

EAAE-ARCC
INTERNATIONAL
CONFERENCE

2nd VALENCIA
INTERNATIONAL
BIENNIAL OF
RESEARCH IN
ARCHITECTURE
11-14 NOV 2020



THE ARCHITECT AND THE CITY

VOLUME 2



UNIVERSITAT
POLITÀCNICA
DE VALÈNCIA



ESCOLA TÈCNICA
SUPERIOR
D'ARQUITECTURA

Publisher:

Editorial Universitat Politècnica de València, 2020
<http://www.lalibreria.upv.es>
ISBN 978-84-9048-842-3 (Set of two volumes)
978-84-9048-981-9 (Volume 1)
978-84-9048-982-6 (Volume 2)

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EAAE-ARCC International Conference & 2nd
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Universitat Politècnica de València

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DESIGN RESEARCH AND A SHIFT IN ARCHITECTURAL EDUCATION AND PRACTICE

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ABSTRACT

Research, once associated only with academia, now equally connects to learning and practice in architecture, as focus has shifted towards a wider design research community. Research has become inclusive of formerly marginalised areas such as process-oriented and practice-based research in the arts and humanities as well as applied commercial research undertaken by industry. Providing a first study of this shift, this paper explores why design research is of growing importance to architecture. It systematically analyses a selection of current cases at the intersection of architectural practice and education within the UK to survey existing design research approaches, and asks: How can design research transform and create new architectural practices and forms of education? Following this question, the paper discusses some of the design research models used across architectural practice and education.

KEYWORDS

Design research; architectural education; architectural practice.

INTRODUCTION

Research in architecture has long been associated with design research (Archer 1978, Frayling 1993, Till 2005, Geiser 2008, Fraser 2013). Known as 'architectural design research', it highlights the design and research processes and outcomes useful

for the creation of projects or a broader contribution to design thinking (Fraser 2013). This definition corresponds with new agendas and frameworks by international research institutions in support of a diversification of research and knowledge exchange.

Design research is increasingly recognised as essential to disciplinary development and architectural education and training. For example, it is one of architecture's core research activities (Rendell 2013) at both graduate and undergraduate levels. In 1999, the Bologna Declaration (Joint Declaration of the European Ministers of Education) caused a shift in education policy within Europe towards research in design-oriented disciplines (Geiser 2008). In the following years, design research in architecture was internationally acknowledged and included within the UK Research Excellence Framework (REF), the Excellence in Research for Australia agendas, and the research framework of the European Association of Architectural Education (Fraser 2013). This year, the European League of Institutes of the Arts (ELIA) presented the Vienna Declaration on Artistic Research to support the establishment of research in all disciplines of art practice including architecture.

Architecture is regarded as a research discipline in its own right (Till 2005), and research is considered to be essential to architectural practice (RIBA 2014c). In 2016, the Royal Institute of British Architects (RIBA) received the highest number of submissions to the President's Awards for Research (RIBA 2017), revealing a growing interest not only in academic research but also by architectural practices to secure funding to conduct research. Therefore, the research community

and audience have become larger, and the distinction between academia and practice lessened. Moreover, the scope and scale of the topics covered expanded and diversified in 2016, while previously most research was project-focused and technical in nature (RIBA 2014c).

Considering these changes, this paper studies how design research transforms architecture. Part of a larger study, this paper will discuss how design research affects architectural practice and creates new forms of education. Based on a survey of current practices and studios within London in the UK, it will further provide a more detailed analysis of selected cases and the differences they present of how design research is understood.

1. HOW DID RESEARCH EVOLVE IN ARCHITECTURAL EDUCATION AND PRACTICE IN THE UK?

For the UK Research Excellence Framework (REF) that replaced the previous UK Research Assessment Exercise (RAE), the definition of research changed from 'an original investigation undertaken in order to gain knowledge and understanding' (RAE 2005) to 'a process of investigation leading to new insights, effectively shared' (REF 2019), with several interim modifications occurring between 2001 and 2019. A comparison of these definitions shows a significant transformation in the understanding of the value of research and the research community over the last two decades. The change also indicates that there is a shift in focus from the academic community to a wider audience, the public. Design research is becoming more important with this shift, as it tends to have a direct impact on practices and practitioners and is directed towards a larger public audience and not just academics. Furthermore, there is a growing emphasis on the process of research and how it is shared, while at the same time still meeting the criteria

of 'originality', 'significance' and 'rigour' used in the assessment of research quality. The new definition manifests that world-leading research can include formerly marginalised areas such as process-oriented and practice-based research in the arts and humanities as well as applied commercial research undertaken outside academia in industry.

Research is associated with postgraduate-level programs in architecture and a requirement specified by the RIBA. The RIBA criteria for Part 2 (master level) UK courses in architecture, which it validates with the Architects Registration Board's (ARB), emphasise a 'critical understanding of how knowledge is advanced through research to produce clear, logically argued and original written work relating to architectural culture, theory and design' (RIBA 2014a, RIBA 2014b). This criterion unfolds the significance of research in architectural education by identifying it as a necessity to advance professional practice.

Design is also increasingly regarded as important in higher research degrees. Some institutions have started to define PhD-level projects through design research, often coined 'PhD by Design', 'PhD by Practice', or 'Practice-based PhD'. For example, currently nine PhD programmes with practice-based pathways in architecture are advertised online within the UK by the Architectural Association, Edinburgh College of Art, Goldsmiths (University of London), Royal College of Art, The Bartlett (University College London), Manchester School of Architecture, University of Edinburgh, University of Nottingham, and the University of Brighton. At the same time, most other universities offer an option to integrate design research into PhD work.

In parallel, there is a growing interest in securing funding for research by professional practices. Architectural practices typically apply for research funding by collaborating with a university or as part of a knowledge transfer partnership (RIBA 2017). The new definition of research for the UK REF, which

is run by UK Research and Innovation, and an expansion of subject coverage for quality-related funding from the UK research councils are encouraging practice-based research. This expansion supports architecture – which is deemed unique as a subject and a discipline (Rendell 2004), as it brings together different modes of research that are often kept apart – to develop practice-based and practice-led forms of research and provides possibilities for new interdisciplinary research.

Architectural design research and skills are also recognised as essential to economic growth. Design skills contribute 12% to the total UK gross value added, and their contribution to the economy rose by 47.2% in the architecture and built environment sector from 2011 to 2015 (Design Council 2018). In particular, architecture schools significantly contribute to a growing pipeline of design skills that benefit not only the design economy but the UK economy as a whole. According to the RIBA Education Statistics of 2016/17 (RIBA 2018), there is a long-term growth in the number of student applications to architecture schools. However, the Design Council reported in 2018 that 82% of people with design skills gained in architecture and the built environment, work outside these disciplines in other design roles (Design Council 2015). It shows that the current skillset of architecture graduates is also effective in other industries.

To summarise, one can say that architectural design research in the UK is currently encouraged by the REF definition of research, RIBA and ARB programme validation criteria, a PhD-level focus on practice-led and practice-based research and the UK research councils' quality-related funding eligibility criteria. Furthermore, the contribution of design skills gained in architecture and the built environment studies to the UK economy is recognised as essential.

2. CURRENT UK LANDSCAPE IN ARCHITECTURE: PRACTICE, RESEARCH, STUDIO

New models of learning and practicing in architecture are encouraged and reformulated through collective processes of learning and design research (Geiser 2008), which address an audience beyond just the academic studio and professional practice (Lawson 2002). New learning and practice approaches consolidate the emphasis of the UK REF on research process and impact, an understanding of research that can be seen reflected in the professional architecture course validation criteria of the RIBA and ARB.

In recent years, architects have become progressively interested in design research in both their practice and teaching as well as the wider societal impacts it can create. Practitioners are increasingly taking part in postgraduate-level teaching as studio tutors, are involved in funded research projects and participate in exhibitions and publications. Design studios thereby provide a valuable ground to test activities at the intersection of learning, research and practice. To study this in greater detail, the paper considers necessary the following survey of postgraduate-level architectural design studios.

In the UK, there are currently 44 Schools of Architecture offering RIBA/ARB Part 2 validated courses at master's degree level. The professional advancement offered by Part 2 studies seems to attract the majority of students after passing their Part 1 and having taken a year out. The number of students entering RIBA validated Part 2 courses in 2017/18 was 2,167 (RIBA 2019). This number grows slightly year on year, but for the academic year starting 2017, it is below the number of graduates who completed their Part 1 studies in 2015/16 (2,973). The number of new entrants from outside the UK to first year Part 2 was 734. Thus, around half the students passing their Part 1 in 2015/16 examination must have decided to continue

School	Programme	Architectural Design Studio	Studio Tutors/Associated practices	AP	UK	CP	T	R	I	Int	
The Royal College of Art (RCA)	MA Architecture (13 Unit) MA Architecture		Steve Salembier (Bildraum)	.					.	.	
		ADS0	Paul Sheppard Maria Paez Gonzalez (Foster + Partners)	.	.	.			.	.
		ADS1	Douglas Murphy Andrea Zanderigo (Baukuh) Ahmed Belkhdjia (Fala Atelier)	.	.	.	.	.	.	.
		ADS2	Diana Ibáñez López (The Why Factory) David Knight (DK-CM)	.	.	.			.	.
		ADS3	Daniel Fernández Pascual, Alon Schwabe (Cooking Sections) Tom Greenall (DSDHA)	.	.	.	.	.	.	.
		ADS4	Matteo Mastrandrea (Es Devlin Studio) Nicola Koller								
		ADS5	Christopher Dyvik, Max Kahlen, Isabel Pietri (Dyvik Kahlen Architects) Clara Kraft, Satoshi Isono	.	.	.	.	.	.	.	.
		ADS6	(Kraft Isono) Guan Lee (Grymsdyke Farm) Marco Ferrari (Studio Folder)	.	.	.	.	.	.	.	.
		ADS7	Elise Hunchuck Jingru (Cyan) Cheng Kamil Hilmi Dalkir								
		ADS8	Marina Otero Verzier Ippolito Pestellini Laparelli (OMA) John Ng (Elsewhere Architecture)	.	.	.	.	.	.	.	.
		ADS9	Zsuzsa Péter (Farshid Moussavi Architecture) James Kwang Ho Chung (Hopkins Architects) Gianfranco Bombaci, Matteo Costanzo (2A+P/A)	.	.	.	.	.	.	.	.
		ADS10	Francesca Romana Dell'Aglio Davide Sacconi								
		ADS11	Renaud Haerlingen Victor Meester (Rotor) Livia Wang	.	.	.	.	.	.	.	.
		ADS12	Benjamin Reynolds, Valle Medina (Pa.LaC.E) CJ Lim (Studio 8 Architects)	.	.	.	.	.	.	.	.
		Unit 10	Simon Dickens (Youmeheshe) Laura Allen and Mark Smout	.	.	.	.	.	.	.	.
		Unit 11	(Smout Allen)								
		Unit 12	Elizabeth Dow and Jonathan Hill Sabine Storp and Patrick Weber								
Unit 13	(Storp Weber Architecture) Jakub Klaska (ZHA) Dirk Krolikowski (DKFS)	.	.	.	.	.	.	.	.
Unit 14	Max Dewdney (Max Dewdney Architects)	.	.	.	.	.	.	.	.
Unit 15	Matthew Butcher										
Unit 16	Yeoryia Manolopoulou (AY Architects)	.	.	.	.	.	.	.	.
Unit 17	Nial McLaughlin (Nial McLaughlin Architects)	.	.	.	.	.	.	.	.
Unit 18	Ricardo de Ostos (NaJa & deOstos) Isaie Bloch (Eragatory)	.	.	.	.	.	.	.	.
Unit 20	Marjan Colletti (Marcos and Marjan Architects) Javier Ruiz Abigail Ashton, Andrew Porter (Ashton Porter Architects)	.	.	.	.	.	.	.	.
Unit 21	Tom Holberton (SoHo+Co) Izaskun Chinchilla Moreno (Izaskun Chinchilla Architects)	.	.	.	.	.	.	.	.
Unit 22	Ovalle Costal (Wilkinson Eyre Architects)	.	.	.	.	.	.	.	.
Unit 24	Penelope Haralambidou and Michael Tite										
Unit 25	Emma-Kate Matthews	.	.	.	.	.	.	.	.

School	Programme	Architectural Design Studio	Studio Tutors/Associated practices	AP	UK	CP	T	R	I	Int
The Architectural Association (AA)	AA Diploma (MArch) (21 Diploma Unit)	Diploma 1	Martin Jameson (Serie Architects) Miraj Ahmed	.	.	.	.	.
		Diploma 2	Lara Lesmes & Fredrik Hellberg (Space Popular) Christina Varvia, Merve Anil, Eyal Weizman (Forensic Architecture)	.	.	.	.	.		.
		Diploma 3		.	.		.	.	.	.
		Diploma 4	John Palmesino, Ann-Sofi Rönnskog (Territorial Agency)	.	.		.	.	.	.
		Diploma 5	Umberto Napolitano, Andrea Guazzieri(GFC Architecture)	.		.	.	.
		Diploma 6	Guillermo Lopez Ibañez (MAIO) Jack Self (REAL Foundation)	.	.		.	.
		Diploma 7	Hamed Khosravi, Platon Issaias						.	
		Diploma 8	Rok Oman, Špela Videčnik (OFIS) Stefan Laxness, Antoine Vaxelaire	.		.		.		
		Diploma 9		.		.				.
		Diploma 10	(TOI-T) Carlos Villanueva Brandt Architecture	.						
		Diploma 11	Shin Egashira							
		Diploma 12	Inigo Minns, Ivan Morison, Alexandra Daisy Ginsberg							
		Diploma 13	Bostjan Vuga (SADAR+VUGA) Alvaro Velasco	.		.				.
		Diploma 14	Pier Vittorio Aureli (Dogma) Maria Shéhérazade Giudici Sam Chermayeff (June 14 Meyer-Grohbrugge & Chermayeff)	.		.				.
		Diploma 15	Lucy Styles (SANAA)	.		.				.
		Diploma 16	Ila Beka, Louise Lemoine (Beka & Lemoine) Gili Merin	.					.	.
		Diploma 17	Gabu Heindl (GABU Heindl Architektur) Eleanor Dodman (Eleanor Dodman Architects)	.	.	.	.	.	.	.
		Diploma 18	Liza Fior (muf architecture/art) Aude-Line Dulière, James Westcott, Lionel Devlieger, Maarten Gielen (Rotor)	.	.	.	.	.	.	.
		Diploma 19	David Kohn, Bushra Mohamed (David Kohn Architects)	.	.	.	.	.	.	.
		Diploma 20	Selva Gürdoğan, Gregers Tang Thomsen (Superpool) Jonathan Robinson (Civic) Tatjana Crossley Didier Fiúza Faustino	.	.			.	.	.
		Diploma 21	(Mésarchitecture) Anna Muzychak							.

Table 1. Postgraduate architecture programmes and studio units leading to professional qualification (ARB/RIBA Part 2) in selected schools of architecture in the 2019/20 academic year.

AP: Architectural Practice, UK: UK-based, CP: Conventional Practice, T: Teaching, R: Research, I: Impact, Int: Interdisciplinarity

Part 2 studies in the following year after having taken a year out for Stage 1 practical experience (with a minimum 24 months work experience required before taking the Part 3 examination and fully qualifying as an architect).

London has the leading postgraduate architecture schools using design research and to analyse the current landscape of

architectural design research in higher education institutions, three schools of architecture are selected among them. Choosing the Architectural Association, the Bartlett and the Royal College of Art provides a cross-section of leading schools of architecture within very different contexts. The AA is a private non-research institution, the Bartlett is one of the major centres for

research, and the RCA is a research intense art and design school with only postgraduate students.

In the 2019/20 academic year, there were 48 units/design studios in postgraduate architectural programmes leading to professional qualification (RIBA/ARB recognised) at the Royal College of Art (13), The Bartlett (University College London) (14) and the Architectural Association School of Architecture (21) (Table 1). In these studios, the total number of associated practices are 60. 89% (43 of 48) of the studios are run by architectural practitioners, of which 63% (38 of 60) predominantly work on building design, therefore, can be considered 'conventional' architectural practices. 63% (38 of 60) of the practices are based in the UK and 50% (30 of 60) of them state that their teaching is an integral part of their practice.

75% (45 of 60) of the practices explicitly refer to research as a learning strategy or associate their practice with research. 32% (19 of 60) of the practices define their practice as interdisciplinary, and 55% (33 of 60) frequently disseminate their work through publications and exhibitions to reach a wider public. All these numbers are based on the written statements given by the practices within their separate practice descriptions online. However, it is likely that more practices see their work fall into categories of practice-based research, interdisciplinarity and engagement with public audiences. Thus, these numbers are only an estimate of the current research landscape within postgraduate architectural design studios in parts of London.

3. HOW CAN DESIGN RESEARCH CONNECT ARCHITECTURAL PRACTICE AND EDUCATION?

Research-led teaching in the MA Architecture programme at the Royal College of Art (RCA) is one of the prominent examples connecting learning and practice in a Part 2 course. Validated by the RIBA and ARB since 1983, the programme philosophy responds to RIBA criteria by fostering independent postgraduate research and experimentation in design with a strong connection to practice and the material reality of the discipline.

In the 2019/20 academic year, the MA Architecture programme offered 13 different Architectural Design Studios (ADS) that resonate with the key research themes of the School of Architecture: Architecture and Social Movements, Institutional Forms and Practices, Intergenerational Cities and Climate Justice. As stated in the Programme Specification 2019/20, each ADS has unique thematic interests and offers a 'Live Project' in alignment with their studio brief and agenda. The ADS structure is based on peer learning, with first- and second-year students working alongside one another. Furthermore, second-year students are required to prepare an Independent Research Project, which is tutored through the ADS and relates to its specific research agenda and studio brief.

ADSs provided a valuable context for this study. In parallel to the programme philosophy, all ADSs at the RCA are run by professional practitioners, and 69% of them are associated with 'conventional' architectural practices (9 of 13). Based on how they describe themselves online, all of the studios explicitly use research as a learning strategy, or they associate their practice with research; 46% (6 of 13) of the studios define their practice as interdisciplinary and 61% (8 of 13) of the studios frequently disseminate their work through publications and exhibitions (Table 1).

To understand better the intersection of learning, research and practice, ADSs in the MA Architecture programme at the RCA were observed during their introductory presentations, Work-in-Progress show and the RCA2020 graduation show in the 2019/20 academic year. In the introductions at the beginning of the year, ADS tutors presented fully-developed briefs suggesting a variety of themes, sites, methods, schedule and external collaborations, which later reflected on the studio outputs exhibited in the work-in-progress and graduation shows.

ADSs differ in terms of their process-driven, output-driven and impact-driven focus. To discuss these different strands of design research they represent, ADS3, ADS6, ADS9 and ADS11 were selected for further observation during their pre-exam reviews before the Final Examination. Observations were undertaken on different days within a remote learning environment due to Covid-19 outbreak measures. For this study, only second-year students' work was reviewed, which were 22 presentations in total. 68% (15 of 22) of these students completed Part 1 in the UK and 32% (7 of 22) had gained their undergraduate degrees outside the UK.

During their pre-exam reviews, all students presented their work in the format of a research book, a design portfolio and slides, and often an additional medium relevant to their studio focus. Examples of this medium are a web platform, an Instagram page, a short film, a simulation, or a digital animation. Students introduced their design research process, stating a research question, methodology, a project brief and a design proposal, often including multidisciplinary considerations. The importance of these elements differed according to the studio approach adopted by ADS tutors.

ADS3 'Refuse Trespassing Our Bodies: Metabolising the Built Environment' is run by Daniel Fernández Pascual and Alon Schwabe of Cooking Sections. Cooking Sections is a research-based practice

that explores the overlapping boundaries between visual arts, architecture, ecology and geopolitics. In 2019/20, ADS3 investigated synthetic pollutants and explored the spatial implications and circular trajectories of these substances. Similar to Cooking Sections' own design research approach, all studio projects addressed issues of locating and investigating a present pollutant, and tracing and bringing into view their spatial implications as well as their sociological, political, metabolic, environmental and ecological impact. Consistent with their chosen dissemination models, students presented their work through performance, mapping and video. Cooking Sections' practice model sets an example for design research with value to policy making and promotes an artistic focus in the studio work.

ADS6 'The Deindustrial Revolution – Garden of Making' is run by Clara Kraft and Satoshi Isono of Kraft Isono, and Guan Lee of Grymsdyke Farm. Kraft Isono is a multidisciplinary film and architecture studio, whereas Grymsdyke Farm is a research facility, fabrication workshop and live-work space that was established by Guan Lee. In 2019/20, ADS6 studied the theme of deindustrialisation and students explored potential contradictions and inconsistencies of human and non-human ecologies in relation to craft and making. The projects varied in spatial, temporal and practical contexts, as did the methods of investigation, which made use of performance, field recording, 3D scans, archival material, poetry, models, prototypes, interviews and photography. All students produced animations and films as part of their studio outputs. Diversity in topics, locations, tools and methods as well as multiple iterations and rigorous use of animation brings together the multidisciplinary approach and specialisation of Kraft Isono and the research and fabrication background of Lee. Their studio focus underlines craft and making as a design research approach.

ADS9 'Aura – A Call for Open Architecture' is run by John Ng, Zsuzsa Péter and

James Kwang Ho Chung. All tutors are practicing architects and Ng also runs a multidisciplinary practice called Elsewhere. In 2019/20, ADS9 investigates architectures of openness with a particular interest in the modes of co-existence. The students' projects explored various spatial contexts and scales in which design proposals can achieve societal, political, cultural and economic impact. Students developed their work through material experimentations, spatial explorations and environmental analysis, and presented their work through web platforms, models, poetry, videos, collages and architectural drawings.

ADS11 'Already There' is run by Renaud Haerlingen and Victor Meester of Rotor with Livia Wang. Rotor is a cooperative design practice that investigates the organisation of the material environment. They have a spin-off project called Rotor DC that facilitates the reuse of construction materials by dismantling, conditioning and selling them. In 2019/20, ADS11 examined practices of deconstructing existing architectures, working with a series of sites and collaborators to develop an understanding of the methods and design possibilities deriving from dismantling and reuse. Students investigated the regeneration of Aylesbury Estate in South East London. Their various proposals involved experimenting with hyper-density, inclusive renovations and reclaiming dismantled materials. The life cycle of materials, residents survey, speculations, learning from demolition, construction and renovation processes were their tools and methods of investigation. Rotor's and Rotor DC's influence is highly present and creates a practice-based focus in the studio outputs.

Evidently, ADS3, ADS6, ADS9, ADS11 tutors have different approaches to research in architecture. ADS3 have a process-driven, artistic focus aiming impact on ecology and geopolitics. ADS6 also have a process-driven research understanding, but they prioritise craft and making through various

medium. ADS9 has an output-driven research understanding with a focus on wider societal impact, whereas ADS11 has a practice-based focus with a specific interest in dismantling and reuse. However, design research is an integral part of connecting their teaching and practice in all of them. Their practice methods highly influence the studio works in terms of research topics, research methods, project development and outputs.

CONCLUSION

Over the last decade, professional practice and research and learning in architecture have become integrated. This recognised a new international understanding of research and a growing importance of design research, which has fostered interdisciplinary collaborations, new research communities and a wider societal impact. Several factors drive this transformation and can be summarised as follows:

- Expanded subject coverage and range to include design within established research frameworks.
- Expanded subject coverage and range to include design in quality-related funding from UKRI research councils.
- New validation criteria by professional bodies in support of research.
- PhD-level focus on practice-led and practice-based research projects in higher education institutions.

This study shows that practitioners that internalise design research in their teaching and practice represent a majority among tutors of postgraduate architecture design studios in London. They have either process-driven or output-driven strands of design research, they are interested in creating wider societal impact and they are highly influential. Further studies are essential to analyse how this influence and growing importance of design research transforms design practice, learning and research in architecture. One

area of research is to conceptually frame and analyse the difference of research processes, outputs and impact in practice and academia. Another is to undertake qualitative research to understand how different practitioners experience design research and the transformations it brings to industry. Therefore, following this paper, a critical reading will be undertaken within a conceptual framework and structured interviews will be conducted with practitioners to study these influences in greater detail.

ACKNOWLEDGEMENTS

This paper is produced as a part of an ongoing postdoctoral research project supervised by Dr Sam Jacoby, funded by the Scientific and Technological Research Council of Turkey (TUBITAK, grant number 1059B191801865) and undertaken at the Royal College of Art, School of Architecture in London.

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