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Autor: Chen, Dijia / Wu, Jiawei
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The Jury and the Workshop: Crits in Architectural Education in China

Dijia Chen and Jiawei Wu

Dijia Chen is a visiting assistant professor at the School of Art, Design and Art History, James Madison University, and a doctoral candidate at the School of Architecture, University of Virginia.

Jiawei Wu is a research associate professor at the School of Architecture and Urban Planning, Nanjing University

The Crit and Its Discontents

While China has maintained a sophisticated building tradition since antiquity, the designers of buildings were traditionally considered craftspeople and were not perceived to be artists in the same sense as calligraphers or painters. Architecture as a liberal profession did not exist before the twentieth century, and an equivalent for the Western term "architecture" did not exist in Chinese. The word frequently identified with the techniques of architecture, *ying zao* (營造), is more accurately translated by the German word *Baukunst*. [1] Master builders were trained in an apprenticeship model that involved accumulating knowledge and experience through actual construction. As apprentices were often taken from the master's immediate family, transmission of craft secrets was restricted by kinship, although masters also exchanged skills when contributing feudal labor in the capital. As a result, despite the availability of vernacular publications containing various rules of thumb for construction techniques, such as *Luban jing* (魯班經), there was little demand for comprehensive theoretical texts that might detach the profession from its reserves of tacit knowledge. [2] The close relationship between construction and architecture was gradually severed after the establishment of architecture as a discipline under the university system.

In the history of the institutionalization of architectural education, two concepts of architectural training can be identified, embodied in the opposition between the French École des Beaux-Arts and the École Polytechnique: "architecture as art" versus "the techniques of building." In France, the two models were well-established as parallel methods by the early nineteenth century. In China, by contrast, technology-oriented architectural education was tentatively introduced first, whereas the art-oriented model appeared in the 1920s, won the support of the central government in the 1940s, and became dominant thereafter.

1 Scholars generally agree that, in ancient China, house construction and other civil engineering activities were collectively referred to as *yingjian* (营建) or *yingzao* (营造). The word *jianzhu'* (建筑), which provides the stem of the Chinese word for *architect*, was introduced into Chinese from Japanese in the 1920s by Chinese architects trained in Japan. Chunfang Jian et al., 中国大百科全书: 建筑, 园林, 城市规划 [Encyclopedia of China: Architecture, landscape architecture, urban planning] (Beijing: Zhongguo dabaike quanshu chuban she, 2004), 1, 564; Min-Ying Wang, *The Historicization of Chinese Architecture: The Making of Architectural Historiography in China, from the Late Nineteenth Century to 1953* (New York: Columbia University Press; ProQuest Dissertations Publishing, 2010), 2.

2 *Luban jing*, or "Luban's Classics," is a handbook that introduces the rules, system, and ceremonies of the trade associations, as well as the various steps of building construction. It provides an overview of the measures and standards of furniture and agricultural tools, as well as the shapes and designations of structural timber used for building. For more about *Luban jing*, see Rong Wu and Daoyi Wu, 图解鲁班经: 中国古代建筑风水择吉经典 [*Luban jing* illustrated: Classics on ancient Chinese architectural feng shui] (Shanxi: Shanxi Shifan Daxue Chubanshe, 2010).

The greatest single impetus for architecture was the arrival of the first generation of Chinese modernists, trained at the University of Pennsylvania in the 1920s. The Beaux-Arts paradigm they brought back from Pennsylvania was a product of professor Paul Philippe Cret's French training. The first Chinese university to establish an architecture department was the National Fourth Sun Yat-sen University, founded in Nanjing in 1927 (and renamed National Central University the next year). [3] The first head of the department, Futai Liu, had obtained both a bachelor's and master's degree from Oregon State University in Corvallis, Oregon, before returning to China. Before the 1950s, most of the core teaching staff had graduated from the United States, especially from the University of Pennsylvania. The architecture graduates who returned from Penn to China were immediately flooded with work, and many completed significant buildings and enjoyed lofty reputations even before they began to work at the National Central University in Nanjing. This made the architectural department the headquarters of the Beaux-Arts model and also a microcosm of the development of modern architectural education in China as a whole.

The first Chinese educators put great emphasis on the careful composition of functional elements, the proportional arrangement of masses, and the ornamentation required to create visually pleasing facades. Xing Ruan observes that the Penn model, with its reliance on architectural illustration and its long, demanding apprenticeship, accidentally echoed traditional Chinese ink painting techniques and the conventional master-pupil relationship within the fine arts. [4] That is, the introduction of architectural education in China effectively promoted the designer of buildings from the status of tradesperson to the cultural position of artist. As Ruan notes, the cultural affinities between China's art traditions and the teaching methods at Penn permitted the astonishingly smooth adoption of the American Beaux-Arts in China's nascent architectural education system and further strengthened the impression that, at its core, architecture required artistic inspiration. The education of architects became a kind of cultivation rather than a technical training. Although teachers who had studied in German or Japanese polytechnics attempted to increase the proportion of technical courses, they were a minority. Later, as a result of Nationalist resistance to the Axis powers during World War II and the communist movement for the "comprehensive study of the Soviet Union" in the 1950s, technology-oriented teaching methods gradually declined. [5] By the end of the 1970s, most Chinese architecture schools, regardless of their original orientation, had adopted a model of architectural education based on art training. [6] In

3 The National Central University was later broken up and reorganized with other institutions into nine new universities in 1952. The Department of Architecture was incorporated into the newly formed Nanjing Institute of Technology (NIT), but the location of the campus remained unchanged. NIT was renamed Southeast University in 1988.

4 Xing Ruan, "Accidental Affinities: American Beaux-Arts in Twentieth-Century Chinese Architectural Education and Practice," *Journal of the Society of Architectural Historians* 61, no. 1 (2002), 30–47, here 33, https://doi.org/10.2307/991810.

5 Feng Qian, "现代建筑教育在中国" [Modern Chinese architectural education] (PhD diss., Tongji University, Shanghai, 2006), 121.

6 Ruyi Han, "美院與工學院·差異與趨同: 從東南大學與華南理工大學的比較研究看中國建築教育的沿革" [Beaux-Arts vs. polytechnic and departure vs. convergence: A comparative study of architectural education at SEU and SCUT], 建築學報 [Architectural journal] 5 (2019), 111–22, here 112.

various places around the world, the crit has played, and still plays, a central role in the reproduction of the architectural habitus. Since 1968, the conventional crit has been repeatedly critically examined by Western scholars for the legacy it bears. According to this critique, the ingrained atelier conventions inevitably overemphasize the authority of the teacher, impeding the student's critical autonomy, and rely heavily on the instructor's own repertoire of experiences and unarticulated instructional prejudices. [7] As a result, the crit has repeatedly been challenged and reinvented, with varying degrees of success. In China, by contrast, due to the prestige of the first generation of modern architectural educators and the postwar aversion to German and Japanese pedagogical models, the hierarchical, jury-driven crit remained unchallenged until the 1980s. [8]

The first architectural crits to take place in modern China were juries modeled on those at Penn. They took the form of written comments on an image-based final assessment (no models were presented for examination) by a committee including the teachers in the design studio and respected senior faculty. [9] The professors were chosen for their eminence rather than for their close familiarity with the students' work in studio, and the committee met behind closed doors. Significant differences in the evaluations of the design were not tolerated. A tutor's defeat in a heated debate within the jury would result in a low grade for a student's work, even though the tutor might have assessed the design as good. One result of this model was that judgments were often inconsistent with assessments that students had received over the course of the studio. [10] Students did not have the chance to question the jury or defend their designs—although they allegedly made a sport of eavesdropping on the heated discussions among faculty. In short, the Chinese version of the crit appears to have been an even more obfuscated and hierarchical teaching paradigm than its Beaux-Arts predecessors. At the same time, the crit in the Chinese context also shows traces of the openness of the fine arts. As several scholars who taught at the Nanjing Institute of Technology (NIT) in the 1980s recall, the training received through

7 See Thomas A. Dutton, "Design and Studio Pedagogy," *Journal of Architectural Education* 41, no. 1 (1987), 16–25, https://doi.org/10.2307/1424904; Thomas A. Dutton, "The Hidden Curriculum and the Design Studio," in *Voices in Architectural Education: Cultural Politics and Pedagogy* (New York: Bergin and Garvey, 1991), 165–94; Aaron Koch et al., *The Redesign of Studio Culture: A Report of the AIAS Studio Culture Task Force* (Washington, DC: American Institute of Architecture Students, 2002), https://www.aias.org/wp-content/uploads/2016/09/The_Redesign_of_Studio_Culture_2002.pdf; Donald A. Schön, *The Design Studio: An Exploration of its Traditions and Potentials* (Portland, OR: International Specialized Book Service, 1985).

8 Daqing Gu discusses the efforts of architects such as Jorsan Huang and Sicheng Liang to adopt modernist approaches from Japan and Germany, but these attempts were suppressed in the 1950s. Daqing Gu, "An Outline of Beaux-Arts Education in China: Transplantation, Localization, and Entrenchment," in Jeffrey W. Cody et al., eds., *Chinese Architecture and the Beaux-Arts* (Honolulu: University of Hawaii Press, 2011), 73–90, here 82, https://www.jstor.org/stable/j.ctt6wqgc4.10.

9 For more on closed juries, see Patrick Flynn et al., "Rethinking the Crit: A New Pedagogy in Architectural Education," in *2019 ACSA/EAAE Teachers Conference: Practice of Teaching / Teaching of Practice: The Teacher's Hunch; Proceedings* (Washington, DC: ACSA Press, 2019), 25–28, here 25, https://doi.org/10.35483/ACSA.Teach.2019.5; Helena Webster, "The Architectural Review: A Study of Ritual, Acculturation and Reproduction in Architectural Education," *Arts and Humanities in Higher Education* 4, no. 3 (2005), 265–82, https://doi.org/10.1177/1474022205056169; Kathryn H. Anthony, *Design Juries on Trial: The Renaissance of the Design Studio*, 20th anniversary ed. (self-published, 1991).

10 Chen Zhao, "Personal Contact," interview by Dijia Chen and Jiawei Wu, November 17, 2021.

desk crits and closed juries was openly described as "只可意會不可言傳" (inexplicit guidance); that is, as training that could not be communicated via explicit concepts alone. [11]

Architectural production in modern China was inevitably shaped by the design pedagogy. The appropriated Beaux-Arts approaches resulted in a series of problems that were gradually acknowledged within the architectural community after the liberalization of 1978. The dominance of instructors in design studios habituated students to a submissive role even after graduation, which impeded individual and creative thinking. Detached from either rationalism or social engagement, architectural design in China from the 1950s to the 1980s was dominated by a disconcerting, often historically incoherent, collage of traditional architectural elements and modern signs. [12]

Breaking with Tradition: The Swiss Influence

In the period of the Cultural Revolution, from 1966 to 1976, higher education *in toto* was repeatedly denounced for being distant from the reality of production, even as architecture was celebrated as a vehicle for collectivism and functional efficiency. Academics and students were sent to construction sites to directly assist local building activities. In the wake of the Cultural Revolution, no classes took place at universities for six years, and many architecture faculty and students who were fortunate enough not to be exiled to the provinces as part of the Down to the Countryside Movement were sent to urban construction sites. [13] There, they were directly engaged in manual building activities. Architectural work was in this way even further removed from autonomous creativity.

During the late 1970s and 1980s, however, a general liberalization made reform possible. In the wake of the opening of China in 1978, architectural design was recategorized as a "creative profession." As a result, the concept of 建築創作 (architectural creation), which had been popular in the 1950s but was suppressed during the Cultural Revolution for its individualistic overtones, resurfaced. [14] Each step of reform led to another. Critical reflections on the largely unchanged pedagogical system and glimpses of alternative crit models from foreign architectural programs appeared in various scholarly journals across the country. [15] The use of models and direct teacher-student dialogue became more common. Some programs with frequent international exchanges also attempted public juries in the late 1980s. In most institutions, these experiments did not have far-reaching consequences. On the whole, critiques and piecemeal reforms did little to change the tenor of the dominant

11 Wowo Ding, "回歸建築的本源：反思中國的建築教育" [Return to the origin of the architecture: Rethinking architectural education in China], 建築師 [Architect] 4 (2009), 85–92, here 88. For more on this topic, see also Daqing Gu, Chen Zhao, and Wowo Ding, "渲染、構成與設計－南工建築設計基礎教學新模式的探討" [Rendering, composition, and design: Exploring a new teaching model for the foundational architectural education at NIT], 建築學報 *[Architectural journal] 6* (1988), *51–55*, here *51*; Wenqing Wang and Jiahua Wu, "談建築設計基礎教育" [On basic architectural education], 建築學報 [Architectural journal] 7 (1984), 38–41.

12 Zhao, "Personal Contact" (see note 10).

13 Jiasheng Bao, "探索与实践－－我的建筑道路" [Exploration and practice: My journey of architecture], 城市環境設計 [Urban environmental design] 3 (2004), 46–53.

14 Dijia Chen, "On the (Mis)Use of Critical Discourse in Architecture: 'Experimental Criticism' and Its Entanglement with Postreform Art Movement in China," *Histories of Postwar Architecture* 4, no. 7 (2020), 146–68, here 148, https://doi.org/10.6092/issn.2611-0075/11429.

15 See, for instance, Wang and Wu, "談建築設計基礎教育" (see note 11); Zhitao Li, "建築設計啟蒙教育方法研究" [On the foundational architectural pedagogy], 建築學報 [Architectural journal] 6 (1990), 37–41; Buyi Zhou, "建築教育的改革勢在必行" [The unquestionable necessity of architectural pedagogical reform], 建築學報 [Architectural journal] 4 (1984), 16–21, 52–83; Charlie Xue, "英國建築教育淺觀" [An introduction to the British architectural education], 建築學報 [Architectural journal] 4 (1994), 50–55, here 54. See also Yilan Gao, "可資借鑑的建築學教學體系" [An architecture teaching system to learn from], 世界建築 [World architecture] 3 (1990), 156–58, here 158.

system, but the sudden influx of Western materials furnished professors and practitioners in China with alternative teaching methods. At NIT, whose prewar precursor was the National Central University, some senior professors began to raise concerns about the conservative teaching model. They criticized the constant judging of renderings according to the tutor's personal aesthetic preferences. "Students realizing the instructor's design" was conventionally considered to be a sign of the tutor's teaching talent. [16] Experienced teachers would draw a sketch for each student based on the characteristics of their initial proposal and then guide the student's project based on that idea in subsequent tutorials. When students finished their projects, many would find that their designs were surprisingly similar to the sketches that the teacher had made weeks before. [17]

Fiercer objections were raised by younger scholars, who took the conventional pedagogy to task for the disappointing outcomes of studio teaching; in particular, for the lack of a rationally applicable design method. [18] Aesthetic judgments dominated discussions on the quality of design, which distracted students from spatial and construction problems. The status quo encouraged a postmodernism of blunt references to ancient Chinese motifs and deconstructivism as a mere style employed for its visual novelty. Dongqing Han, an NIT graduate, recalls that, at the beginning of his third-year hotel project, a tutor introduced concepts such as culture, tourism, and spatial experience to inspire the students. However, after a month, finding that most still had not found the proper form, the frustrated teacher had to be more straightforward: "A hotel is a combination of dormitory and restaurant; one function can be either put on top of or next to the other, as simple as that!" New, clearer instructions on how the residential and dining components of a hotel could be either stacked or juxtaposed were necessary because students had no clue about the functional requirements of hotels, even after four weeks in the design studio. [19]

Younger faculty members at NIT began attempting pedagogical reforms to develop a more rational design approach. They made extensive references to foreign pedagogies that were available at the time and tried to incorporate them into a new system of their own. However, the success of these early experiments, as Han's anecdotes show, was limited. The decisive impetus for change ultimately came from an exchange agreement with ETH Zurich. Unlike most exchange programs, where, in deference to hierarchical conventions, desirable overseas visiting positions were primarily handed out to senior faculty, the head of NIT's architectural department, Jiasheng Bao, decided to send the department's

16 Wang and Wu, "談建築設計基礎教育" (see note 11), 39.

17 Zhao, "Personal Contact" (see note 10).

18 Jiawei Wu, "The Transplantation of an Architectural Pedagogy: The Zurich Model and Its Developments in China" (PhD thesis, Chinese University of Hong Kong, 2017), 247.

19 Dongqing Han, "韓冬青自述" [Self-report by Han Dongqing zishu], 世界建築 [World architecture] *5* (2016), 77, 127.

youngest tutors—including Daqing Gu, Yong Shan, Wowo Ding, Chen Zhao, and Lei Zhang. [20] Bao had entered NIT as a student in 1954 and had received an education that was profoundly influenced by the Soviet model. He was shocked by the gap between Chinese architectural education and that of Western countries when he visited MIT at the end of 1981 and was therefore determined to initiate pedagogical reforms with the younger professors. [21] Gu, Zhao, and Ding were born in the 1950s and were among the first generation of architectural students to study after the end of the Cultural Revolution and the resumption of college entrance examinations. The best of their cohort, they each had distinctive personal characteristics. Gu was a painting enthusiast and had a strong interest in design methodology, while Zhao was known for both his interest in traditional Chinese architecture and his good sense of humor. Ding, the only female member of the reformist group, was an extremely rational thinker with a strong sense of leadership. Zhang, by far the youngest of the group, was born in the late 1960s and thus belonged to a generation less directly affected by the Cultural Revolution. He was attracted to the architectural language of minimalist modernism even before studying at ETH.

According to the exchange agreement, one or two scholars from NIT would visit for an academic year under the guidance of an ETH professor. [22] While neither the hosting professor nor the research plan was specified in the treaty, Professor Herbert Kramel, then in charge of both first-year design and construction courses, invited the visiting scholars through his Chinese doctoral candidate and so became host by default. [23] This partially accidental connection between Kramel and the NIT scholars was later cemented into a long-lasting partnership that inspired pedagogical reforms back in China.

For the young visiting scholars, the daily teaching at ETH differed drastically from what they were used to. Some were astonished that the public juries comprised educators, critics, and architects from within and outside the school, that students defended their projects in front of their peers, and that they even argued with the jury committee. [24] Although public juries have been interrogated by contemporary scholars in the West and critiqued as "a ritualized performance" that depends heavily on verbal and representational skills rather than professional design capacity, for visiting design tutors from China such concerns were outweighed by the public jury's ability to broaden the scope of discussion, encourage peer learning, and open dialogue with the profession. [25] In place of the obscure grading procedures of the closed-door jury, the jury-student dynamic

20 Wu, "Transplantation of an Architectural Pedagogy" (see note 18), 208.

21 Jiasheng Bao, interview by Jiawei Wu, May 26, 2016, Nanjing.

22 Federal Institute of Technology Zurich and Nanjing Institute of Technology, Agreement NIT-ETHZ, 1985. ETH-Bibliothek, Hochschularchive der ETH Zürich.

23 Wu, "Transplantation of an Architectural Pedagogy" (see note 18), 217.

24 Zhao, "Personal Contact" (see note 10).

25 Webster, "The Architectural Review" (see note 9), 271; Sarah M. Dinham, "Architectural Education: Is Jury Criticism a Valid Teaching Technique?," *Architectural Record* 174, no. 13 (November 1986), 51–53, https://www.architecturalrecord.com/ext/resources/archives/backissues/1986-11.pdf?531205200.

in public juries allowed negotiation over, or at least justification of, the final assessment of student work. Input from experts other than the studio instructor also provided more conceptual perspectives and ultimately contributed to the students' more comprehensive understanding of design in society.

Aside from the public juries, the visiting scholars from NIT were also greatly impressed by the rational design processes, where studio instructors were capable of altering students' thinking through verbal — that is, explicitly conceptual — reasoning. [26] In contrast to the empirically based judgments on taste and aesthetics made back home, the desk crits in Kramel's studio involved constant negotiation and debate over the spatial logic of the students' designs. In addition to representations of plan, section, and elevation, drawings were expected to reveal design processes over time. As the visiting scholars recall, students were told to draw on tracing paper, as tracing permitted spatial arguments to emerge iteratively. Analytical diagrams and thematic drawings were added as they logically developed. [27]

Kramel's own formative experience at ETH had involved working with the design professor Bernhard Hoesli, who had been a key figure in the Texas Rangers (a group of architects at the University of Texas School of Architecture) before his return to Switzerland in the late 1950s, and professor of construction Heinz Ronner. From the former in particular, Kramel acquired the modernist spatial theories and pedagogical approaches of the Texas Rangers, approaches he then combined with his interest in anonymous architecture and developed into a design methodology upon which all his studio assignments were structured. [28] This method required design to be considered in terms of three paired concepts: site/place, material/construction, and function/space. [29] Kramel closely monitored the students' design outcomes at every step to ensure that the training on fundamental aspects of design would provide "a common denominator for the school." [30] In Zurich, Kramel's pedagogical approach was perceived as rigid, even as detrimental to individual creativity, but in Nanjing it would prove to be a useful teaching method with

26 Wu, "Transplantation of an Architectural Pedagogy" (see note 18), 219.

27 Wu, "Transplantation of an Architectural Pedagogy" (see note 18), 230.

28 Drawing on Gestalt theory and the spatial analysis of modernist classics, the Texas Rangers developed a pedagogy that was both comparable to the well-established Beaux-Arts system and adapted to the spatial and formal language of modernist architecture. Compared to the Beaux-Art's heavy reliance on the repetitive application of style, the Texas Rangers perceived form as the outcome of a logical evolution of a concept under external conditions. In their pedagogy, studio instructors were not worshiped and emulated by students but rather aided in students' critical and logical thinking. See Alexander Caragonne, *The Texas Rangers: Notes from an Architectural Underground* (Cambridge, MA: MIT Press, 1995).

29 Herbert Kramel, Daqing Gu, and Jiawei Wu, 基礎設計·設計基礎 [Basic design · Design basics] (Beijing: China Architecture and Building Press, 2020), 10.

30 Herbert Kramel, *Die Lehre als Programm: Grundkurs 1985* (Zurich: Institut für Geschichte und Theorie der Architektur, 1985), 15.

rationally structured training processes and a logically articulated assessment system. [31] The material and construction strand particularly interested Chinese educators, for this binary constituted an ontological essence of architecture that had been long omitted from design training in China.

On their return to Nanjing, the tutors began their reforms with the first-year design studios. The 1989/90 and 1990/91 studios led by Gu were the first attempts to transplant Kramel's design pedagogy to Southeast University (as NIT was renamed in 1988), and they emulated the ETH focus on spatial issues and rational formal operations. Ding, Zhao, and Zhang then reformed the second-year studios by providing a specific site, using handmade scale models, and emphasizing structural and constructional rationality. **fig. 1** Compared to the conventional studios, the final outcomes from Zhang's studio showed a marked consistency between interior space and building volume and featured the application of modular systems to control the overall volume; the use of standardized architectural elements on the building envelope; candid structural and constructional logic; and, most impressively, modernist simplicity with little ornament. Students were also asked to make large-scale models to articulate their designs. The students' work, which negotiates relationships between envelope and interior, planes and functional zones, reflects the time dedicated to desk crits over the course of the design studio. **fig. 2**

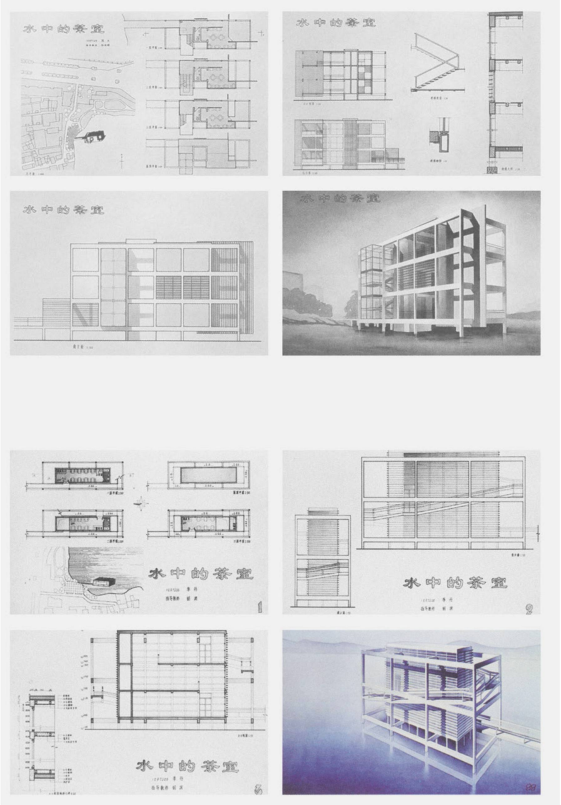


fig. 1 Student drawing for "A Design for the Teahouse," a second-year studio at SEU, 1998/99. Courtesy of Southeast University School of Architecture Archive

The pedagogical changes, however, failed to gain support from senior faculty, as the rationalized crits emphasized critical thinking and encouraged students to debate—and potentially contradict—their teachers. [32] Among the staff, the new teaching methods were viewed not merely as rearrangements of the existing knowledge system but as an attack on the (by now) nationalized *école* model of professorial authority.

In the face of resistance to change at Southeast University (SEU), in 1999 some of the reformist educators, led by Bao, left to launch a new architectural program, the Graduate School of Architecture (GSA) at Nanjing University (NJU). While the pedagogical philosophy

31 Mathias Müller and Daniel Niggli, founders of the EM2N design office, began their study at ETH Zurich in 1989. Reminiscing about their learning experience, they expressed dissatisfaction with the "Basic Design" program: "Under Kramel, this lively approach (of B. Hoesli) to teaching gradually lost its vigor and became dry and desiccated." Mathias Müller and Daniel Niggli, "How We Became Who We Are—A Professional Biography of EM2N (Part 1)," in Ilka Ruby and Andreas Ruby, eds., *EM2N: Both And* (Zurich: gta Verlag, 2009).

32 Daqing Gu, "設計基礎教學改革的心路歷程" [A memo for the reforms on design basics], in Guxi Pan, ed., 東南大學建築系七十周年紀念專集 [Memorial symposium for 70th anniversary of the Architectural Department of Southeast University] (Beijing: China Architecture and Building Press, 2020), 216–19, here 218–19.

of the GSA took inspiration from the initial teaching reforms at NIT, the new school also provided a clean slate for a more systematic reinvention of the conventional educational model. Whereas students in conventional graduate programs were fixed in a rigid master-apprentice relationship, GSA provided interlocking design studios, workshops, and lectures that fostered thematic studies into design, conceptual work, and tectonics. Design classes were based on the three conceptual pairs proposed by Kramel and encouraged the exploration of structure and material, the contextualization of architecture in an urban environment, discussions of humanist considerations, research-based problem-solving processes, and sketches of modernist spatial arrangements. As was demonstrated in Zhang's studio on apartment design, students were expected to start the project by conducting interviews, analyzing existing cases, and only then proposing a problem to solve. Zhang also divided students into groups of three and asked them to design part of the apartment district independently. [33] Since each student's design built upon their partners' work in this scenario, Zhang created a unique form of "peer-crit" among students that encouraged both cooperation and critical negotiation.

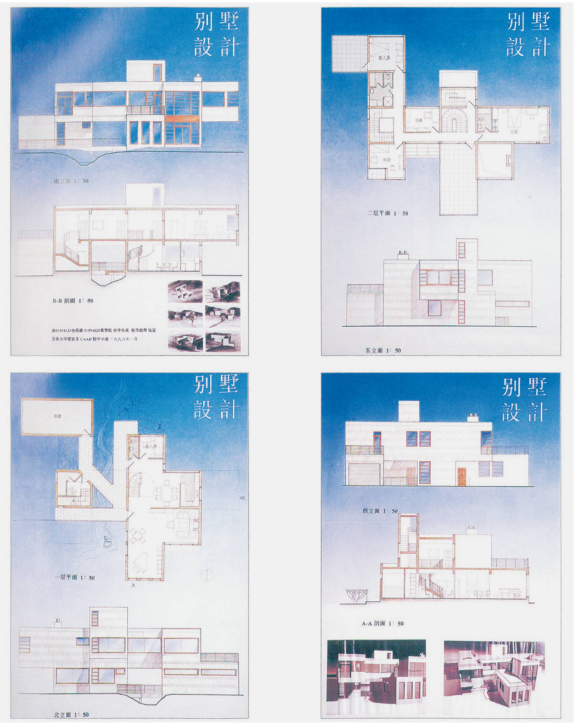


fig. 2 Drawings for "Design of a Villa," a second-year studio at SEU tutored by Zhang Lei, 1995/96. Courtesy of Southeast University School of Architecture Archive

The design teaching at GSA therefore built upon and diversified the reformist studios at SEU. By creatively mobilizing and appropriating Kramel's teaching methods, the young faculty members at GSA were able to test their ideals in a new architectural program that they had established. Derived from a Swiss architectural pedagogy, these reforms fundamentally threatened the foundations of traditional Chinese pedagogy and sparked widespread hope for alternative design teaching among the architectural community in China.

Beyond the "Crit": Tectonics and the Making of a New Tradition

Among the innovations in the Graduate School of Architecture's curriculum at NJU, the most notable was arguably the systematic training in tectonics, which was vaunted as an essential doctrine of

33 Zhang Lei, "基本設計" [Design basics], in GSA 南京大學建築研究所年鑒2002–2003 [NJU-GSA year book 2002–2003] (Nanjing: Nanjing University Press, 2003), 1–8.

architecture, transcending style, time, and place. [34] Not only were more than half of the lectures, workshops, and design studios dedicated to materials, structure, and construction, but the faculty also organized university-wide and international exchange events on full-scale construction experiments and frequently published their teaching and research outcomes. [35] The GSA also introduced Kenneth Frampton's notion of "tectonics" to the Chinese architectural community via *A+D*, the bilingual journal launched at GSA. [36] Frampton's tectonics, which reevaluated modern architectural history through the craft of construction, went viral among Chinese scholars soon after. The architectural theorist Junyang Wang (also known as Qun Wang), who was then teaching architectural history at GSA, had been exposed to Frampton's newly published book *Studies in Tectonic Culture* while pursuing his doctorate at Chalmers University of Technology in Gothenburg in the 1990s. Wang's Chinese translation of Frampton's book, published in 2007, had a great impact on the Chinese architectural academic community. [37] A turn to tectonics was without doubt a radical attack against the conventional pedagogical approaches in China, if not an ontological overthrow of the received understanding of architecture in general.

The appetite for tectonic studies had surfaced among the young NIT scholars even before their visit to ETH, as they had discovered in the NIT archive a home-grown tectonic curriculum that had been lost since the 1920s. Courses on structure and architectural details had, at that time, also predominated over design studios. [38] This curriculum, designed in a reformist moment between the wars, had long been suppressed. The restructuring of architecture schools in the wake of the postwar, nationwide adoption of Soviet models had reinforced a Beaux-Arts emphasis on representation, while training in construction knowledge languished. [39] **figs. 3 and 4** Curricula on rendering ancient Chinese architecture,

34 See Chen Zhao, "前言：建構在當代中國的意義" [Preface: The meaning of tectonics in contemporary China], in Chen Zhao et al., 南大建構實驗 [Tectonic experiments in Nan Da] (Nanjing: Southeast University Press, 2004), 1.

35 Workshops included the international Workshop for Wooden Construction, jointly held in Nanjing and Tvedestrand, Norway, in 2006; and the landscape furniture and spatial structures built at the Honshan Zoo in Nanjing in 2007. Publication outcomes included Chen Zhao et al., "以建構啓動的設計教學" [Approach to the initiation of tectonics and others in design teaching], 建築學報 [Architectural journal] 5 (2001), 33–36; Jinlong Feng and Chen Zhao, "關於建構教學的思考與嘗試" [Reflection and practice upon the teaching of tectonics], 新建築 [New architecture] 3 (2005), 4–7; Jinlong Feng, Chen Zhao, and Ling Zhou, "建築設計教學中的木構建造實驗" [Wooden construction experiments in architectural design studio], 世界建築 [World architecture] 8 (2005), 40–44; Chen Zhao, ed., *Cross Cultural Workshop with Wooden Construction* (Beijing: China Architecture & Building Press, 2008); Wowo Ding and Heng Hu, eds., 建築文化研究 [Studies of architecture and culture] (Beijing: Central Compilation and Translation Press, 2009).

36 Qun Wang, "Reading Studies in Tectonics Culture [解讀建構文化研究]", *A+D* 1 (2001), 69–70; Qun Wang, "Reading Studies in Tectonics Culture (2) [解讀建構文化研究 (二)]", *A+D* 2 (2001), 68–69.

37 Lu Feng, "重新建構–《建築文化研究》建構"專輯書評" [Reconstructing "tectonics": Review on studies of architecture and culture], 建築學報 [Architectural journal] 12 (2009), 62–63, here 63. A mark of Frampton's influence is the preservation of his personal architecture library at Hong Kong University.

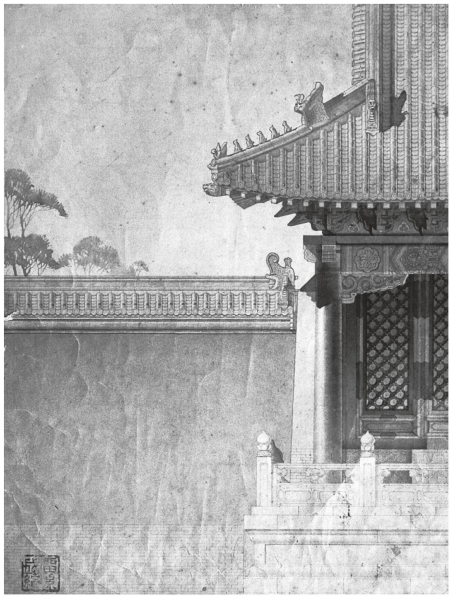
fig. 3 Zhao Fuxing, rendering of Chinese architectural elements, NIT, 1952. Courtesy of Southeast University School of Architecture Archive

38 In the 1950s, Liu Dunzhen and Yang Tingbao also invited carpenters to make full-scale wooden joints for the model room. Yanze Wang, "学院式建筑教育的传承与变革" [Evolution and revolution of academicist architectural education: With special reference to the history of architectural education at Southeast University] (PhD thesis, Southeast University, Nanjing, 2019), 79; Zhao, "Personal Contact" (see note 10); Wowo Ding, "Personal Contact," interview by Jiawei Wu, May 29, 2016.

39 Wang,"学院式建筑教育的传承与变革" (see note 38), 88.

designed to present the structural logic of timber architecture, diverged from its original intent and was reduced to mere painting exercises. 40 fig. 5

In the 1980s, the younger design tutors at NIT realized that the unfiltered application of Beaux-Arts rendering methods, with their fixation on facades, reduced a characteristic feature of Chinese architecture—the sophisticated three-dimensional structural logic embodied in joinery—to two-dimensional images. figs. 6 and 7 Renderings of Western classical architectural elevations are used to help students grasp the vital formal properties of architectural design: proportional balance, axial coordination, and geometric relationships. These concepts, however, are pointless in understanding Chinese timber architecture, as the so-called facade of a Chinese house is not intentionally designed but spontaneously generated by the timber structure itself. Zhao, in particular, combined his early interest in Chinese timber architecture with studies of anonymous architecture during his stay at ETH. 41 Zhao and his peers criticized the first-generation modern architectural historians Sicheng Liang and Huiyin Lin for errors brought about by documenting China's indigenous building system with Western classical architectural techniques. These errors, Zhao argued, could be corrected, and a renewed understanding of Chinese timber architecture could be achieved, by studying its tectonic aspects. 42 This would both restore cultural context and repair the severing of the facade from the structure in design education and practice. 43 For the GSA group, as for others seeking to ground their opposition to a mainstream canon prioritizing formal abstraction and style, as well as the superficial stylization of ancient Chinese architecture, Frampton's theories provided a theoretical touchstone.



While the young scholars who had discovered the suppressed NIT prewar curriculum failed to reintroduce its tectonic content, the group led by Bao at the GSA at NJU was, by the early 2000s, able to establish a self-sustaining dynamic of theory, research, and hands-on experimentation addressing the dialectic between material, tectonics, and concept. 44 Design studios at

40 Wang, "学院式建筑教育的传承与变革" (see note 38), 118–119.

fig. 4 Zhuang Youji, rendering of Chinese architectural elements, NIT, 1952. Courtesy of Southeast University School of Architecture Archive

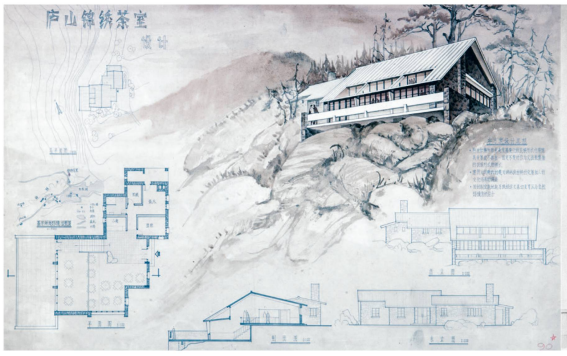
41 Chen Zhao, "'民族主義'與'古典主義'–梁思成建築體系的矛盾性與悲劇性之分析" ["Nationalism" and "classicism"—Analysis of the contradiction and tragedy in Liang Si Cheng's architectural theory], 建築與設計 [Architecture and design] 4 (2000), 13–22, here 17.

fig. 5 Bao Jiasheng, facade rendering of ancient Chinese timber architecture, NIT, 1955. Courtesy of Southeast University School of Architecture Archive

42 Chen Zhao, "關於"中國為何用木構建築"——個建築文化的觀念與詮釋的問題" [On "Why China uses wooden architecture"—A question of perception and interpretation of architectural culture], in 立面的誤會 [The misconception of facade] (Beijing: SDX Joint Publishing Company, 2007), 84–95, here 85. Similar opinions are presented in Wowo Ding, "新思考中國的建築教育" [Rethinking China's architectural education], 建築學報 [Architectural journal] 2 (2004), 14–16; Chen Zhao, "Elevation or Façade: A Re-evaluation of Liang Sicheng's Interpretation of Chinese Timber Architecture in the Light of Beaux-Arts Classicism," in Cody et al., *Chinese Architecture and the Beaux-Arts* (see note 8), 193–206.

43 Zhao et al., "以建構啟動的設計教學" (see note 35), 33.

44 Bao's group included Ding, Zhao, Zhang, Jinlong Feng, Wang Qun, Ji Guohua, Zhu Jingxiang, and Zhou Ling.



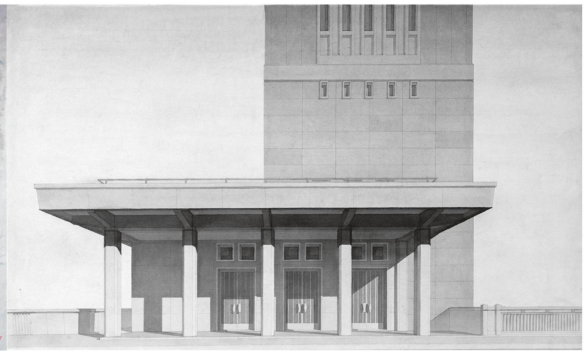


fig. 6 Zhang Hong, rendering of a teahouse design, NIT, 1980s. Courtesy of Southeast University School of Architecture Archive

fig. 7 Anonymous, rendering of the Yangtze River Bridge Tower, NIT, 1982. Courtesy of Southeast University School of Architecture Archive

the GSA were paired with lectures and workshops, each focusing on one aspect of tectonic studies, such as material properties, large-span structures, varieties of timber structures, modular systems, and spontaneous construction. Through case studies, hands-on model making, and empirical observation, students were expected to survey the correlation between material, construction method, and formal expression, study the technical failures caused by improper connections, and investigate the physical and phenomenal aspects of material performance. **fig. 8** The design tasks in these courses were usually small-scale, single-function temporary buildings such as shelters, pavilions, and vacation huts that were expected to be completed with predetermined material types, quantities, structures, and/or budgets, and articulated with diagrams, construction drawings, and large-scale models showing construction processes and joint details. Excluded from these workshops were complex functional arrangements, overall formal shaping, and the facade design of conventional design studios. Correspondingly, judgments of visual appeal and presentational skills were replaced by rational discussions of practical construction during desk crits and final juries. As these workshops turned students' attention from aesthetic to pragmatic questions, the tectonic-centered curriculum fundamentally shifted thetenor of crits. [45]

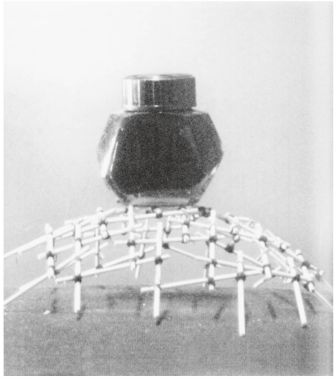


fig. 8 Structural model from Feng Jinlong's studio, GSA at Nanjing University, 2002. Courtesy of Nanjing University School of Architecture and Urban Planning Archive

In this context of reform, the construction experiments primarily led by Zhao exemplified a double rejection of *école* methods and, as such, could not help but be controversial. Inspired by Kramel's timber-construction *Baukurs* at ETH, [46] Zhao replaced representation-based design with real-scale building experiences that also echoed the Maoist injunction that architects return to the building site. His experimental workshops required small groups of students to design and build functional pavilions and outdoor furniture out of timber and later

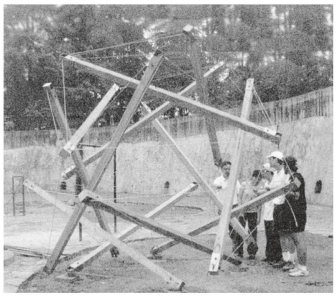


fig. 9 Construction experiment in Hongshan Zoo, Nanjing, GSA, Nanjing University, 2007. Courtesy of Nanjing University School of Architecture and Urban Planning Archive

45 This includes lectures on tectonics by Wang, on materials and construction by Jinlong Feng, and on modern structure (2001–2006) by Zhu; and studios including Jinlong Feng's Experimental Constructions of Wooden Structure (2001) and Span Space (2002), Zhou's Tectonic Study (2003), and Zhu's Structuring the Self-Built Hut (2005).

46 Ban Shan and Chen Zhao, "尺度與材料的真實性：南京大學建造教學漫談" [Authenticity of scale and material: The construction teaching of Nanjing University in Zhao Chen's perspective], 新建築 [New architecture] 4 (2011), 15–17, here 16.

bamboo. fig.9 The process of building shifted the nature of students' work from the hypothetical to the real. However, the expectation that the final products of these experiments demonstrate structural stability and functionality for at least some period of time was difficult to implement within Chinese universities at that time. Few if any students had prior practical experience with building, and carpentry was not (and is still not) a permanent position at any Chinese university. Furthermore, organizing student activities required that approval be obtained from university departments, an onerous process.

Zhao's studios revealed that students were better able to assimilate faculty instructions and suggestions when these were directly reflected in construction outcomes, whether successful or not, rather than based purely in images. Students were also faced with issues that never manifest in drawings, or even in models, including problems with the length and weight of a material element, the material's flexibility and durability, the complexity of joints, tolerable errors in the construction process, and so on. Thus, structure and details are no longer considered merely in the final stages of design, if at all, as in conventional design studios, but are part of the design itself or even the source of inspiration. As one student recalls, "construction is a process of problem-solving... Design and construction can be united, correlated, and refined by one another." In this process, crits become opportunities for flexible, on-site communications between tutors and students. [47]

Donald Schön once proposed design studio training as a model of "reflection-in-action," as studio-based projects simulate the complexities of real-life projects and allow students to calibrate their designs with the thinking of experts. [48] Although Schön has been criticized for exaggerating the relevance of desk crits to real professional experience, [49] Zhao's construction experiments arguably exemplify an effective realization of "reflection-in-action" for students long estranged from real-world practices. Zhao's studios restored design as a series of interlocking problem-solving processes and compelled tutors and students to adapt continually to new situations and proceed toward a common goal through rational and straightforward communication. The construction experiments redefined the power dynamics among students and their tutors. Since the value of an idea was plain to see in the completed building, much of the aura revolving around the "final jury" collapsed.

As Thomas Dutton observes, two fundamental dynamics in the crit model, hierarchy and competition, greatly impede open discussion and peer learning. [50] On the one hand, students in

47 One student described how a screw cap's thickness was overlooked and led to two reworks. See Chen Zhao et al., eds., 南京大學建築學院成立10周年紀念冊 [10th anniversary album of the School of Architecture at Nanjing University] (Nanjing: Nanjing University Press, 2011), 78–80.

48 Schön, *Design Studio* (see note 7), 21.

49 Helena Webster, "Architectural Education after Schön: Cracks, Blurs, Boundaries and Beyond," *Journal for Education in the Built Environment* 3, no. 2 (2008), 63–74, https://doi.org/10.11120/jebe.2008.03020063.

50 Dutton, "Design and Studio Pedagogy" (see note 7).

competitive environments are more inclined to pander to the studio instructor's perceived subjective preferences—their teacher's taste, whether expressed or implied—rather than focusing on the design problem itself. On the other hand, the tension among peers competing for grades, as well as anxiety about potential plagiarism, may prevent students from sincerely sharing and discussing one another's proposals. For his construction experiments, Zhao transformed the conventionally intense and competitive final jury into a celebratory party by giving all students the same grade to acknowledge their mutual achievements. [51] By undermining the gravity of the final jury, the construction experiments loosened the hierarchical tutor-student tension and encouraged more relaxed and engaged discussion over the course of the workshop. With less pressure from competition and restricted possibilities for asserting individual creativity, most students collaborated instead of competing with one another. Zhao's construction experiments thus overcame the inadequacies of the conventional crit model by encouraging nonhierarchical learning and nurturing the development of shared professional competencies.

51 Shan and Zhao, "尺度與材料的真實性" (see note 46), 17.

Conclusions: The Shifting Knowledge Model of the Crit

Despite its dominance in design pedagogy, the crit is seldom documented in China. As some scholars argue, the crit is a "black box," barely definable and highly mutable; nonetheless, it clearly manifests the epistemic model of a particular version of design education. [52] By tracing shifts in curricula from the interwar years at the National Fourth Sun Yat-sen University to the GSA at NJU after 1999, this article critically examines two vital transformations of the crit in architectural pedagogy in China, both ultimately inspired by the exchange experiences of young, discontented NIT faculty members at ETH Zurich during the late 1990s. The leap from closed to open juries signaled a fundamental change in the power dynamics between students and studio instructors. The authority of the crit further declined after the rise of architectural tectonics, a paradigm that ultimately led to the substitution of image-driven projects by real-scale construction projects. The reformist curricula implemented at GSA, developed from a Swiss conception of architecture as *Baukunst* (art of building), maintained that design consists of interrelating problem-solving operations and should be dissected and taught through a series of rationally structured procedures.

52 Rachel Sara and Rosie Parnell, "Fear and Learning in the Architectural Crit," *Field Journal* 5, no. 1 (2016), 101–26, here 102, https://www.field-journal.org/article/id/61/; Helena Webster, "The Analytics of Power: Re-presenting the Design Jury," *Journal of Architectural Education* 60, no. 3 (2007), 21–27, here 22, https://doi.org/10.1111/j.1531-314X.2007.00092.x.

The transformation in the design pedagogy at GSA marked a profound change in the perception of architecture. Rather than attempt to define architecture as a fine art, GSA graduates

returned to the craft of building, but with newfound self-awareness. They continued this conscious exploration of construction issues in their subsequent careers. GSA members have gone on to make a lasting impact on China's architectural academic community, providing an antidote to moribund stylistic formalism in both architectural theory and design practice.

The crit, as a "rhetorical situation" that molds students' perceptions and actions through communication, echoes the shifting power dynamics in design teaching. [53] The unstated values, attitudes, and norms of the classroom articulate how knowledge is constructed and conveyed between tutors and students. Adopted into a culture with artisanal conventions dating back thousands of years, the crit in China morphed into a more mystical and asymmetrical ritual than its Western counterpart. The reforms at GSA, however, radically redefined the role of studio instructors from unquestioned dictators of taste to guides of logical reasoning, and the role of students was elevated from imitators to critical thinkers. Although the tradition of artisanry in architecture was revived through hands-on experiences with real-scale construction experiments, the master-apprentice relationship as manifested in the dynamics of the crit was dissolved. After GSA began to allow tutor-student interactions in the open jury in the early 2000s, similar reforms were gradually implemented across multiple major architectural programs in China's universities. In the meantime, other universities have also started their own construction experiments, sometimes expanding into a "construction festival" that has further encouraged knowledge exchange among faculties and students from all over the nation. [54] GSA led the push for construction experiments, testing evolving materials such as industrial bamboo. [55] The design teaching model developed at GSA thus not only reflected the mutual endeavor of progressive teachers but was also shaped by the evolution of the construction industry in China as a whole, a topic on which more research is needed.

53 Yeonjoo Oh et al., "A Theoretical Framework of Design Critiquing in Architecture Studios," *Design Studies* 34, no. 3 (2013), 302–25, here 319, https://doi.org/10.1016/j.destud.2012.08.004.

54 Tongji University, for instance, has hosted construction festivals annually since 2007. The festival invites teams from most of the major universities in China to build temporary shelters on campus.

55 One of the key events in this regard was the Construction Workshop held at the Ecological Material of Industrialized Bamboo for the symposioum of the Association of East Asia Research Universities (AEARU) in 2018.