

A R C H I
T E K T U R
W I S S E N
S C H A F T

Vom Suffix zur Agenda

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Forum Architekturwissenschaft
Band 5

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NETZWERK
ARCHITEKTUR
WISSENSCHAFT

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Die Schriftenreihe *Forum Architekturwissenschaft* wird herausgegeben vom Netzwerk Architekturwissenschaft, vertreten durch Sabine Ammon, Eva Maria Froschauer, Julia Gill und Christiane Salge.

Was ist Architekturwissenschaft? Der Begriff lässt Unschärfen zu und kann so auf der einen Seite suggestiv und produktiv sein, auf der anderen Seite aber wirft er zahlreiche Fragen auf: Von welchen Architektur- und Wissenschaftsvorstellungen, sei es in der Geschichte oder in der Gegenwart, sprechen wir hier? Was meint Forschung unter dieser Begriffsklammer Architekturwissenschaft und mit welchem Material und welchen Methoden arbeitet sie? Welche Akteurinnen und Akteure betreiben Architekturwissenschaft und mit welchen Perspektiven? Diese Fragen waren der Gegenstand des 5. Forums Architekturwissenschaft unter dem erweiterten Titel „Vom Suffix zur Agenda“, das vom 14. bis zum 16. November 2018 an der BTU Cottbus-Senftenberg stattfand. Das Ziel der Tagung lag in der weiteren Klärung und Präzisierung des Selbstverständnisses, der Fundierungen, der Arbeitsfelder und der Potentiale von Architekturwissenschaft, gerade auch vor dem Hintergrund der vielfältigen Sichtweisen auf Architektur, für die das Netzwerk seit seiner Gründung steht.

Der vorliegende Band versammelt erstmals unter dem Titel „Architekturwissenschaft“ eine Reihe unterschiedlicher Aspekte des Zusammenkommens von Wissenschaft und Architektur und zeigt auf, welche Rolle das eine für das andere spielt, gespielt hat, oder in Zukunft als institutionalisierte Architekturwissenschaft spielen wird.

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III.

PERSPEKTIVEN UND
PROJEKTE DER
ARCHITEKTURWISSENSCHAFT



PABLO VON FRANKENBERG

Architecture as Science

Add-on or Autonomous?

When science is understood as a reflection of practice – e.g. history as a reflection of the now, sociology as a reflection of living together – architecture is the reflection of the design of the human habitat. With a brief historic and empirical analysis this essay argues that a stronger academically aligned architectural education will improve the architect's ability to systematically understand and interpret construction tasks and their boundary conditions. It is precisely the practice of architecture that makes obsolete disciplinary dissociations. Paradoxically, it also calls for a profound theoretical and methodological foundation. From this perspective, architectural science can be seen as an autonomous subject. It is, in any case, an absolutely essential add-on for architectural study.

Architecture often is referred to as the mother of all arts.¹ Taking into account the historic development of the profession, it turns out to be the lost son of academia. Architecture is one of the oldest professions, though it did not transform into a scientific discipline.² There is no architecturally scientific community that

1 A myth that was picked up again lately by Arata Isozaki when he “erroneously embraces Hegel’s system of aesthetics” and reduced it to a causality whereby there is no art without architecture, see: Darell Wayne Fields: *Architecture in Black: Theory, Space and Appearance*. London/New York 2015, p. 11.

2 This goal was already part of the demands of the student protest at the École Nationale Supérieure des Beaux-Arts in 1968. According to the students, architecture should be “a legitimate university discipline based on knowledge

instead of artistic arbitrariness”, see: Stéphanie Dadour, Juliette Pommier: *Multidisciplinarity, A Brief History of UP1 (1964–1984)*. In: *OASE* 102, 2019, pp. 23–31, here p. 23. This is one of the reasons why Uta Hassler calls architecture also the ‘slowest of all disciplines’. Basic knowledge comes from other disciplines like mathematics, physics, or mechanics. Experiments are often limited to a building that remains unique – in contrast to the reproducibility of a valid experiment, see Uta Hassler: *Das Lehrbuch und die Lehre vom Bauen*. In: Uta Hassler (ed.): *Der Lehrbuchdiskurs über das Bauen*. Zürich 2015, pp. 6–7, here p. 6.



shares common terms, problems, and methods – or at least this community works in the diaspora of architectural theory and history chairs, often smiled at by the other architectural faculties. This essay first shows the special path architecture took in its academic development by using the architects' training as an indicator. How architects were trained over time shows both what masters deemed necessary to become an architect and what prospective architects were equipped with to perform their profession.³ The historic development of how architects-to-be are educated shows the genesis of the profession's self-image. On this rough and rather incomplete historic backdrop, the status quo of architectural education is analyzed. A survey of architecture curricula from German universities exposes the scientific aspects of the discipline. Finally, an approach is outlined that aims at a stronger science and research-based education of architects. This base would not only strengthen the scientific and research aspects inherent in architecture, but can also lead to a better practice with a more critical, self-conscious, effective, and holistic way to solve complex building tasks.

History of Architectural Training: Processes of Differentiation and Professionalization

In Ancient Egypt, architects were civil servants. The training of civil servants was highly characterized by copying documents in order to learn how to write. Learning how to write was closely attached to learning the contents of what was copied. Specialization came by what a prospective civil servant copied the most. If the teacher, often the father of the pupil, had a specialization in building houses, the prospective civil servant was likely to copy a lot of plans. Archaeological findings of shards with identical plans on the front and back indicate this learning process. The trainees had to draw the same plan on the reverse

3 There are not many studies on the history of architectural training. Mary Woods sees the focus on the work of star-architects in the history of architecture as one of the reasons

why there are so few studies in this domain, see Mary N. Woods: *From Craft to Profession: The Practice of Architecture in Nineteenth-Century*. Berkeley/Los Angeles/London 1999, p. 3.



side by heart.⁴ Trained architects or masters took design principles that were written down in sample books, stored in the temple, and modified them. The design process consisted of applying the bequeathed samples and forms to specific construction tasks. Thus, ‘imitatio’ was not only part of the architect’s training. It was integral to the whole profession.

In Ancient Greece and also in the Roman Empire, the architect’s training was bound to the family. It was not institutionalized – despite Vitruvius’ *Ten Books* in which he outlined what an architecture education should consist of.⁵ After Vitruvius, every architect needed to be equipped with the two basic qualities ‘fabrica et ratiocinatio’ – craftsmanship and theoretic conception. To attain the latter, Vitruvius demands: “Let him be educated, skillful with the pencil, instructed in geometry, know much history, have followed the philosophers with attention, understand music, have some knowledge of medicine, know the opinions of the jurists, and be acquainted with astronomy and the theory of the heavens.” Only then can he reach “the heights of the holy ground of architecture.”⁶

Skillful with the pencil did not only refer to drawing abilities, but also to the ability to write about one’s own work to ensure the architect’s lasting fame. Historical knowledge is not only necessary to apply the ornaments in the right way, but to decipher the meaning of existing architecture. Philosophy strengthens the character. Musical knowledge enables the architect to build theaters, but music also has a natural affinity toward architecture. Finally, basic medical knowledge is needed to build healthy surroundings.⁷ Vitruvius’ significance for the architecture of his time is estimated to be rather low. Also, his writings were discovered and praised only centuries later. During Vitruvius’ time

4 See Ulrike Fauerbach: Bauwissen im Alten Ägypten. In: Jürgen Renn, Wilhelm Osthues, Hermann Schlimme (ed.): Wissensgeschichte der Architektur. Band II, Max Planck Research Library for the History and Development of Knowledge Studies 4. Berlin 2014, pp. 7–124.

5 See Wilhelm Osthues: Bauwissen im Antiken Rom. In: Renn, Osthues, Schlimme 2014 (note 4), pp. 265–422, here pp. 383–384.

6 Vitruvius: The Ten Books on Architecture / Vitruvii de architectura libri decem. Translated by Morris Hicky Morgan. Cambridge/London 1914 [ca. 33 BCE], Book 1, Chapter 1 pp. 5–12.

7 See also Hanno Walter Krufft: A History of Architectural Theory. From Vitruvius to the Present. New York/London 1994, pp. 30–31.

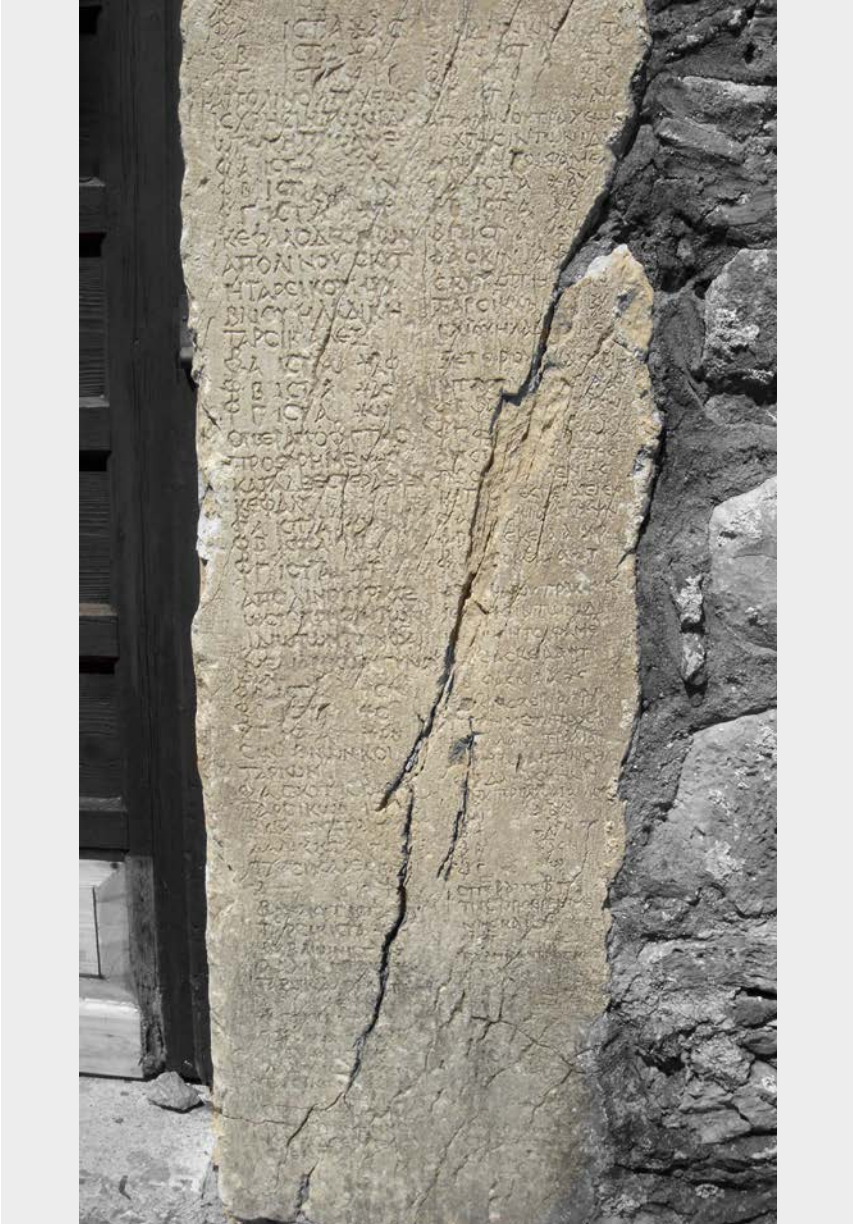


there existed the possibility of paid schooling, which usually took place again within a family context. The apprenticeship fee was regulated in Late Antiquity in the course of the *Edict on Maximum Prices* of Diocletian in 301 AD (Fig. 1). Here, the apprenticeship fee of architects was also mentioned.⁸ This may evidence that in those days some architects already specialized in training other architects. Despite the price edict and Vitruvius' textbook, there was no quality control or standardization of architectural education, though.

Only during the Renaissance did architectural training change, bit by bit into a more formalized structure. Leon Battista Alberti, who studied physics, mathematics, and law, enforced the division between the architect as thinker/designer and his role as a craftsman. This is the first great differentiation process in architecture – a discipline that by then was already a couple of thousand years old. Andrea Palladio, a trained stonemason and self-taught architect, is a great example of this differentiation. His patron, the poet and philosopher Gian Giorgio Trissino, instructed Palladio in mathematics, music, and Latin literature. Trissino advised Palladio also to study the work of Vitruvius. He financed Palladio's first educational trip to Rome in 1541, where he studied Roman architecture. At first, Palladio was a craftsman who also built houses. After his theoretical studies and research, he became an architect who was also a proficient craftsman. In 1563, the foundation of the *Accademia del Disegno* in Florence led to a stronger professionalization and academization of the training of architects. In Italy up to that point, the discipline was dominated by artists and polymaths like Giotto, Palladio, Alberti, and Raffael. However, the *Accademia* did not set up a strictly architectural curriculum. Young talents were supported, which was seen as more important than a system of grades and certificates.⁹

8 For an *architectus magister* the apprenticeship fee was limited to a maximum of 100 dinars per month. See Osthus 2014 (note 5), p. 384.

9 See Hermann Schlimme, Dagmar Holste, Jens Niebaum: *Bauwissen im Italien der Frühen Neuzeit*. In: Renn, Osthus, Schlimme 2014 (note 4), p. 142.



- Fig. 1: Apprenticeship fee for architects, fragment of Diocletian's Edict on Maximum Prices, reused in the church of St. John Chrysostomos, Geraki, Greece. Source: Ash / CC-BY-SA-3.0. https://commons.wikimedia.org/wiki/File:Edict_on_Maximum_Prices_Diocletian_piece_in_Berlin.jpg (March 16, 2019)



The second great division came at the turn of the 19th century with Jean Nicolas Louis Durand. As a consequence of French revolutionary architecture, Durand edited his *Précis des leçons d'architecture* at the École Polytechnique in 1802 (Fig. 2). Here, he underlined the division between architects as engineers and architects as artists. He summed up developments of the 18th century and built upon the first differentiation between craftsman and architect. Yet, Durand clearly distinguished his aims for architectural education from those in the ten books of Vitruvius. In the eyes of Durand, teaching architecture should rely upon the two dimensions 'convenance' and 'économie'. The first comprises 'solidité', 'salubrité' (hygiene) and 'commodité' (comfort), the latter 'symétrie', 'régularité' and 'simplicité'.¹⁰ If an edifice complies to these functions, aesthetic aspects fall into place quite naturally. This architectural rationalism allowed a more specialized education. Other textbooks reflect this evolution, too. The depiction of exemplary historic buildings show building techniques and materials arranged according to building types. Systematic, historical research is the starting point for these textbooks to define the milestones of architecture.¹¹

Despite this new rationalism and historicism, architecture as a subject did not go through the same processes of differentiation and specialization that other subjects faced. The division of the sciences and humanities in the 19th century that were trying to build a separate identity by using specific theories and methods of research, hardly had an influence on architecture. Only since the beginning of the 21st century did a new demand for a more academic, research-based approach to architecture evolve.¹² However, this demand is hardly visible in today's curricula.

10 Jean Nicolas Louis Durand: *Précis des leçons d'architecture*. Vol. 1, Paris 1802, p. 23.

11 Hassler 2015 (note 2), p. 7. These kinds of textbooks were still produced in the 20th century.

12 Beside the comprehensive philosophical and sociological approaches to architecture and space in the second half of the 20th century

e.g. Otto Friedrich Bollnow: *Mensch und Raum*. Stuttgart 2004 [1963]; Henri Lefebvre: *The Production of Space*. Malden/Oxford/Carlton 2005 [1974], relevant monographs of the last two decades include Martina Löw: *Raumsoziologie*. Frankfurt a. M. 2001, Heike Delitz: *Gebaute Gesellschaft. Architektur als Medium des Sozialen*. Frankfurt a. M. 2010, and also the concerted activities, conferences, and publications of the *Netzwerk Architekturwissenschaft*.



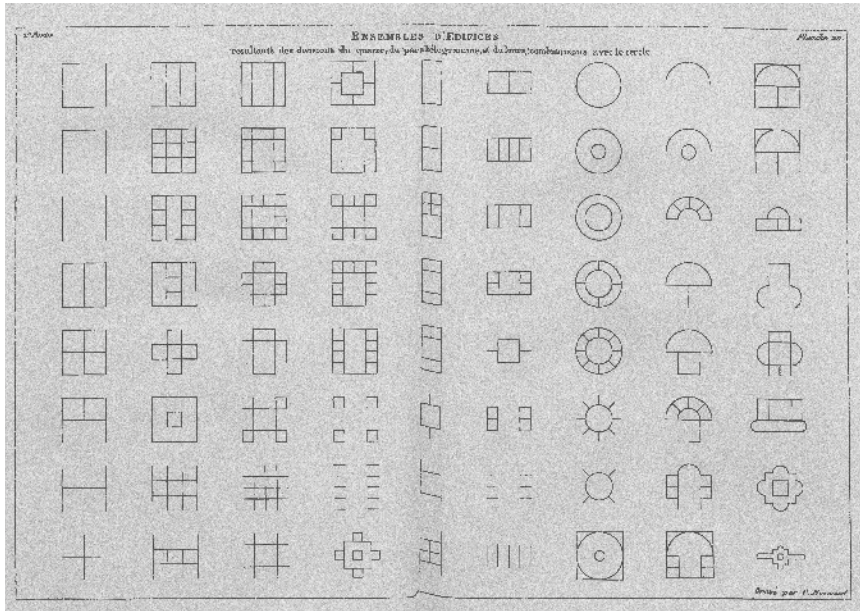
Status Quo: Teaching Architecture in Germany

In Germany today, architecture is taught at technical universities, at universities of applied sciences (Fachhochschulen), and at art academies. An analysis of the curricula of these universities shows the dominating directions of architecture as an academic subject and whether or not it is understood as a scientific discipline. The survey comprises 50 German technical universities, universities of applied sciences, and art academies where scholars can study architecture.¹³ The main criteria for a curriculum to be included into the survey was a full-time study with a degree that enables graduates to be inscribed in the chamber of architects known as the 'Kammerbefähigung' and thus to be able to work as freelance architects. The survey ignores minor universities as well as art academies without a fixed curriculum (e.g. Art Academy Munich and Düsseldorf as well as Frankfurt's Städelschule).

The curricula of most of these universities included all standard subjects such as architectural history and theory, design/presentation ('Gestaltung/Darstellung'), design/construction ('Entwerfen/Konstruieren'), structural engineering, building construction ('Baukonstruktion'), digital design/CAD, building physics/building material/technology and urban planning. Design, presentation, and construction often are multi-semester courses, while architectural history and theory at some universities is reduced to a one semester introductory teaching session. In the last years, courses like building law and project management as well as smart building/sustainability were partly implemented into the curricula.

By focusing on practice, architecture resembles more a training with academic traits than a university discipline. Other disciplines faced a similar development after the Bologna process.

¹³ The sample was taken during the winter semester 2018/19. Data was collected via the online published curricula and examination regulations of each university.



● Fig. 2: Introduction of a rational basis for architectural education: variations of building plans in Durand's *Précis des Leçons*. Source: Universitätsbibliothek Heidelberg. <https://digi.ub.uni-heidelberg.de/diglit/durand1802bd1/0158> (March 16, 2019) [edited]

However, architecture, as was outlined before, looks back on a different tradition and epistemic history than younger disciplines like economics, sociology, or psychology.

Half of the universities examined offer classes beyond a form of architectural training; the other half, however, did not. These curricula comprise classes such as 'studium generale', methodology classes, and architectural sociology. However, a closer look reveals that a few more than a quarter of the universities set those classes as mandatory. The mandatory classes are usually two to four hours per week, which is negligible compared to the rest. Two hours per week for one semester of 'studium generale' can in fact be seen as somewhat 'contradictio in adjecto'. Nevertheless, these numbers indicate that a little more than one fourth of architectural universities are trying to implement scientific research skills within the curriculum. Given the fact that a master's degree entitles a graduate to commence a doctoral dissertation, every graduate should be equipped with theoretical, analytical, and



methodological skills to do scientific research. Would that be a gap in the market to be filled by a new academic discipline called architectural science or ‘Architekturwissenschaft’?¹⁴ Or is it more effective to implement a more scientific and research-based approach to the existing curricula?

Architecture in Between Science, Research, and Practice

An academic discipline is a communicative frame that consists of scholars who are connected by common problems, common terms, and a common methodology.¹⁵ In the case of architecture, the discussion (with the exception of some agile departments of architectural theory), focuses more on how to build buildings than on developing common terms and methodologies – unfortunately seeing both as contradictory. There is another crucial aspect for defining an academic discipline: the complementary function of research and teaching. The prime concern of architectural training today is to pass on a practical competence with which to build buildings. This is by no means to be criticized. But what it lacks is a methodological basis to do research on architecture. Furthermore, in today’s architectural faculties, rather than witnessing a complementarity of teaching and research, there is a complementarity of teaching and practice. Teaching itself is very much focused on practice, as are the teachers. Some professors spend a lot of time not in the university, but in their studios, designing new buildings.¹⁶ Sometimes this is applied research, though the majority of this labour is taken up in the pursuit of

14 When e.g. the semiotic approach of Charles Jencks and George Baird with their *Meaning in Architecture* “proved to be too difficult to teach” and teaching architectural history in both the U.S. and the European system is an “embarrassment”, see: Mark Jarzombek: The School of Architectural Scandals. In: e-flux, URL: <https://www.e-flux.com/architecture/history-theory/225182/the-school-of-architectural-scandals/> (March 30, 2019), *Architekturwissenschaft* could overcome this challenge.

15 See Thomas S. Kuhn: *The Structure of Scientific Revolutions*. Chicago/London 1962, pp. 1–2 and Rudolf Stichweh: *Wissenschaft, Universität, Professionen. Soziologische Analysen*. Frankfurt a. M. 1994.

16 The absence of practicing professors of architecture on campus, sometimes even in classes, is a highly controversial subject not only in the European system, e.g. URL: https://www.baunetz.de/meldungen/Meldungen_Vor-



maintaining a stable income. A lot of architecture teachers are practitioners, which is good, but they are not scholars. Albeit having finished a university degree, they very likely lack basic research skills. If we take research as a crucial element of a scientific discipline, architecture at least is different to other university disciplines. In this view architecture is closer to art, which is not reflected in the rigid and technical curricula of the majority of universities.

Research is the systematic investigation into and study of materials and sources in order to test hypotheses, reach new conclusions, and develop new theories, which again can be tested by research. By this definition finding a new design solution for a building type or the application of a new material in a building project is not strictly speaking research.¹⁷ In the case of architecture, the materials and sources being studied can be historic sources as well as theories or empirical data that might derive from material testing, structural engineering experiments, social inquiries and the like. Today, the teaching of research methods remain either on the side of engineering or within the domain of neighboring humanities like art history, sociology or ethnology. Empirical studies on the socio-cultural conditions of architectural design and its implementation,¹⁸ or the use of buildings by

laeufige_Suspendierung_von_Christoph_Langhof_an_der_Uni_Innsbruck_12931.html; Feb 12, 2003 (March 18, 2019); or URL: <https://www.zeit.de/2014/29/nebenverdienst-professoren-hochschule/komplettansicht>; Jul 24, 2014 (March 18, 2019), but also in the U.S. system: URL: <https://www.archdaily.com/884590/architecture-education-is-unhealthy-expensive-and-ineffective-could-online-learning-change-that> (article from Nov 29), 2017 (March 16, 2019).

¹⁷ Berlin State Opera's reverberation gallery by HG Merz is an example of how research can take place within an architect's studio. The two-year process of receiving the statutory approval (*Zulassung im Einzelfall*) was accompanied with research projects in cooperation with the University of Delft and the structural engineers from Knippers Helbig. Here, a new material and a robotically built structure was

implemented into a listed building. Many hypotheses regarding acoustics, fire protection, statics and the like had to be tested to be able to implement the architectural planning.

¹⁸ There are some empirical studies in this domain, e.g. Daniel Grincer: *Architecture as Cultural and Political Discourse: Case studies of conceptual norms and aesthetic practices*, London 2016; Stephanie Kernich: *Alltägliche Architektur. Die gebaute Umwelt in unserer Alltagswirklichkeit*. Köln 2016; Pablo v. Frankenberg: *Die Internationalisierung der Museumsarchitektur. Voraussetzungen, Strukturen, Tendenzen*. Berlin 2013; Robert Gutman: *The Questions Architects Ask*. In: Dana Cuff, John Wriedt (ed.): *Architecture from the Outside In. Selected Essays by Robert Gutman*. New York 2010 [1966] pp. 152–185; Albena Yaneva: *The Making of a Building. A Pragmatist Approach to Architecture*. Bern 2009.



their inhabitants,¹⁹ grow in the precarious in-between spaces of architecture, sociology, art history and other similar disciplines. What lacks is a systematic integration of both the findings of these studies and their methodologies into the teaching of architecture.²⁰ One of the reasons for this gap between research and teaching is quite obvious. A majority of architecture professors – practitioners with their own studios and a weekly presence on campus of about one to three days – have no chance to get in touch with these in-between spaces where (empirical) architectural research actually takes place.

Academization as a Benefit to Architectural Practice

Architecture did not take part in the processes of differentiation and professionalization other disciplines faced in the 18th and 19th century. Instead, architectural theory and history were cut into bite-sized packages while the teaching of research methodologies was put into non-mandatory classes by selected universities. The benchmark for any architect is her or his portfolio of realized buildings. Research publications or excellent teaching are often not enough for one to be appointed to a chair, which surely can be seen as one of the reasons why architecture as a science of its own never quite developed. Architectural practice and architectural research are not to be seen as opposites

19 See e.g. the approach of post occupancy evaluation, in Wolfgang Preiser et al.: *Post-Occupancy Evaluation*, Abingdon/New York 1988, or publications like Sabine Ammon et al. (ed.): *Architektur im Gebrauch. Gebaute Umwelt als Lebenswelt*. Berlin 2018; Christine Neubert: *Gebauter Alltag. Architekturerfahrung in Arbeitsumgebungen*. Wiesbaden 2018; and with a historic perspective on using architecture Kenny Cupers (ed.): *Use Matters: An Alternative History of Architecture*. Abingdon/New York 2013. Other publications in this domain (e.g. Jörg Stollmann, Jessica Bridger, Johannes Cramer (ed.): *Research in Architecture*. Berlin

2013 or Murray Fraser (ed.): *Design Research in Architecture: An Overview*. Surrey/Burlington 2013) are merely overviews of different projects without a methodological framework or an instrumentalization of design and architecture tools for researching specific topics.

20 A starting point could be seen in Silke Steets: *Der sinnhafte Aufbau der gebauten Welt. Eine Architekturosoziologie*. Berlin 2015, who tries to establish an integrative theory based on the sociology of knowledge. However, the methodological consequences of this approach remain unclear.



though.²¹ Instead, a stronger academically aligned architectural education would improve the quality of architectural production.²² Architects with a more profound knowledge of scientific methodologies are more competent to systematically understand and interpret construction tasks and their boundary conditions. The affinity between a design process and a scientific research process then becomes explicit. From developing a draft or hypothesis, to challenging the draft/hypothesis with different means (models/visualizations/discussions in the team or further reading/testing the questionnaire/discussions at conferences), to revising the design (research), to implementing it or going into the field (with many iterative steps in between), designing and conducting research have a lot in common. Given the methodological foundations, researchers are usually able to reflect the research process itself. Architects, being closer to practice, usually cannot afford this level of meta-reflection. This is the reason why integrating ‘Architekturwissenschaft’ into the curricula enhances architectural production in the long run. If for example a prospective architect conducts an empirical study of visitor behavior in a new museum²³ or on the design process of an architecture competition²⁴, he or she gains a different view of architecture. The pressure of solving a design task is suspended in favor of momentarily changing sides. This specific intersubjective perspective is featured in all scientific research and enhances architectural practice, bringing it closer to its social mandate. Having

21 In opposition to Karl Kogler’s attempt to define architecture as a “Handlungsdisziplin” (discipline of action), as for this definition it is necessary to determine design (i.e. the action of “doing architecture”) the core of teaching architecture, which makes the definition a tautology, see his essay *Normen Kunst: Warum Architektur keine Wissenschaft ist*. In: *trans 24 “normiert”*, March 2014, pp. 138–143, here p. 139.

22 Outside of German architectural discourse this assumption seems to be more popular, see e.g. Christophe Van Gerwey, David Peleman, Bart Decroos: *Schools&Teachers. The Education of an Architect in Europe*. In: *OASE 102*, 2019, pp. 2–13, here pp. 3–5.

23 See e.g. Natalie Heinich: *The Pompidou Center and its Public: The Limits of a Utopian Site*. In: Robert Lumley (Ed.): *The Museum Time-Machine*. London/New York 1988, pp. 199–212.

24 Yaneva 2009 (note 18).



been taught research methods and how to conduct architectural research, it is easier to communicate a design proposal to a broader public or client and to establish high quality management within the design process and therefore design more efficiently. The need to be equipped with a toolbox that includes more than just technical skills is underlined by Umberto Eco's analysis of the semiotics of the built environment. While granting architects their own vocabulary, he denies them their own grammar. In his view, architects depend on codes that derive from sociology, anthropology, politics and other domains.²⁵

Add-on or Autonomous

Given these observations it seems more effective to integrate architectural research approaches, methodologies and scientific work within today's architectural training instead of establishing a new discipline. Founding a new discipline will not necessarily help solving the problems of the old, whose stakeholders and lobbies are big and cumbersome. A toothless little brother would rather jeopardize the above stated aims of empirically analyzing the processes of architectural design, its conditions and its outcomes on every level – be they stylistic, technical, ecological, social or cultural. Not every architecture student is interested in doing research and not every student has to become a researcher. Furthermore, nor does every architecture student want to build buildings. Integrating research methods into the curricula in a stronger way than is currently the case is not a demand to make practicing architects outstanding researchers or to skip in any way the strongly practical aspects of architectural education. It means to offer students different approaches to their subject. And it means to get prospective practicing architects out of the

25 “[L’architetto] Ha un vocabolario, forse una logica, ma gli rimangono una grammatica e una sintassi da inventare. E tutto pare dimostrare che non sarà mai l’architettura da sola a fornirgli quelle regole che cerca. Non rimane dunque una risposta: l’architettura parte forse da codici architettonici esistenti, ma in realtà si appoggia

su altri codici che non sono quelli dell’architettura, e in riferimento ai quali gli utenti dell’architettura individuano le direzioni comunicative del messaggio architettonico.” See: Umberto Eco: *La struttura assente. La ricerca semiotica e il metodo strutturale*. Milano 2008 [1968], p. 233.



studio into the field to get their hands dirty and to see how the built environment is used, adapted, decays, hinders and enables peaceful coexistence – how it lives after it leaves the computer screen, how it contributes to and forms parts of the reality. The design process itself can still take place in a remote cabin in the woods or in the secluded studio of the architect-as-artist – informed by the knowledge of how to conduct research, how to systematically gain information about the very reality the result of the design process will be a part of.²⁶ If a scientific approach is integrated into architectural education on a more extensive basis, each architect would have the expertise to critically reflect the foundations of their own work. She or he would have once (or several times) conducted research on the technical, design related, social, and cultural conditions of architecture, an action that changes the one's perspective of the built environment. In the case of architecture teaching the terms, problems, and methods of each scientific discipline is defined by not only the means to enable (empirical) architectural research, but also to improve the quality of architectural practice.²⁷ Rather than founding a new discipline or changing the running system of today's curricula, architectural science or 'Architekturwissenschaft' can provide architectural education with an update that brings the discipline closer to its social mandate.

Updating Architectural Education

Three aspects are essential for this update: to sensitize the students' vision of the world, to strengthen the analytic approach to

26 Michael Sorkin is much more precise about dirty hands with his extensive list "Two Hundred Fifty Things an Architect Should Know", see: Michael Sorkin: *What Goes Up*. London/New York 2018, pp. 277–284.

27 As an early empirical study in this domain witness Robert Gutman's analysis of the design process of a new university building that was accompanied by a research project lead by sociologists: "[the designers] claim to have found the sociologists helpful in devising the interview

schedules and other research instruments [...]; but they report that they were generally disappointed that the sociologists were not more adept in guiding them toward the articulation of university purposes and goals." (Robert Gutman: *The Questions Architects Ask*. In: Cuff, Wriedt 2010 (note 18) pp. 152–185, here: pp. 162–163. This conclusion can also be read as an inability of the designers to handle the sociologists' results as they most likely were never confronted with empirical research before.



social structures and to anticipate the architectural tasks of the future. These three aspects are to be integrated in today's training of architects in stages, by level of complexity, from bachelor to master and to advanced studies/further education.

During bachelor studies, a structured "school of the eye" (Fig. 3) should be included into the teaching of architecture. Learning to see architectural realities, design processes and conditions of creativity are the main tasks of this school of the eye. Well prepared excursions, not mere pilgrimages to the worshipped masters, are one part of this school. Teaching social theories, (neurological) perception theories and philosophical theories are also an important part of it. This also means committing more non-architects to the teaching of architecture.²⁸

Another aspect of sensitizing the prospective architects' vision of the world is the teaching of techniques of scientific work.²⁹ Architectural master programs have a specific and decisive focus on setting practical design projects. Were not only the design projects, but also architectural research projects part of a given masters study program, students could develop a different approach to architectural challenges. These research projects would be based upon the school of the eye and further training in methodology and could, for example, analyze the use of a building after it has been completed, or the working situation in architectural offices, or the social structures of an urban quarter. Research into neighboring disciplines (structural engineering, physics, material sciences etc.) are in no way affected by a more scientific architecture. In the same way that physics needs mathematics and

28 A rich example of the implementation of a *school of the eye* into the curriculum is shown by Anselm Wagner/Sophia Walk: *Architekturführer Graz*. Berlin 2019, an architecture guide, which is based in part upon an architecture students' study project.

29 Some methodological approaches to the analysis of architecture are already outlined in case studies e.g. by Juan Pablo Bonta, who analyzes architecture critic, Rybczynski with his biographical approach, or Albena Yaneva,

who applies Latour's Actor-Network-Theory to analyze the design process, see: Juan Pablo Bonta: *Über Interpretation von Architektur. Vom Auf und Ab der Formen und die Rolle der Kritik*. Berlin 1982; Witold Rybczynski: *The Biography of a Building. How Robert Sainsbury and Norman Foster Built a Great Museum*. London 2011; Yaneva 2009 (note 18). Schubert goes one step further and suggests a method matrix for an empirical architecture sociology, see Herbert Schubert: *Empirische Architektursoziologie. In: Die alte Stadt 1*, 2005, pp. 1–27.



● Fig. 3: A school of the eye is a process of constantly changing perspective. Façades, styles, structural engineering, finances, politics, togetherness, climate issues, social inequality, and other aspects are evidenced in this snapshot from the terrace of the New Whitney in New York. Source: Photo by the author

history needs archaeology, without ever thinking about incorporating the one into the other, the research into other disciplines relevant for architecture continues. With more scientific and methodologically oriented teaching within architecture, it is easier to understand how scientific knowledge is produced and thus how to implement the research of other disciplines into one's own work – be it practical, theoretical, or empirical work.

A last step of this updated architectural education would be to strengthen a core competence of the discipline. If designing means anticipating a future condition of a piece of land, a building, a room or even something to sit on in the form of a sketch, a computer rendering or a floor plan, thinking about possible future realities and the tasks of these realities is inherent to architecture. A lot of what architects have to do on the day to day level is to think about the future of living and working together, of mobility, the concept of the family and many other aspects. Architects



surely cannot change the future, but they inevitably have to build for it and thus have to develop scenarios of what happens next. For example what would happen when a building they designed three or four years ago is suddenly put into action in a reality that was not present when the building was initially designed?

After finishing their studies architects are equipped with all necessary tools for designing. This also means that they are adept at addressing future tasks in all domains related to architecture, be it style, building technology, social challenges or cultural identities. To cultivate this quality to a greater degree, future studies could be integrated into the post-grad training of architects. In Germany, architects usually have to complete further education in order to be admitted by to the chamber of architects. Instead of acquiring training in public procurement law, building information modeling, or honorary fee calculation, architects could also develop a project that anticipated future tasks. The chamber of architects would be the jury and also the publishing platform for these projects. This attempt to establish future studies within architectural education could also lead to cooperations with extra-university institutions such as architecture and design museums (Frankfurt, Munich, Berlin), other agencies with a focus on architecture (e.g. Bundesstiftung Baukultur) or political institutions. The newly founded Bauakademie in Berlin could also be a strategic partner for this endeavor. Institutions that act beyond both the pressures of the market and the constraints of the university can offer open spaces to think and do research for the future of architecture.³⁰

30 The discussions on the 5th Forum Architekturwissenschaft in Cottbus helped to sharpen many aspects of this article. Most of all, though, I am grateful to Sophia Walk who thoroughly read the article and gave numerous hints and constant inspiration regarding how architectural education should and could be.



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Was ist Architekturwissenschaft? Der Begriff lässt Unschärfen zu und kann so auf der einen Seite suggestiv und produktiv sein, auf der anderen Seite aber wirft er zahlreiche Fragen auf: Von welchen Architektur- und Wissenschaftsvorstellungen, sei es in der Geschichte oder in der Gegenwart, sprechen wir hier? Was meint Forschung unter dieser Begriffsklammer Architekturwissenschaft und mit welchem Material und welchen Methoden arbeitet sie? Welche Akteurinnen und Akteure betreiben Architekturwissenschaft und mit welchen Perspektiven? Diese Fragen waren der Gegenstand des 5. Forums Architekturwissenschaft unter dem erweiterten Titel „Vom Suffix zur Agenda“, das vom 14. bis zum 16. November 2018 an der BTU Cottbus-Senftenberg stattfand. Das Ziel der Tagung lag in der weiteren Klärung und Präzisierung des Selbstverständnisses, der Fundierungen, der Arbeitsfelder und der Potentiale von Architekturwissenschaft, gerade auch vor dem Hintergrund der vielfältigen Sichtweisen auf Architektur, für die das Netzwerk seit seiner Gründung steht.

Der vorliegende Band versammelt erstmals unter dem Titel „Architekturwissenschaft“ eine Reihe unterschiedlicher Aspekte des Zusammenkommens von Wissenschaft und Architektur und zeigt auf, welche Rolle das eine für das andere spielt, gespielt hat, oder in Zukunft als institutionalisierte Architekturwissenschaft spielen wird.

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