Between regulation mechanisms and professional essentials: Exploring current challenges in architectural education

ABSTRACT
As new technologies and organizational arrangements establish in the market for building design, these developments represent important changes – for design practitioners as well as for the institutions responsible for the education of designers. We explore the tension between current mechanisms that aim to regulate the production of architects and architecture, and the fundamental tenets that characterize the profession. Providing data from a Danish school of architecture based on the Beaux-Arts tradition, we use actor-network theory as a lens to explore how these mechanisms produce requirements that challenge the traditional understanding of knowledge and methodology in architectural training. While architects are reliant on their ability to act according to market conditions, they are concurrently obliged to work according to the essential tenets of their discipline. The article offers

KEYWORDS
architectural education architect profession Beaux-Arts tradition architectural design practice knowledge in architecture actor-network theory
empirical illustrations and considerations of this dilemma facing the profession of architects and their practices, which is provisionally discussed in the light of a contemporary educational initiative.

INTRODUCTION

In recent years, we have seen a number of technologies and organizational arrangements establish in the market for building design. Increasingly professionalized and competitive, the architect profession is under pressure to navigate the many mechanisms, established as means to regulate the profession and its product. While creativity may serve as a legitimizing principle among the architects themselves, a shift towards complex business models, competence development programmes and political reforms to control the organization and production of architecture seems to gain dominance in the field (Pinnington and Morris 2002; Styhre 2009; Spencer 2014). Contemporary architectural offices often hold a threefold structure, concurrently operating as a service organization, a professional organization and a creative organization, each representing a different discourse (Winch and Schneider 1993; Cohen et al. 2005). These developments towards managerialism have substantial effect on the current practice – or business – of architects (Brown et al. 2010; Spencer 2014; Ahuja et al. 2017). While similar tendencies are approaching in the organization of architectural education institutions, not much attention has been given to how such mechanisms are affecting the content provided by the schools – the pedagogical principles, knowledge conceptions and methodological approaches, upon which the training has historically been based. We address this gap by exploring the tension between the regulation mechanisms that affect current developments in the production of architects and architecture, on the one hand, and the fundamental tenets that characterize the profession, on the other. In the accounts below, we present this tension as a dilemma – a quandary reflecting two positions – and illustrate the argument by drawing on empirical data from a Danish school of architecture based on the Beaux-Arts tradition.

In what ways can the conditions for producing architecture on the market for building design and that of producing architect candidates be seen as representing similar dynamics? Under the current market conditions, successful transaction requires an increased level of transparency about the goods that are subject to economic exchange. In this calculation, documentation of the (value of the) service is a prerequisite for the client to accept the contract. Not only does the fee need to be known up front, details of the design solution must also be explained. In the context of architectural competitions, design teams not only compete on the creative, sustainable and functional capacity of a design idea, they also vie to provide the best estimated fee for the detailing of the sketch design, its buildability within a given budget and on the team’s organizational arrangements and processual competency. Likewise, in the educational institutions, in which the framework for teaching and the profile of the candidates are increasingly being regulated and evaluated through standardized courses and fixed curricula, obligatory learning objectives and formal grading systems. These new conditions have adjusted the relationship between teacher and student and affected the conception of knowledge production and research at the schools. Today, research in architecture is being assessed and evaluated by the same means as in traditional academic institu-
tions: on the ability to publish in high-ranking journals and on the capacity to attract external funds and grants. Through such measurements the results can be documented – for future appropriation to be estimated by conventional standards.

In this article, we highlight these mechanisms as organizing principles, which partially contradicts a common idea in architecture: that constraints are not settled at the level of sketch design, but will gradually reveal as the design process and the construction proceed (Yaneva 2009a: 60, 2009b: 113–60; Schön 1983: 76–104). While creativity in architecture unfolds as ‘a reflective conversation with the situation’ (Schön 1983: 76), the new conditions indicate a process that is somewhat reversed. Put differently, this means that what has traditionally been considered the result of the creative effort done by architects and students of architecture has increasingly become part of the premise for architects and the educational institutions to be commissioned – by clients, politicians, public standards and current trends. We suggest that the situation reflects a significant dilemma – a quandary reflecting two positions – between the mechanisms representing clients or subsidizers, on the one hand, and the inner workings representing the professional essentials, on the other. While these two reflect a tradition for mutual dependence, the current conditions may challenge the necessary fit. More specifically, the argument we aim to develop is that the obligation to document design approaches, student profiles, teaching programmes and knowledge production – at a point in time and in a language and format that dissonates with important professional essentials – has made architects and the schools in which they are trained accountable for things they do not control and cannot know. While architects deal with design dilemmas as an intrinsic part of their practice, we find this particular quandary important to explore and discuss as it may have implications for the future practice and education of architects. This article contributes with important insights into educational contexts that aim to support new design practices by navigating the balance between tradition and the new conditions for design.

We consider schools that are based on the Parisian École des Beaux-Arts tradition as particularly relevant in relation to the focus of our article, as these institutions have historically trained architects as artists. Central to this pedagogical principle are the close relation between student and supervisor – the experienced architect – and the exchange between the students taking place at the atelier. The tradition emphasizes the sketch as the core tool and the identification of one main concept or figure as the organizing design principle, (Reinmuth 2011), supporting the student to develop as an artist (Cret 1941). While these characteristics have been reinterpreted at the school in question, to fit the current practice, they still appear as important guidelines – making it an obvious case for our aspirations.

The implicit bond between the professional field of practice and the educational institutions is an important part of the above-mentioned dilemma. In Denmark, the schools of architecture are part of the publicly funded educational system, representing one out of many connections to the world outside the schools – between the framework for professional training and its body of governance. Upon graduation the majority of the candidates are recruited to different public and private jobs, while some engage in start-up initiatives or other employment. The governmental legislations affecting the framing of the study programmes and the recruitment panels involved in internships programmes and the process of employment all represent actors that partake in defining the competencies of the candidates. Below we explore
activities taking place at the schools based on the current mechanisms of regulation. More specifically, we look at three issues of great importance for this educational institution: the notion of architectural methods, the conception of knowledge in architecture and the conditions for teaching and training.

Taking these three issues as point of departure, we aim to explore the above-mentioned dilemma between mechanisms that regulate the education and the fundamental principles upon which the profession is based. We apply actor-network theory (ANT) as a lens to discuss the effects these regulation devices may have on the production of architects and architecture. Referring to a distinct definition of the notion of ‘actor’, designated ‘by what it does – its performances’ and its co-constitutive relation – ‘the actor-network’ – to other (human or non-human) constituents (Latour 1999a: 16), this theory may help us comprehend the continuous developments of architectural education.

In what follows, we begin with a rough draft of the constituents of architecture as profession and a glance into the conditions for architectural education, particularly focusing on the schools based on the Beaux-Art tradition as they have developed in the Danish context. Next, we present our methodological approach, the research setting and process of data collection. Our findings reveal three brief empirical examples to illustrate current challenges in architectural research and education that reflect the overall dilemma. In addition to these examples, we close by presenting provisional ideas for ‘educational implications’ by describing a concrete, contemporary teaching initiative.

THE PRACTICE AND EDUCATION OF ARCHITECTS

Architectural practice is often characterized by the inbuilt contradistinction between a somewhat concealed design practice and a rather tangible result (Habraken 2005). Architects have historically taken on the role as warrantors of the design quality, ensuring the aesthetical, functional and social attributions of the product. Over the years, the sequential order of these attributions has gone through certain shifts, in relation to the profession’s responsibility and competency. In sociology, the discipline is consistently characterized as being marked by ‘interdisciplinary eclecticism’ (e.g. Blau 1988: 7; Cuff 1991). Similarly, the architect herself has been given many labels such as artist genius, applied scientist, businessman and entrepreneur – not to mention historian, psychologist or lawyer (MacKinnon 1965: 274). This unsettled understanding of professional identity and core competencies is an important reason that the discipline ‘has been less successful’ in establishing itself as an actual profession (Blau 1988: 6). The tension between the architects’ autonomy as professionals and their dependency on clients, subsidizers, other experts and/or the numerous standards and codes of conduct that regulate architectural production – what Larson calls ‘heteronomy’ (1993: 12) – may reflect this sense of uncertainty. As a tension, it mirrors the dilemma we address in this article.

Being one out of several contributors in projects that involve a growing level of complexity is not new to architects or in contexts of architectural design. As a discipline, architecture has always been characterized by change and collective action (Cuff 1991). However, as many technological and societal developments have established over the recent years, the architect’s position in the projects has been adjusted and substantially challenged (Duffy and Rabeneck 2013; Sage 2013). While Till (2009) has argued that this sense of
dependency on others in the design process represents the key characteristic of the contemporary architect, other scholars focus on architectural production not as an ‘end product, but [as] the social dynamics of the architectural design process: the knowledges and technologies of design (history, models, pen and paper, computer visualisations, regulations and principles) as well as the performances of persuasion (presentations’) (Jacobs and Merriman 2011: 215). This attention to architecture as a process, involving many materials and actors through its production as well as its use, has gained much attention in the literature and from many (theoretical and methodological) perspectives. From empirically based theoretical works that focus on architectural design as the result of a multitude of inputs (with works by Yaneva [2009a, 2009b] and Houdart [2008] as prominent examples) or the renewed sociological interest in the ‘so-called social turn in architecture and design’ (Richter et al. 2017: 269), towards more practice-oriented accounts of ‘co-design’ (Sanders and Stappers 2008: 5) – just to mention a few of the scholarly directions currently addressing the role and work of architects as designers. In practice, the focus on, and status of, such many new contributors in the production of architecture have catalysed new organizational arrangements, representing a potential challenge to architects, which may also have implications on educational programmes.

 Turning to the close bond between the practice and education of architects, this has been discussed by theorists from different fields (e.g. Schön 1983; Cuff 1991; Fischer 2000; Cuff and Wriedt 2010). While the medicine profession has gained strength by ‘integrating practice, education, and research through the institution of the teaching hospital’ (Fisher 2000: 116), there are other ways to form the link in architecture. Central examples are the collaboration between firm and school established through internship programmes and the tradition for employing a substantial number of teachers, concurrently working as practitioners (Cuff 1991). In addition, the connection has been upheld by acclaiming architecture as a field of applied science, in which practical rather than abstract knowledge was considered the core competence (Blau 1988). In contrast to other professional practices like engineering and medicine, architectural practice has not been considered as research-based (Albertsen 1994: 120). But while the notion of knowledge in architecture has historically been characterized by a close connection to the practical work (Schön 1983) – the embodied experience that makes the practice hard to explicate – the current tendencies indicate a shift in the judgement of knowledge in architecture. We will return to this point in the accounts below.

**Architectural education in Denmark**

The first architectural education programme in Denmark was founded in 1754 in Copenhagen, as part and parcel of the Academy of Fine Arts. As the institution’s full name, The Royal Danish Painting, Sculpture and Building Academy indicates, it was a place for artistic education (The Danish Evaluation Institute 2006: 11). Like many European and American art schools, it was inspired by the Parisian Écolé des Beaux-Arts. The training was based on studio teaching and individual project development and on the student’s close interaction with fellow students and the supervisor (e.g. Cret 1941; Cuff 1991; Reimnuth 2011). After being a constitutive part of the Academy, the school became an independent institution in 1968 as the Academy was split into a school of architecture and a school for the visual arts. In 1965, Aarhus School of Architecture was founded, based largely on the same fundamental principles.
Architectural education can generally be categorized as being based either on a polytechnic, a Bauhaus’, a craft-oriented or an artistic Beaux-Arts tradition (Neuckermans 2005: 8). While the majority of the architectural education institutes around the world are – broadly speaking – polytechnic institutes referring to a knowledge tradition from the technical and natural sciences (Ahnfeldt-Mollerup 2008: 17), the two Danish architectural education institutions highlight the notions of artistic knowledge, scientific knowledge and practical knowledge as the three corner stones of the training.

**Architectural practice and education as actor-networks**

We draw on the idea of the ‘actor-network’ (Latour 2005) and the theoretical approach of ANT as a concept that may allow for a better understanding of the scope of the components involved in architectural practice and training. By considering architects as one of many actors involved in the dynamic network of the practice, it becomes apparent that a multiplicity of actors, e.g., different political and commercial phenomena, relate to the architect and the design proposal in focus. In this perspective, the development of architecture – or the architect candidate – must be considered as a collective: the effect of a heterogeneous actor-network that is stabilized through its relations (Yaneva 2009a, 2009b; Law 1992). Yaneva (2009a) has described how the development of architectural proposals occur as a dialogue between architects, the chosen material and the available tools, as well as legislation, documentation material, previous models and projects. These are all actors in the network that are included in, affected by and affecting architectural work and the production of architects. In the empirical examples below, we particularly draw on the concepts of black box, mediator and script.

When complex phenomena are simplified, accepted and disseminated without having their content questioned, they appear as ‘black boxes’ (Latour 1987: 3, 1999b: 304). The drawing studio at the schools of architecture has, for example, been compared to a tribal house – a black box only accessible by the tribe (Banham 1990: 295). This concealment can be seen as a way to maintain control, as the construction of black boxes is equivalent to the consolidation of power (Latour 2005). As it is pointed out by Albertsen, professions are strongly occupied with protecting their professional monopoly. The concealed body of knowledge applied by professional architects may in this way be considered as ‘the most subtle refinement of power’ (Albertsen 1994: 119). The concepts of black box make it possible to observe the enrolment of such power.

The Latourian distinction between the terms mediation and intermediary (Latour 2005: 39, 1999b: 307) is important in understanding the interaction between actors of architecture. While the intermediator represents the idea of inputs that are considered as neutral and without ‘agency’ (Latour 2005), the mediators are seen as actors that leave an impact. Along this span, the ANT approach considers objects, documents and other materials as mediators that either prompt others to act in particular ways or that carry out particular actions delegated to them (Latour 2005). The foam cutter or the cardboard as modelling materials can, for example, be considered as mediators (Yaneva 2009a: 58), representing a co-designer in the practice. As architectural practices are based on applying tools and materials, the concept of the mediator may support our understanding of the dynamics at play.

Designers and architects tend to inscribe their expectations of the usage and applicability of the product into the actual object. According to Akrich
(1992), this may be called an ‘in-scription’ of the object, in this way giving it a certain ‘script’ (see also Gottschling 2017). While scripts distribute agency to objects and other architectures, other types of scripts are also involved in the production of architecture, e.g., procedures, legislations, contracts or other structuring devices. But there is never one, but many scripts attached to a design or a design situation (Law and Mol 1995). Scripts may guide, but not determine the action (Akrich and Latour 1992: 261).

**METHODS**

**Empirical setting**

Our empirical site is one of the two institutions that represent training and research within building architecture in Denmark, and that is based on the Beaux-Art tradition. It is a school strongly rooted in the Academy, emphasizing architectural work as a creative process resulting in arts products (The Danish Evaluation Institute 2006: 22). A number of institutional changes and tendencies established over the last two decades may, however, suggest a decrease in the school's embeddedness in the artistic tradition. In 2002, common EU standards were provisionally implemented, referring to the Bologna process for European higher education institutes organized as a 3+2+3 structure on the BA, MA and Ph.D. levels. Increasingly structuring the training through courses and the achievement of ECTS points, the experiments with grading initiated in the 1990s were enforced in the wake of the affiliation with the EU programme (Melgaard 2005: 30–42). In 2011, the two Danish schools of architecture were administratively relocated from the Ministry of Culture to the Ministry of Higher Education and Science, and in 2013, the school underwent substantial organizational restructuring.

The priority of a close link between architectural education institutes and the labour market has recently led to significant changes at the schools. In 2016, it was decided to decrease the study admission due to an increase in graduate unemployment. As a response, the school produced a new action plan to adjust the study programmes so as to get students better prepared for employment – to ‘match’ the needs of the labour market. The plan highlighted three ‘megatrends’: the breaking down of professional boundaries between architects and designers, the significance of technological development and the importance of globalization, providing recommendations for how to accommodate the conditions. These organizational arrangements may reflect the overall dilemma we address in this article – the mechanisms meant to regulate the organization of and the results produced by the school, as opposed to the school’s, presumably less streamlined tradition for producing creative products and candidates. From being creative in nature based on a professional body of knowledge, this process may tendentiously be developing towards the accomplishment of standardized procedures and explicitly promised results.

We consider a school of architecture as a key site for observing how the architect profession struggles with the current conditions – mechanisms that in several ways challenge some of the entrenched aspects of the architect’s creative identity. The school under study has undergone radical transformation within recent years. Researchers are expected to expand the artistic and/or practice-based body of knowledge with more generalized forms of knowledge, while teachers must develop new curriculums in order to secure rapid employment and prepare the candidates to perform under the new
circumstances. In this way, the school is struck by the dilemma we address in this article. As a research setting, it provides a helpful context for studying how a Beaux-Art-based architectural education deals with contemporary requirements, and how current initiatives and negotiations may represent productive ways to handle the situation.

**Data collection**

Based on our interest in the architect profession and the practice and training of architects, we have approached the site in a number of ways that are all based on qualitative research methods. We conducted nine semi-structured interviews with faculty members in 2013, querying about the constituents of architectural practice and education, and their experience as teachers and researchers at a time of significant changes. In the same period, we engaged in a number of informal conversations and observed several teaching situations. While the second author has a long relationship with the school, first as student, then as teacher and researcher, the first author has followed the school’s developments from 2013, engaging in part-time teaching and curriculum development from 2015. We have both been involved in the planning and execution of particular courses at the school, one of which we will present below in the last section as part of our data material. We consider this course, entitled ‘Forms of Practice’ (‘Praksisformer’), as an example of how the highlighted dilemma can be explored.

We consider our approach in the study to be ethnographic – as a ‘written representation of culture’ (Van Maanen 1988: 1; Latour 1999a, 2005) – involving active engagement in (formal and informal) meetings and supervision, the production of field notes and semi-structured interviews. In addition, we had access to a great number of documents – describing the school’s efforts to adapt to the changing conditions, referring from debates in the media and architectural periodicals and also documents that reflect the development of specific teaching initiatives. Finally, we consulted the literature to understand more about architectural practice and profession. Below, we provide three examples illustrative of some of the present challenges in architectural training and practice. While the provided quotes are based on interviews, we draw on a larger pool of data in the analytical comments.

**FINDINGS: THREE ASPECTS OF ARCHITECTURAL PRODUCTION**

The following accounts are examples of the overall dilemma we attempt to explore. It is based on the reflections of the informants who are teachers and researchers at the school that make up our case organization, and on recent discussions and available documents about the conditions at hand in this institutional context. We report from the informants’ reflections on the present conditions at the school, in relation to three aspects of being an architect and of architectural production: the methodological approach; the perception and assessment of knowledge production; and the pedagogical principles of the teaching.

**Example 1: Architectural methods**

If architects end up solidifying by an undisputed notion of the architectural method, I think we’ll be left more vulnerable. Today, there
are many in the building industry stealing market shares from us and several other schools providing architectural educations. The reason is presumably that there are obvious available market shares out there. [...] We have seen a general increase in the awareness of [the architectural] method, which I guess initiates an overall question about the way we do things. This gives us the chance to reflect on the implications it may have if we accept the idea of one architectural method. [The result] is perhaps not ‘the medium is the message’, but rather ‘the method is the message’ which at worst implies that our work become reproductions. Instead, [a few of the schools] are currently developing a dynamic sense of the consistency between techniques and design proposals. It is in these contingent relations some new ‘architectural ecosystems’ can develop. So instead of the notion of a fixed method, method is rather seen as something that develop as part of the course. Not in such a way that you learn ‘how to’ in order to apply it in one exact way, but rather that methodology becomes part of the particular design situation.

(Interview with architect #1)

These reflections on the role and character of architectural methods are presumably motivated by the current requirement to explicate the processes by which architecture is produced. Such requests for documentation are relatively new in architectural design. Architects have historically been considered as professionals whose skills were acknowledged based on the acceptance of their training (Habraken 2005). Experience from the track record of projects was seen as sufficient proof of methodological rigour, without the need for further definition and documentation of the design. The closer integration into the rational context of the market for building design puts pressure on architects to document their methods more directly. The clients need to rationalize their investments in the projects, of which the architectural deliverance is considered a risk. Moreover, public involvement and user participation are establishing as a service and a competitive parameter in the projects – conditions that make it paramount for architects to be able to designate and communicate their work. The ‘increase in the awareness of method’ pointed out by architect #1 requires for architects to open their historically black-boxed ways of working (Latour 1987, 2005), making their domain more exposed to external interference. Allowing for a more comprehensive actor-network to be involved in the production of design proposals this development represents a reorganization of the power structure in the projects (Duffy and Rabeneck 2013).

As it seems, architect #1 predicts that a standardization of the method may negatively affect the quality of the architecture. Reacting to the propensity to reduce the architectural method to a rational, transparent process, which may result in the production of a replica instead of the unique – this architect cautions against the mechanisms that seem to guide current tendencies within architectural production. In architecture, different design situations represent different actor-networks, components and devices, of which some affect the design proposal as ‘mediators’ (Latour 2005: 39, 1999b: 307; Yaneva 2009a) – potentially leading it in multiple and sometimes unpredictable directions that are difficult to document and explain. This may be what architect #1 characterizes as an ‘ecosystem’. Methodological approaches and design proposals form a reciprocal connection, indirectly protecting the creative domain of the architect by applying the professional body of knowledge. Rejecting the notion of a
recognizable method of architecture, architect #1 suggests instead for such approaches to be considered as design processes in their own right, where both frameworks and techniques are seen as network effects related to the specific design situation (Law 1992).

We might, however, say that such caution for a strict definition of an architectural method is somewhat in contrast to the actual organization of building design projects. In the building industry, there are a number of industrial standards contributing to regulating the stages and contents of the projects. These standards serve as ways to secure project performance within various technical norms, as points of departures in forming and employing the contracts and as ways to distinguish division of labour. They serve as scripts (Akrich 1992), indicating direction for the involved parties in the projects attempting to mediate and impact the outcome. While these scripts, which are control mechanisms predetermined by key parties of the industry, have become part and parcel of professional architectural practice, architect #1 emphasizes the importance of the architects’ own inscriptions and translations of the available scripts. We might see a duality in the methodological framing of an architectural design project, in which the method is concurrently scripted and black-boxed. This is perhaps the duality that architects need to be able to handle.

Architect #1’s argument is not against the method as such, but against the notion of a method that obliges architects in a certain way. Instead, he suggests methodological considerations as opportunities to reflect upon the practice, i.e., seeing architectural methods as networks or ‘ecosystems’ that do not oblige, but enable architectural production. Rationalizing architectural work to be based on a definable method may come at the cost of disrupting the specificity of the architecture – the uniqueness referring to the specific situation or proposal.

**Example 2: Architectural knowledge**

[Today], you’re supposed to write research articles under similar conditions as in other academic institutions. But this school has been based on a different tradition, without peer-reviewed articles in scientific journals. […] Instead, we have written books, made projects, built houses and things like that. I think it’s hard to see how you can go from this tradition towards documenting almost everything [in research evaluations]. In an evaluation here at the school, the only things they counted were the academic articles. Obviously, the results weren’t very impressive. Architects have perhaps developed an objection against the current request for putting everything they do into words. Contrary, if your medium is the written word [as in a university], well, then this is what you do. But for architects, who [sketch] and build, to also be requested to write – I think it is seen by many as a violation – particularly to the older generations.

(Interview with architect #2)

[Architects] work with things that are not easily conceptualized, and they are quite obstinate in relation to be made scientific. And after all, there are many who protest against research; who still don’t understand that it’s possible to research within this field. […] [C]reativity is a core
concept in what we do, and it is extremely important – in relation to research – that we insist that this is our most distinctive feature. There are always particular conditions, particular assessments, etc. But you cannot approach every issue in the same way as at the university. Nor can your assess value by the same means. We have also gotten a grading system, which is in many ways equally problematic.

(Interview with architect #3)

The statements may reflect a knowledge struggle, illustrating this Beaux-Art-based institution in a state of transition. What is to be known about architecture and architectural work, and how should such knowledge be documented to be recognized? To meet the current conditions, architectural knowledge must ‘be made scientific’ as it is pointed out by architect #3. The work needs to be published as texts in scientific journals to be accountable, and the quality of the candidates made assessable by grades. While the embodied knowledge that architects and students of architecture establish through the concrete experience with design development in the projects seems to be replaced by a notion of abstracted, theoretical knowledge and a request for comparability and a measurable output.

Explaining that the ‘written word’ is not the ‘medium’ of architects, architect #2 refers to the embodied knowledge by highlighting the importance of the many mediators involved in architectural production: cardboard, foam, pencils, paper and so on (Yaneva 2009a). It is in the interaction between multiple components that architectural ideas are created, shapes are formed and design projects developed. In line with the architectural tradition for an embodied practice (Schön 1983), architect #3 black boxes this interaction by promoting the broad concept of ‘creativity’. If causal reasoning and the predictability of effects becomes that which constitute the accepted conception of knowledge, then creativity, which is ‘a core concept in what we do’ according to architect #3, becomes the opposite of what is being valued. Falling outside of the accepted understanding of scientific knowledge, the traditional idea of knowledge in architecture is in danger of being excluded as inadequate. This tension was pointed out by an external expert panel in a report about the school: ‘To some extent the school seems to struggle with a culture that defines knowledge as being in opposition – and in some way a threat – to art and creativity’ (The Danish Evaluation Institute 2006: 32). While architects implicitly have knowledge through their practice-oriented, embodied approach, non-architects demand theoretical knowledge that can be documented and shared outside of the architectural workshop. The relocation of the school from the Ministry of Culture to the Ministry of Higher Education and Science may be a representative for such an adjusted understanding of knowledge – considered as a mediator productive of supporting new ways of working with research and teaching.

The omnipresent call for scientific knowledge – sometimes characterizes as evidence-based knowledge (Frandsen et al. 2009) – has become part of the daily practice in architecture, e.g., in a number of major construction projects. When we invest in mega projects like new hospitals or university buildings, knowledge is called for as a precondition for (architectural) decision-making. The scope of the technical, financial and social complexity of these projects reflects the request for answering the *why* – an explanation of the design solution. But while some actors are concerned with asking why, a more pressing question for the architects is *how*; how to navigate the conditions, while
concurrently maintaining the distinctiveness of the (creative and artistic) knowledge. As pointed out in the statements by architects #2 and #3, architects distinguish between the creative knowledge, as opposed to research-based and scientific knowledge. We might, however, consider another available model, one that contains a research agenda that holds creative knowledge production as its analytical object. Within this research agenda, the aim is not to replace the creative knowledge or to turn it into a blueprint, but to describe and analyse these embodied processes in order to better understand them. Such a model may allow for the threefold concept of knowledge that integrates art, practice and science, which is today broadly applied in both the Danish architectural education institutions that are based on a Beaux-Art tradition. It separates the fields of knowledge while at the same time indicates their interdependency, as necessary constituents in architectural training. On the other hand, this divided concept of knowledge may produce an increased distance between the three fields, potentially reflected in the above statements. Both architects #2 and #3 seem to refer to two, rather than three, fields of knowledge. They make the distinction between the creative, architectural knowledge (artistic and practical/embodied) and the scientific (research-based) knowledge. This somewhat unsettled understanding of the status of knowledge in architecture makes up a complex debate in the schools, not easy to navigate for researchers, teachers, practitioners or students.

Example 3: Architectural training

Today, we have to follow common guidelines for how to describe our research and teaching, as well as our work in general. Just look at the ‘learning objectives’. It has been very difficult as a teacher to fulfil something as banal as learning objectives, because the way we work with projects is through presenting very open problem areas, aiming to work our way through the issues in collaboration with the students. We consider the students as a type of research assistant, where you don’t want to define exactly where you’re going. Instead of answering questions, we would rather ask even better questions, and teach the students how to do so. So to me, learning objectives are really a way of violating the kind of thinking this school is based on – to be able to work in a context that is very open and confusing.

(Interview with architect #4)

Working with design proposals has [historically] been a matter of testing and trying to see how it develops. This means that you are given an assignment and then you try to solve it as best as you can. Then there is the critique where we discuss whether it could have been solved differently and what the quality of the different aspects might be […] I suppose this is how it has happened throughout the ages – it has always been about working on and solving the project. We have also incorporated some kind of knowledge into it, but it hasn’t been much formalised.

(Interview with architect #5)

The statements describe how the changes in the school’s institutional settings represent significant challenges – this time in terms of fundamental principles that affect the teaching. Architect #4’s reaction may perhaps be considered
another response to the tendencies towards rationalizing architectural practice and education. The notion of ‘learning objectives’ represents a structural framework to organize and mediate the process of becoming an architect, by which students are guided to reach clearly defined goals.

What a student of architecture needs to learn, and through which sources, has become increasingly predetermined and scripted (Akrich 1992), implicitly defining how students become ready for the labour market. The politics of learning objectives represent the ability to perform action (Latour 2005) – an action that involves a number of additional actors, outside as well as inside of the school. Mobilizing learning objectives as actors in the training of architects makes it possible to discuss and further develop the content and aspirations of the study programmes among larger networks, making the school and its activities subject to much wider debates. The learning objectives function as a contract between students and teachers, teachers and management, and management and government. They may be seen as regulation devices that initiate particular results, but they may also be considered an opportunity for further discussion.

The definition of learning objectives means that the competencies and tools taught in an architectural education are no longer black-boxed, but somehow exposed to and discussible among a broader audience. In architecture – as in most other educational contexts – such competencies and tools have historically been something that was acknowledged underway among the students. This notion of predefined skills and competencies seems contrary to the description of the learning situation as ‘open and confusing’ (architect #4) and as ‘a matter of testing and trying’ (architect #5). Along the same lines the grading system – brought up as ‘equally problematic’ (as the assessment criteria defining the knowledge production) by architect #3 – can be considered as a script, prompting teachers to assess students by quantifiable means. The grading system may be considered an additional actor-network, involving transparent criteria for grading that may justify the assessment. In this way, professional evaluation is revealed from its historical position in the black box. When teachers follow – or rather interpret – the grading system, it involves a quantification and verbalization of the architect and architectural competencies. While a script always represents a multiplicity of scripts (Law and Mol 1995), they are still mediators that break with traditional courses of action.

Learning objectives and grading systems represent an approach to teaching and learning that differ substantially from the pedagogical methods initiated by architects #4 and #5. In such training situations, allowing for a greater scope of outcome, students and teachers continually consider the relevance of the activities (architect #4) and the quality of the outcome (architect #5). Referring to the collaboration between teachers and students as that between researcher and ‘research assistants’, architect #4 emphasizes that the learning outcomes are undefined and open-ended for both. With the tendencies towards transparency, the inbuilt preference for risk that has historically characterized the practice and education of architects is potentially reduced, due to the predictability and strategic prospects disclosed in these regulation devices. They are predictable, as they reflect a planned process, designed up front and legitimized by an expected set of learning effects when executed effectively. On considering learning objectives in this way, what needs to be learnt can be specified in advance. They are strategic in the sense that if the right things are learned (according to the learning objectives) and the students graduate and are employed at the right speed, the school will be rewarded by future appropriations.
Architectural work is known to be more about the design problem than about the design solution (Schön 1983). To see the learning opportunity in working on a design problem, in which the ability to explore its framing and network of actors is at centre stage, is the gift of professional creativity. Such a competence may be best stimulated when there is no solution to the stated problem. It seems important to avoid that the rationalized approaches to teaching imply ways of working with training that violate the students’ practical experience and creative capacity, potentially misdirecting them in their preparation for practicing as architects.

**CONCLUDING REMARKS AND A NOTE ON EDUCATIONAL IMPLICATIONS**

Above we have explored how current mechanisms that aim to regulate contemporary architectural education form a challenge to the creative competency that students of architecture are expected to represent. The argument proposes an implicit distinction between the rational purposes of these mechanisms, on the one hand, and the interior workings of the profession, on the other. In each empirical example we applied ANT as an analytical lens to explore how new mechanisms and traditional workings interact to form new translations (Law 1992). We suggest the dilemma to be further negotiated – in architectural education as well as in the practice. Below, we touch briefly on the examples.

Regarding the question of the method, the dilemma refers to the recurrent character of architectural method – representing the implicit continuity in the process of design proposals – as opposed to the standardized and scripted procedures, increasingly established in the market for building design. We propose architectural method to be considered a mediator, where the challenge for contemporary architects is to navigate the great continuum between the notion of standard and the unique sense of handling attached to a particular project. To develop awareness of this continuum is a key competence for architectural students.

In terms of the concept of knowledge, our informants describe a fundamental difference between creative/artistic knowledge and research-based/scientific knowledge within the field of architecture. We consider this supposed resistance against theorising architectural creativity as a concern for predetermining the creative output through documentation and articulation. Looking at current presentations of the school’s conception of knowledge on the institution’s website, however, consisting of ‘scientific research’, ‘artistic development’ and ‘professional practice’ as overlapping fields, we suggest that this trichotomy represents an important orientation towards larger actor-networks (e.g., the art world, adjacent research domains, as well as the labour market) that might be fruitful for architects – students and practitioners – in the future.

In relation to architectural education, the dilemma refers to the predefined training reflected in learning objectives versus the more open-study process where an element of risk is involved. This connects to the introduction of grading in architectural education, involving a quantitative evaluation that is contrary to the tradition of oral qualitative criticism. Grades and learning objectives have brought the notion of fixed scripts into teaching, potentially referring to the notion of pre-set architectural competences. Both aspects require unpacking of the architect’s (black-boxed) quality criteria, to once again make the ability to balance the call for such transparency with basic characteristics of the profession.
Educational implications

Based on the challenges provisionally brought up in our empirical examples, it seems relevant to ask how students of architecture will be able handle these tensions in the coming years: How do they get a firm understanding of the different fields of knowledge and the overlap between them, and of the multiple methods applied and embodied experiences applied in the training activities? A specific attempt to address these issues is the cross-disciplinary course Forms of Practice (‘Praksisformer’), which has been offered to third-year BA students at the school under study since 2014. We have been involved in the course development, as well as in teaching and supervising the students. Running over five weeks, the course aims at enabling students to conduct empirical case studies of professional architectural practices. While students have been trained in analysing architectural works based on their design qualities in other parts of the education, this course invites them to analyse where the works or projects come from. They are asked to consider questions such as, which processes preceded the work of the involved architects? What conditions were the process based on? Who were involved and what role or roles did the architects play?

The groups of students are each given a unique case and access to an empirical field, in which agreements with informants involved in the case project/situation have been set up in advance. The breadth of the chosen cases ensures that students gain insight into the diversity of architectural work, thus gaining a differentiated insight into the practice. Students are taught to conduct a qualitative case study, in which they are in charge of identifying a problem statement, collecting data through interviews and archive material, and analyse their data material based on a chosen practice theory. The issues of concern involved in the cases have thus not been prearranged by the teacher, but identified and chosen by the students, based on the engagement with data. This type of ‘field research cases’ (Kjellén 2007: 119) – as opposed to predesigned cases – involve what Healy (2005: 7) characterizes as ‘inquiry-based learning’, implying that students explore problems in practice by the use of scientific methods. Case-based teaching is highlighted in the literature as a productive way to develop the students’ analytical skills. By engaging them directly in projects, it contributes to prepare them for the design complexities they will be facing as professional architects (Muckadell and Hvithamar 2013: 42).

The course provides an opportunity for students to conduct a form of ‘scientific’ investigation into professional architectural processes, in which both ‘professional practice’ and ‘artistic development’ is present as equal fields of knowledge. In this way, all three fields are directly involved in the course, potentially providing both a connection between them and a differentiation. It gives the students an insight into the practice of an architect, different fields of knowledge and different methodological approaches.

With reference to Latour’s seminal ideas, Albertsen (1994) proposes that architectural practice must be perceived as the mastering of heterogeneous actor-networks that involve both human and non-human actors. Based on the traditional body of (black-boxed) knowledge among professional architects, and the ability of architects to balance the different dispositions of design projects, we consider architects to be well equipped to navigate and negotiate these complex networks. When contemporary architects feel under pressure to handle mechanisms aiming to control the production of architects and
architecture, however, we propose that a stronger sense of cohesion in the knowledge body – between the creative/artistic, the practical/embodied and the research-based/scientific – will help architects to strengthen their position. Albertsen’s approach seems accurate in relation to the dilemma in focus of this article, which points to that the scope and scale of actor-networks that the graduates need to traverse is growing. This makes a teaching format such as ‘Forms of Practice’ more relevant than ever, helping graduates (soon to be professionals) to adapt to and stimulate the projects, but without losing an architect’s fundamental competences out of sight.

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