.

The second half of the semester is allocated to developing regional strategies, which are more focused on the development process itself than the actual outcome. The key graphic, that students submit as part of the last assignment, is a timeline that determines key interventions and expected impacts. The 'big plan' locating all interventions within the region is spatially highly selective, leaving major parts of the region blank as prioritizing is a key characteristic of strategic thinking.

Apart from the strategic and procedural focus, TUM's pedagogy departs from other planning conventions – especially the territorial and the normative notions. A strong normative bias is deemed to be unhelpful because it diverts the student's thinking from achievable futures to dreamlike visions. Administrative boundaries play only minor roles, because it leads the students to believe – as described in our introduction – that the mismatch of administrative territories and functional areas is the only obstacle for integrated regional development. By deliberately taking administrative boundaries off center stage, it makes cooperation with public authorities more difficult, though. Students would have to deal with multiple authorities with different expectations. Cooperation with stakeholders is therefore largely steered by the teachers. The 'problem-solving' methodology of TUM is therefore a combination of both planning and design approaches.

### *Pedagogical Measures to Integrate Design, Planning, and Social Sciences*

The individual assessments of both TUD/TUM regional design courses reveal that the studios are both integrative but in different ways. In the following part, we try to explain how the assessment results from the previous sections are linked to four main pedagogical dimensions: 1) the institutional setting of the studio; 2) the relation between research and design; 3) the learning objectives; and 4) the assessment strategy. Table 21.5 provides a summary of the pedagogy of both courses.

*Institutional setting* – Regional development education at both TUM and TU Delft is based upon design studios. These so-called problem-based learning environments are very common in disciplines employing design approaches, first and foremost in architectural education, but also in the form of study projects in planning education. At both universities, this is not surprising as both studios are integrated into a model of planning education, which is organizationally tied to the local architecture programs. We have to point out that TU Delft's urbanism education receives predominantly students with an architectural background,<sup>10</sup> while as mentioned earlier TUM's program is open for students from all spatially relevant disciplines, including architecture, planning, and social sciences.

*Research and design* – While integrating students from architecture and planning has never been a big challenge, students holding an undergraduate degree in social sciences struggle with

Table 21.5 Synopsis of the pedagogy of studio courses at TUD and TUM

	<i>TUD Studio</i>	<i>TUM Studio</i>
<b>Institutional setting</b>	Master's programme in Architecture, Urbanism and Building Sciences (Track: Urbanism) admitting primarily students holding a bachelor degree in architecture, and urban design & planning	Interdisciplinary Master's programme in Urbanism admitting students holding bachelor degrees in architecture, landscape architecture, planning, and geography
<b>Research - design</b>	Developing an evidence-based, long-term (25 years) spatial vision and development strategy for an urban region in the Netherlands	Developing an evidence-based long-term (30 years) spatial development strategy for a subarea of the Munich metropolitan region
<b>Learning objectives</b>	After course completion, students shall be able to develop in a team an integrated spatial vision and strategy, supported by a portfolio of policies and strategic interventions	After course completion, students shall be able to work collaboratively in groups of designers, planners, and social scientist on regional development issues
<b>Assessment strategy</b>	Written project report, a group presentation in front of teachers, guest critics, stakeholders from the region, and a written individual reflection on the project contents and group work	Three group presentations in front of teachers, guest critics, and local stakeholders

Source: Authors.

developing design solutions. Social science students lack visualization and (to some extent) creativity skills and methods. This can create tension between the students especially towards the end of the semester when producing graphics and maps becomes the main task. Social science students often feel that they cannot contribute to the work at that stage and architects and planners feel left alone with the work. Additionally, social science students struggle with making proposals that do not unambiguously derive from the analysis. Herein lies the biggest challenge and potential. While architects and planners might propose without hesitation solutions for problems they have not really understood yet, social scientists could help the group to stay focused on evidence-based proposals. The best design proposals (both at TUM and TUD) are usually from those groups that are able to support their vision, design theme, and design solutions with strong empirical analysis and research work. It is exactly the connection between research and design that builds strong, logical, and convincing solutions, arguments and narratives. In conclusion, an equipollent integration of design, planning, and social sciences aspects requires bringing together students of different disciplinary backgrounds, but also requires a great methodological effort (Buis, Post, and Visser 2016).

*Learning objectives* – The objectives of both courses are quite similar: small groups of students are asked to develop spatial strategies – in the case of TUD somewhat more design and solution-focused, and in the case of TUM somewhat more problem- and research-focused – that they present to experts and local stakeholders during and at the end of the semester. After course completion, students shall be able to understand the shortcomings of established planning approaches on the regional scale and be able to develop better integrated design strategies. These learning objectives should be universal to all students, but are in fact for interdisciplinary student groups: in the case of TUM's course, very different for individual students. While design students may be able to develop and visualize ideas, social science students may understand more easily the systemic implications of inventions. The achieved learning objectives are based on the previous knowledge and skills of the student. This becomes especially apparent when students have to work alone as part of the Master's thesis later on in their studies. Students have obtained very different abilities as part of an interdisciplinary course and the Master's theses often have a different nature.

*Assessment strategy* – Delft with its quite homogeneous group of students, has for all its students one rubric assessing the group vision (40 percent), the group strategy (30 percent), the group performance (10 percent), and the individual performance (20 percent). But when the learning objectives differ between students from various disciplinary backgrounds (as in the TUM studio), the assessment of those objectives should be adjusted accordingly – in other words individualized (towards disciplinary background). Assessment criteria should also be formulated in terms of interdisciplinary attitudes, knowledge, and behaviors. These are criteria which go beyond a certain discipline. But this is easier said than done. Little educational scientific knowledge is available on how to assess interdisciplinary education (Klaassen 2018). Most studio courses – also at TUM – overcome this issue by assessing the groups' performances and not those of individual students. While this is perhaps not fully in line with educational rigor, it is common practice especially in planning programs. However, this consequently results in relatively low failing and drop-out rates, a leveling off of examination results, and a constant critique of (very) good students in underperforming groups.

## **Conclusion: Implications for Planning Education**

Our urge to reflect on currently established educational practices emerges from the underlying bigger issue that knowledge and skills that will be required to tackle city-regional challenges in the future have become increasingly specialized in various domains. No specialized domain



alone will be capable of aligning various spatial interests to resolve regional development challenges sustainably. Regional design and planning practices will, thus, need to adopt a cross-domain way of working. Various European regional design examples demonstrate that design as a cross-domain way of working can overcome some of those issues of disciplinary fragmentation (Gilliard et al. 2020). We, therefore, suggest that it is necessary to train students in studios: a cross-domain learning environment, which is well established on other scales of planning and design education, most prominently in architecture, urban design, and landscape architecture.

Assessing in general terms the two studios discussed in this chapter, TUM prepares students from social sciences, (landscape) architecture, and urban planning to work with each other on issues of regional development. TUD, on the other hand, prepares urbanists, primarily with a bachelor background in architecture, to take into account aspects of planning and social sciences when designing regional strategies. TUM and TUD graduates will both have to work in practice with experts from other disciplines to achieve integrated approaches to solve the complex socio-spatial challenges of today and tomorrow. We argue that the success of solving those challenges is based on a paradigm shift in both education and practice from discipline-based communities to more cross-departmental, interdisciplinary cooperation.

The success of cross-domain activities remains dependent on the quality of domain-specific knowledge and skills. Many scholars therefore question the central role of an independent planning discipline for spatial development. They argue that ‘instead of trying to squeeze these different professional perspectives into one planning program, it has been seen as most important to develop interdisciplinary skills’ (Lapintie 2015, 33). The advantage of offering a variety of planning degrees is the possibility to deepen knowledge in a specific field. Research in the field of organizational studies indicates that highly specialized knowledge is (also) necessary to push the boundaries of existing spatial concepts and develop innovative new ideas (Cooke 2002, Young 2013).

Adopting (architectural) design methodology, however, is not to be misunderstood as a plea for abolishing planning education. Rather, we understand planning as a boundary discipline which bridges and brokers between various disciplines (Gilliard and Thierstein 2016). Expanding our understanding of regional planning from a mono-disciplinary towards an interdisciplinary conception is associated with the hope that planning develops better place- and time-specific interventions (Galland and Sørensen 2015, Zonneveld and Nadin 2015, Schmitt 2015, Scholl 2015). Both TU Delft and TU Munich show that it is not necessary to have consecutive Bachelor’s and Master’s degrees in order to understand and steer regional development. It would seem more important to prepare a variety of students from various disciplinary backgrounds to co-create regional futures (Rooij and Frank 2016).

This leaves us, however, with a number of open questions for higher education. How can we admit students from various disciplinary backgrounds or at least with different specializations into the same studio course? Do we – as people responsible for learning objectives and exit qualifications – accept that students from different disciplinary backgrounds will learn different things? How do we assess and grade that then? Does a regional design approach require explicit interdisciplinary educational training? And what other issues may arise from interdisciplinarity which in turn could actually ‘hinder’ successful disciplinary education? Or, can we improve disciplinary knowledge and skills via interdisciplinary education? And how do we assess that? Is an interdisciplinary approach enough or do we need to incorporate positions of practitioners as part of a transdisciplinary approach? While there has been a growing body of research leading to new pedagogical approaches, it seems to be necessary to start evaluating their feasibility, successes, and failures more structurally to better understand whether we need to make larger fundamental changes to planning education.

## Notes

1. In this chapter, interdisciplinarity refers to the integration of knowledge across multiple scientific communities; transdisciplinarity refers to the integration of knowledge across multiple scientific and non-scientific communities.
2. In this contribution, 'architecture' is broadly defined to include disciplines such as urban design, landscape architectural design, and building technological design.
3. In this contribution, spatial planning is used as an umbrella term for urban planning, regional planning, national spatial planning, rural planning, and town planning.
4. Both courses and the presented pedagogical concepts have been discussed during the 'Shaping Regional Futures' conference in October 2015 (Förster et al. 2016).
5. For more details about the TU Delft MSc Urbanism program see: [www.tudelft.nl/en/education/programs/masters/architecture-urbanism-and-building-sciences/msc-architecture-urbanism-and-building-sciences/master-tracks/urbanism/program/](http://www.tudelft.nl/en/education/programs/masters/architecture-urbanism-and-building-sciences/msc-architecture-urbanism-and-building-sciences/master-tracks/urbanism/program/) (accessed 15 June 2020).
6. The text in this section is based on the 2018/2019 quarter guide *Spatial Strategies for the Global Metropolis*, presenting the contents, didactics, and organization of the 10EC R&D studio and the 5EC methodology course.
7. In 2016/2017, 2017/2018, and 2018/2019 this theme was 'circular economy' as the studio was embedded in and supported by the TU Delft lead H2020 REPAIR research project 'REsource Management in Peri-urban Areas: Going Beyond Urban Metabolism' (see <http://h2020repair.eu/>, accessed 15 June 2020).
8. For the applied assessment tool see: [www.itpmetrics.com](http://www.itpmetrics.com), accessed 15 June 2020.
9. See [www.ar.tum.de/en/re/teaching/completed-student-projects/](http://www.ar.tum.de/en/re/teaching/completed-student-projects/) for more information of the projects at TUM (accessed 15 June 2020).
10. Students who do not have a design background in their undergraduate studies (like Civil Engineering, Geography, Planning), but want to enter the MSc Urbanism program at TUD, have to follow a bridging program of two or three semesters focusing on (among others) design skills.

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