

Framing the Field: A Critical Systematic Review of Research Problems and Methods in Architecture

Deborah Macêdo dos Santos^{1*}, Guilhermina Lobato Miranda²

¹IISCA / Universidade Federal do Cariri (UFCA) Juazeiro do Norte, Brasil. Email: deborah.santos@ufca.edu.br

²IE / Lisboa, Lisboa, Portugal. Email: gmiranda@campus.ul.pt

*Correspondence: Email: deborah.santos@ufca.edu.br

RITA_25
June 2026
ISSN: 2340-9711
e-ISSN: 2386-7027

Received: 05-01-2026
Revised: 19-03-2026
Accepted: 21-04-2026
Published: 30-06-2026

Abstract

This article offers a critical systematic review of how architectural research articulates its problems and methods in the contemporary academic landscape. Through the analysis of 68 peer-reviewed articles published between 2013 and 2024 and indexed in Scopus and Web of Science, the study identifies prevailing thematic areas, innovation, heritage, diagnostics, and education, and reframes methodological approaches within the classical triad of qualitative, quantitative, and mixed methods. While acknowledging the hybrid and practice-based nature of architectural inquiry, this framework seeks to counter the epistemological fragmentation that often obscures methodological clarity and interdisciplinary dialogue in the field. By employing the PRISMA protocol and the Bibliometrix tool, the study reveals patterns, omissions, and disciplinary silences in architectural scholarship, particularly the frequent lack of explicit research problems and methodological transparency. These findings are situated within broader concerns around curriculum design, research training, and the positioning of architecture within global knowledge production systems. The proposed classification serves both pedagogical and reflective functions: it assists early-career researchers and educators in navigating methodological complexity, while also promoting alignment with epistemic standards adopted in other disciplines. Ultimately, the article contributes to the consolidation of architecture as a research-driven discipline, one that values methodological literacy not as a procedural formality but as a critical and ethical practice. It advocates for a more coherent, inclusive, and socially engaged research culture capable of addressing pressing urban, educational, and environmental challenges.

Keywords: Architectural Research, Research Problem, Methodology, Epistemology, Interdisciplinarity, Prisma, Bibliometric Analysis.

INTRODUCTION

Architecture occupies a complex position between creative practice, technical knowledge, and academic inquiry. This hybrid condition has expanded the field's intellectual reach, but it has also made it more difficult to define shared research problems, methodological standards, and coherent classificatory frameworks. Rather than treating this diversity as a weakness in itself, this article argues that the central challenge lies in the absence of a sufficiently clear shared vocabulary for identifying and classifying research problems and methodological approaches in architecture.

Architecture and the crisis of research coherence

What is architecture? The term derives from the Greek *arkhi* (chief or principal) and *tekton* (builder or craftsman), underscoring the architect's dual role as leader and creator in the construction process ¹. This article adopts the traditional definition of architecture as the art and science of designing and constructing spaces and structures that fulfill human needs while reflecting cultural, aesthetic, and functional values ².

Despite this established meaning, literature on architecture often reveals a fragmentation of definitions rather than convergence around its original conception. The term "architecture" is also applied in various other fields. In psychology, it refers to the mental frameworks that organize thought and behavior ³; in computing, to the conceptual and logical organization of systems ⁴; and in biology, to the structural design of organisms ⁵. This cross-disciplinary appropriation can lead to confusion, particularly in architectural research, where the absence of clearly defined boundaries complicates literature reviews and methodological focus.

As in other fields, architectural research requires a well-defined research problem and a suitable methodological approach. The research problem serves as the foundation of scientific inquiry, guiding its direction, shaping its outcomes, and determining its relevance ⁶⁻⁸. Identifying appropriate research questions allows scholars to generate meaningful insights and contribute to advancing knowledge and practice.

This conceptual drift has practical implications: without a common methodological vocabulary, architectural research becomes harder to teach, harder to compare, and harder to integrate into broader interdisciplinary conversations, ultimately undermining its academic credibility.

Research Aim and Contribution

This article aims to contribute to architectural scholarship by identifying and proposing an updated classification of research problems and methods in architecture and urbanism. Grounded in a systematic literature review and bibliometric analysis of 68 peer-reviewed articles published between 2013 and 2024, this study seeks to: 1 - Identify and classify the most frequent types of research problems in the field; 2- Map the methodological paradigms employed in recent architectural research.

Unlike previous frameworks, the classification proposed here is based on empirical evidence and aligned with the classical methodological triad (qualitative, quantitative, and mixed methods) widely adopted in other academic disciplines ^{6,9}. While acknowledging that architectural research often includes hybrid and emergent approaches, this simplified model serves a pedagogical purpose: to support curriculum development and provide students with a clear, transferable framework for selecting appropriate research strategies.

This contribution bridges architecture's specificities with the methodological standards of other disciplines, fostering pedagogical clarity, disciplinary coherence, and broader academic engagement. Furthermore it is expected to aid educators, students, and policymakers alike -facilitating the development of more coherent curricula and informing research agendas that are methodologically sound, socially relevant, and aligned with sustainable urban development goals.

To address this issue, the next section states the aim and contribution of the study, followed by a literature survey on how architectural research problems and methods have been historically classified

LITERATURE SURVEY

This literature survey situates the study within the historical and methodological debates on architectural research, highlighting the absence of an updated and coherent classificatory framework.

From Vitruvius to Fragmentation: Historical Attempts to Classify Architectural Research

What types of research problems are studied in architecture, based on its traditional definition?

Efforts to classify architectural research problems have deep historical roots. Vitruvius, writing in the 1st century BCE, categorized architecture into three domains: the art of building, the design of timepieces, and the construction of machinery². He further divided the art of building into two areas: (1) construction of fortified towns and public works, and (2) private structures, today commonly understood as urbanism and architecture.

More recent scholars have expanded upon these early classifications. Salama¹⁰ proposed two overarching research categories: one viewing architecture as art (focused on formal aspects) and the other addressing knowledge gaps and user needs, especially through post-occupancy evaluations. Malard¹¹ emphasized two core research objects: the physical products of architecture and urbanism (e.g., buildings, squares), and the processes that generate them. Groat, and Wang¹² presented a conceptual framework as a cylinder, representing a continuum from theory to design, allowing for multiple associations across the research spectrum.

These classifications provide a valuable foundation. However, they raise the question of whether architectural research has since expanded to cover additional topics. Recent scholarship suggests that this expansion is not only ongoing but increasingly complex. Patil, and Salama¹³, for example, classify recent architectural and urban scholarship into established, evolving, and emerging knowledge spaces, showing how the field is being reshaped by sustainability, technological innovation, and community-centred design. Likewise, Youssef¹⁴ argues that contemporary architectural thought requires updated theoretical frameworks capable of addressing twenty-first-century variables such as climate change, pandemics, carbon emissions, and the AI revolution.

Together, these contributions confirm that architecture is actively seeking new classificatory tools to interpret a rapidly changing field. However, such efforts remain primarily focused on thematic and theoretical organization, leaving comparatively underexplored the question of how research problems and methodological approaches themselves are structured across architectural scholarship. This article identifies a gap: the absence of an updated, comprehensive classification of architectural research problems and their associated methods.

Attempts to classify architectural research methods vary. Salama¹⁰ identified 24 methodologies grouped into four study types: (1) the architect's societal role; (2) traditional design education; (3) innovative teaching strategies; and (4) studio practice analysis. Groat, and Wang¹² described six research strategies (historical, qualitative, correlational, experimental, simulation, and logical argumentation) alongside a mixed strategy combining them. Akšamija¹⁵ proposed four categories: qualitative, quantitative, experimental, and mixed-mode research, each with specific designs.

From Vitruvian origins to contemporary typologies, the scope of architectural research has undeniably expanded. However, no unified system has emerged to consolidate this diversity of methods into a coherent framework.

By contrast, disciplines such as education^{6,16}, social sciences¹⁷, psychology¹⁸, and health sciences have long employed a triadic classification of research approaches: qualitative, quantitative, and mixed methods. This system facilitates methodological clarity, comparability, and consistency across studies.

Architectural research, in comparison, remains fragmented, epistemologically, disciplinarily, and procedurally. This ongoing fragmentation underscores the need for a simplified and integrative classification model, such as the one proposed in this study, which aligns architectural research with the well-established triad found in other academic domains.

Although these authors provide valuable typologies, none have established a shared methodological framework that connects architectural research to broader epistemological structures. This fragmentation persists despite recurring efforts across centuries.

The Need for Methodological Literacy in Architecture

The absence of a recent, evidence-based classification of architectural research problems and methods presents

significant challenges. In academia, the treatment of research methodology in architecture curricula is often inconsistent or too narrow. Baum¹⁹ notes that planning students trained solely in analytical research lack critical competencies in decision-making and social engagement—a critique equally applicable to architectural education. Similar concerns are echoed in design education more broadly. As Furniss, *et al.*²⁰ shows, the disjunction between evolving design practices and outdated educational structures is creating systemic challenges, calling into question the pedagogical models currently used to prepare designers for interdisciplinary and hybrid realities. Architecture, like other design fields, must confront this disconnect by rethinking how methodological literacy is taught and aligned with contemporary practice.

Compounding this issue is the interdisciplinary use of the term “architecture,” which complicates bibliometric analysis. During data collection for this study, numerous articles categorized under “architecture” actually addressed computational systems, cognitive structures, or biological organization—further highlighting the need for clearer disciplinary boundaries.

Moreover, while architectural research has evolved to accommodate design-driven investigations, this evolution may have unintentionally distanced it from the methodological conventions upheld in other fields. Traditionally, scientific methods are grouped into three core categories: qualitative, quantitative, and mixed methods. These paradigms, rooted in distinct philosophical traditions, provide a robust foundation for academic rigor and methodological transparency^{6,9}.

Methodological literacy is not merely a technical competence, but it is a form of academic empowerment. In the absence of a shared language for research design, architecture risks remaining peripheral in interdisciplinary research agendas and ill-equipped to address urgent societal challenges.

METHODOLOGY

This article consists of a systematic literature review and a bibliometric analysis of scientific production in the field of architecture over the past 11 years, focusing on identifying the research problems and the methods used to address the proposed problems.” It used the procedure proposed by PRISMA (Preferred Reporting Items for Systematic Reviews) for the systematic literature review and the software Bibliometrix for the bibliometric analysis. It collected and analyzed articles from the Scopus and Web of Science databases.

The methodological procedures were as follows: 1. Search for articles in both databases (Scopus and Web of Science) that explicitly state their architectural research problems; 2. Use the Bibliometrix tool to exclude duplicates; 3. Apply PRISMA qualitative analysis to the inclusion and exclusion criteria; 4. Conduct a bibliometric analysis for quantitative assessment; 5. Classify the articles based on research problems and their corresponding research methods (qualitative analysis).

We utilized the PRISMA methodology but did not conduct a meta-analysis, as the majority of the articles found were qualitative in nature. The problem and research questions that this article seeks to address are also not suitable for a meta-analysis. This methodology was updated in 2020 and involves a structured research process for conducting systematic reviews of scientific literature, following a rigorous and transparent procedure. The PRISMA reporting guideline comprises twenty-seven statements²¹.

The bibliometric analysis is a scientific methodology for computer-assisted reviews²². An open-source tool named Bibliometrix was utilized to conduct the bibliometric analysis²³. This tool facilitated the collection of data from the articles, allowed for tabulation, and visually represented the outcomes.

Database Search

On November 2024, the research was conducted through the Scopus and Web of Science databases (Table 1), focusing on publications from the last decade (2013 to 2024). The terms “architecture” and “research problem” or “problem of research” were selected to facilitate the identification of the most common issues explored in architectural research (Table 1). This choice aims to streamline the recognition of recurring challenges faced by architectural researchers, thereby providing a clear understanding of prevalent trends and gaps within the field.

Table 1: Database and Boolean operators for the first systematic review process

Database	descriptors	results
Scopus	(TITLE-ABS-KEY (“research problem” OR “problem of research”) AND TITLE-ABS-KEY (architecture) AND NOT TITLE-ABS-KEY (neural)) AND (LIMIT-TO (DOCTYPE , “ar”)) AND (LIMIT-TO (SUBJAREA , “ARTS”) OR LIMIT-TO (SUBJAREA , “SOCI”) OR LIMIT-TO (SUBJAREA , “ENVI”) OR LIMIT-TO (SUBJAREA , “EART”) OR LIMIT-TO (SUBJAREA , “MULT”) OR LIMIT-TO (SUBJAREA , “ENER”))	52 articles
Web of Science	Architecture (All Fields) and “research problem” or “problem of research” (All Fields) not neural (All fields). Query link: https://www.webofscience.com/wos/woscc/summary/14a072d3-ee6f-4389-92f2-4a8c967b9729-012e4341c7/relevance/1	72 articles

Both databases have categories connected to architecture field. This action allowed the automatic exclusion of part of non-related work with homonymous descriptors, such as the computer science, psychology and biology fields.

The search within Scopus database was performed within the fields: “article title, abstract, keywords”, using the descriptors: “research problem” or “problem of research” combined with “architecture”, excluding the term “neural”. The search was restricted to articles only, and the subject areas were limited to: “Social sciences, arts and humanities, environmental sciences, energy, earth and planetary sciences, and multidisciplinary”. The range for the search was set from 2013 to 2024 (Table 1).

The search within Web of Science was performed across all fields, using the descriptors “architecture” combined with “research problem” or “problem of research”, excluding the term “neural”. The document type was limited to articles, and the search covered the time frame from 2013 to 2024. The search was restricted to the following Web of science categories: Engineering Civil, Construction Building Technology, Environmental Sciences, Architecture, Engineering Multidisciplinary, Environmental Studies, Green Sustainable Science Technology, Urban Automation Control Systems, Education Educational Research, Multidisciplinary Sciences, Social Sciences Interdisciplinary, Art, Geography, Development Studies, Education Scientific Disciplines, History, Social Issues, Sociology (Table 1).

PRISMA Qualitative Inclusion and Exclusion Criteria

Out of the 124 articles from both databases, 9.17% (n = 12) were duplicates, which were excluded using the Bibliometrix tool. As a result of this process, 112 articles remained. Approximately 35% (35.47%, n = 44) of the articles were excluded after a qualitative analysis based on titles, keywords, and abstracts. This exclusion was necessary because, although these articles referenced “architecture,” the term was applied in contexts unrelated to its original meaning.

After applying the exclusion criteria, the final database contained 54.83% (n = 68) of the retrieved articles from the Scopus and Web of Science databases. In other words, nearly half of the retrieved articles did not align with the original meaning of architectural science, despite the application of category filters during the database search, as illustrated in Figure 1.

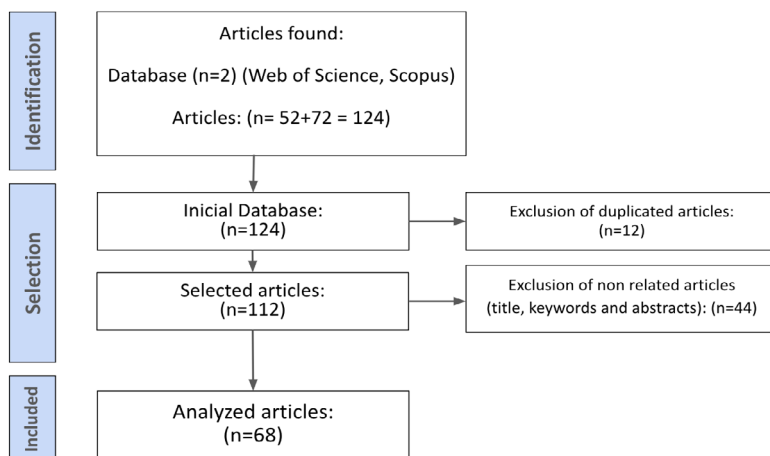


Figure 1: PRISMA methodology to articles inclusion and exclusion

After organizing the database with the 68 articles, a quantitative bibliometric analysis was conducted to provide a comprehensive evaluation of the quantitative data concerning scientific papers related to the research problems investigated in architecture.

Subsequently, a detailed reading of the articles was performed to identify the research problems addressed in each one. Initially, the research aimed to extract investigation problems directly from the abstracts of the selected articles. However, while some abstracts explicitly mentioned research problems, this was not the case for all. As a result, a more thorough approach was necessary, involving the detailed reading of full articles to extract and tabulate the relevant problems.

RESULTS AND DISCUSSION

Quantitative Results

A bibliometric analysis can provide valuable insights into the evolution of scientific fields by quantifying research output. In terms of annual scientific production, the data includes articles published between 2013 and 2024, as shown in Figure 2. The analysis explores trends by calculating annual growth rates and examining external factors that may correlate with the observed changes

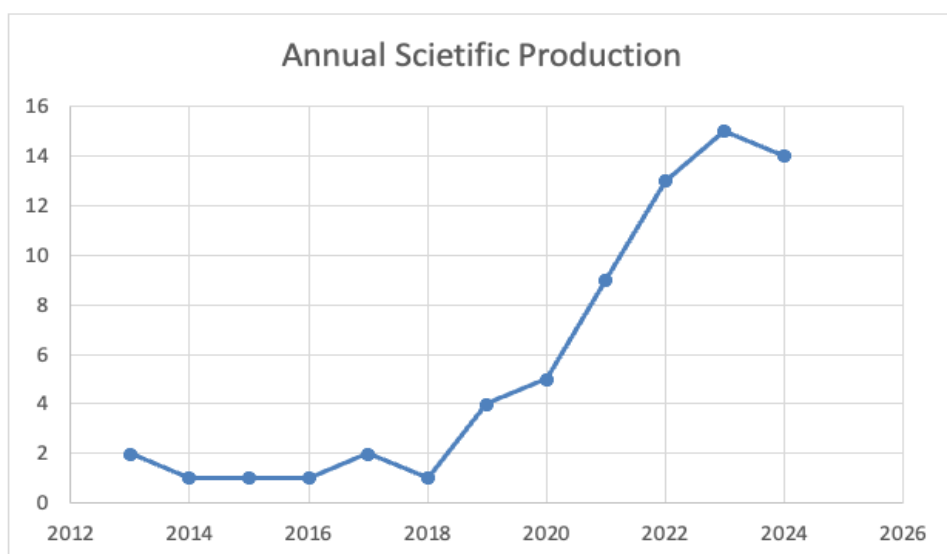


Figure 2: Annual scientific production

The data reveals a gradual increase in scientific production from 2013 to 2024, with distinct phases: Between 2013 and 2018, publication rates remained low, with annual outputs fluctuating between 1 and 2 articles. A notable increase begins in 2019, when the number of articles doubled compared to the previous year (from 2 to 4 articles). The upward trend continued through 2020-2023, with a peak of 15 articles in 2023. This represents an increase of 650% compared to the 2013 baseline.

The slight decline from 15 articles in 2023 to 14 in 2024 (the current year) is a minor reduction (-6.7%) and may reflect the conclusion of ongoing research projects or shifts in research focus.

In Figure 3 is presented the most relevant journals where the articles were published. This information could help to reveal trends and focal areas within the research community, because journals titles often reflected specific thematic interests and enriches the understanding of the field's evolution.

The journal *BUILDINGS* and the *Journal of Engineering Science and Technology* each contributed four articles, representing the highest number of publications in the dataset. Both journals are multidisciplinary in scope, which may explain their prominence in addressing topics related to “architecture” and “research problems.”

With three articles, the journal *Sustainability* highlights the growing importance of environmental and societal considerations within architectural research. Several other sources, such as *Archnet-IJAR: International Journal of Architectural Research* (3 articles), *Actual Problems of Theory and History of Art* (2 articles), and *Frontiers of Architectural Research* (1 article), provide a mix of theoretical and practical insights, exploring topics ranging from architectural heritage to contemporary design practices.

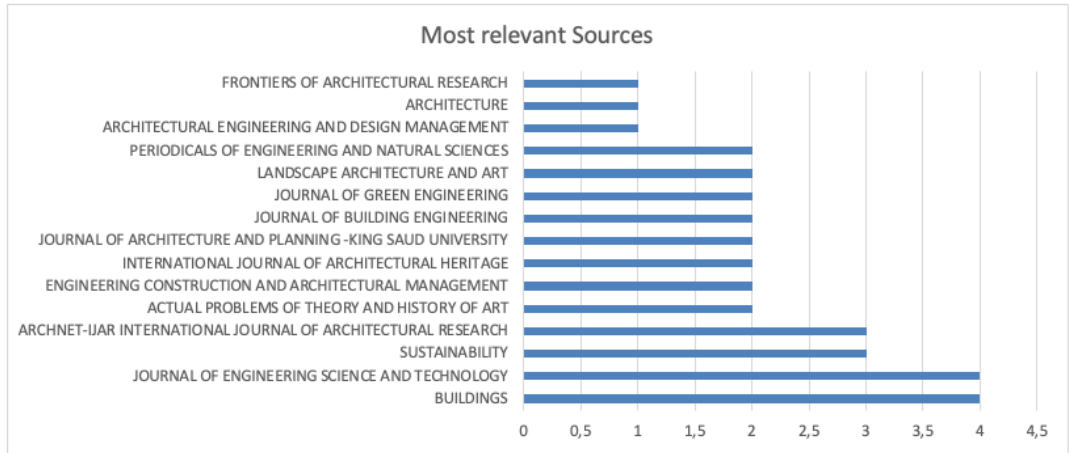


Figure 3: Most relevant sources

The diversity of these sources reflects the interdisciplinary nature of architectural research, enriched by contributions from engineering, art history, and cultural studies. Journals like *Engineering Construction and Architectural Management* and the *International Journal of Architectural Heritage*, each contributing two articles, emphasize the integration of technical, historical, and cultural aspects in architectural research.

Other notable sources include the *Journal of Green Engineering*, *Landscape Architecture and Art*, and the *Journal of Building Engineering*, each contributing two articles. These publications prioritize sustainable and aesthetic considerations in architectural design and innovative engineering approaches.

The most frequent words in the database (Figure 4) reveal a variety of topics, underscoring the evolving and multidisciplinary nature of architecture-related research.

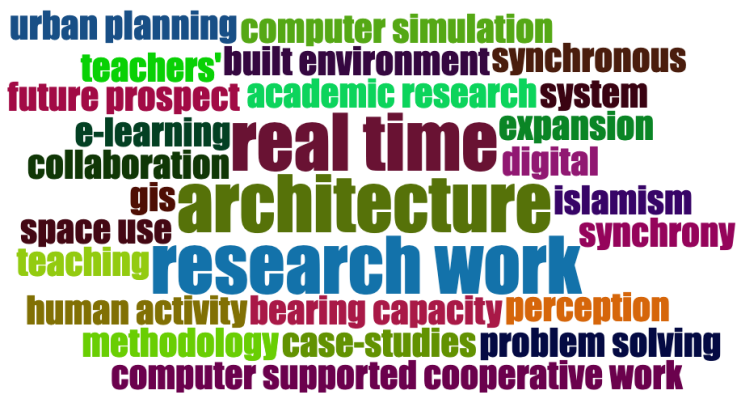


Figure 4: Most frequent words (word cloud)

The word “Architecture” appears as a central term, which is expected given the study’s focus. Other repeated terms, such as “real time” and “research work,” point to a growing interest in technological and methodological advancements within the field. These terms indicate a shift toward integrating digital tools and collaborative methods in architectural research.

The thematic map Network (Figure 5) presents the main themes per nodes. The size of the node represent the more significant themes, in this case “architecture” and “research work”. The lines between the nodes represent relationships or co-occurrences between themes, and the clusters nodes organizes by colors indicate the related topics in the consulted database.

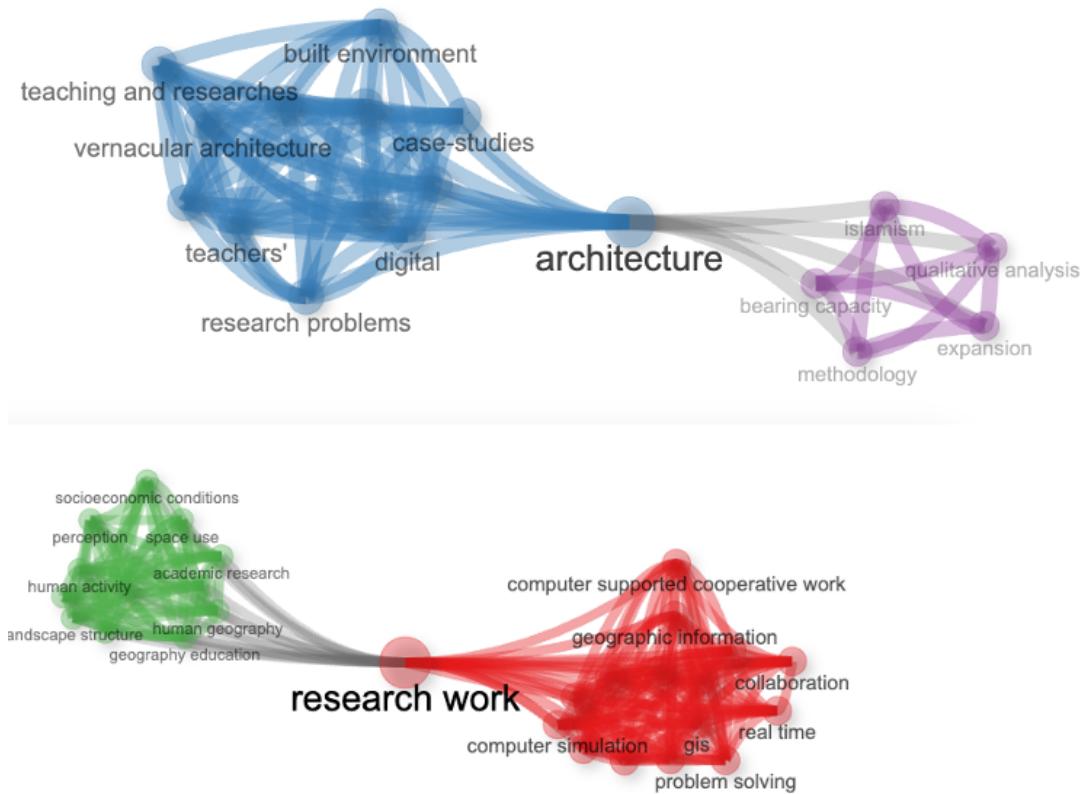


Figure 5: Thematic network map

The thematic map presented four clusters of nodes. The red cluster appears to be more related to new technologies and processes, the green cluster focuses on pedagogical research issues, the blue cluster pertains to case study diagnostics, and the purple cluster is associated with historic heritage. These quantitative clusters seem to correlate with the qualitative analysis presented in the next section.

Qualitative Results: Research Problems

After a detailed reading and analysis of the 68 articles, it was possible to identify all the research problems studied and their corresponding methods. Unfortunately, the methods were not always explicitly stated within the content of the articles; as a result, many of these methods had to be inferred from the procedures described, requiring an additional effort for interpretation.

The articles were strategically organized into four principal categories of research problems: 1. Innovation, 2. Historic Heritage, 3. Diagnostic, and 4. Education (Figure 6).

The innovation category accounts for 32.35% of the analyzed articles ($n = 22$). These articles address research problems related to the need for improvement in design representation, project design processes, or the development of new objects (such as houses, buildings, cities, and landscapes). Each article presents innovative solutions to these problems by proposing or discussing new technologies for representation, novel project design processes, new simulations, or new data. Topics in this category include sustainable construction methods, digital fabrication, and smart building systems. Table 2 presents the three most cited articles in this category.

Architecture articles: Problem of research

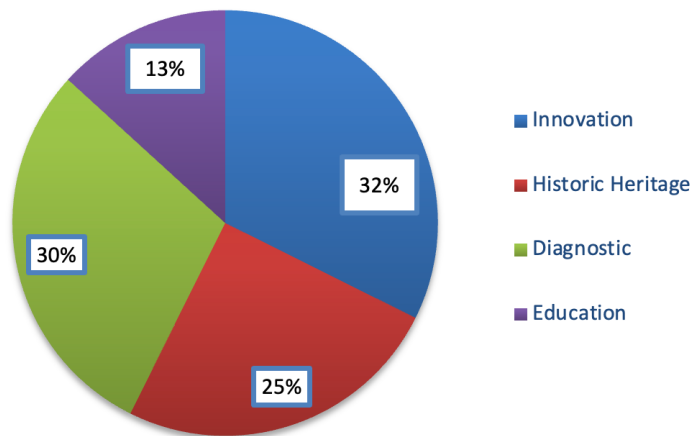


Figure 6: Pizza chart with percentage of articles classified according to their problem of research

Table 2: Three most cited articles in Innovation

Author	Citation	Problem of research	Methods	Object of research
Sun, and Li ²⁴	45	Lack of overview and historical background on the subject of (CGIS)	Qualitative: Literature review	Collaborative Geographic Information Systems (CGIS)
Pottmann ²⁵	36	How advances in Architectural Geometry start to influence architectural practice and are about to change digital architectural design	Qualitative: Survey of research	Architectural Geometry / Geometric Modeling
Fekry, <i>et al.</i> ²⁶	11	the lack of an appropriate mean in the current assessment methods to evaluate items linked with sensation and emotions	Quali-quant: mapping consumer responses to questionnaires	human comfort requirements in buildings

The historic heritage category accounts for 25% of the analyzed articles (n = 17). All of these articles address research problems associated with historic heritage. While some introduced novel methods, these were primarily applied to the restoration of historical buildings. The majority of the other methods involved analytical studies of typologies and documentation of historical buildings and sites. Table 3 presents the three most cited articles in this category.

Table 3: Three most cited articles in historic heritage category

Author	Citation	Problem of research	Methods	Object of research
Jolshin ²⁷	1	The demand of the comprehensive research of the civil architecture in old rus' in premongol period (10th–13th centuries)	Qualitative: Documental analysis	Old rus' in premongol period (10th–13th centuries)
Wdowiarz-Bilska ²⁸	1	Revalorization of a historical urban complex as a strategic element of stimulating and enhancing the attractiveness of public space in a historical city center	Qualitative: Review: literature, archival cartographic materials, planning and design documentation.	The area of the former tramway depot complex at św. Wawrzyńca street
Sarhaddadian, <i>et al.</i> ²⁹	1	the lack of sufficient information about the dezzak mosque	Qualitative: Data collection of the case studied in site, literature review of similar mosque.	The architecture of the Dezzak Grand Mosque

The diagnostic category represents 30% of the analyzed articles (n=20). The research problems are related to the lack of knowledge about several themes that could be solved observing and evaluating the different studied objects. The table 4 presents the two most cited articles in this category, the other articles did not present citations.

Table 4: Two most cited articles in diagnostic category

Author	Citation	Problem of research	Methods	Object of research
Gornova ³⁰	3	reasons for the formation of a negative city identity of Omsk residents	Qualitative: Literature review + case of study in Omsk	visual semiotic aspects of Omsk identity.
Kiyenko ³¹	2	How to explain structure of the architect's understanding of the social and as a set of social models	Qualitative analysis of architectural texts	sociology of architecture

The Education category represents 13% of the analyzed articles (n=9). The research problems are related to architectural schools, teaching or learning, mainly related to the needs of knowledge development of academic community. The table 5 presents the three most cited articles in this category.

Table 5: Three most cited articles in diagnostic category

Author	Citation	Problem of research	Methods	Object of research
El-Kholei, and Yassein ³²	14	how students' knowledge, attitude and practices reflect their awareness regarding sustainability? Has their education induced any behavioral changes? What is the instructors' role in mainstreaming sustainability?	Quantitative: Documents, Questionaries. SPSS for statistical analysis	Egyptian architectural students
Kling ³³	1	the lack of theorizing at the intersection of situational analysis (sa), architecture, and urbanism, which constitutes an impediment to interdisciplinary work.	Qualitative: Using research exemplars and student work, produced in urban design to underpin the argument.	situational analysis (sa)
Seeumpornroj ³⁴	1	the need for globality and inclusive vision in art and architecture history pedagogy	Qualitative: interpretive-historical research methodology	studying and teaching art and architecture history

Qualitative Results: Methods and Research Designs

Architectural research encompasses a wide array of approaches tailored to the discipline's unique characteristics, often diverging from traditional classifications of qualitative, quantitative, and mixed methods. However, upon closer examination, the specialized methods used in the examined architecture articles could be reframed within the traditional broader methodological paradigms (qualitative, quantitative and mixed methods), emphasizing their connection to well-established research traditions while retaining their discipline-specific nuances.

Bases on the 68 reviewed articles and on the literature discussed along this document, the Table 6 was developed to summarize the most typical methodologies in architectural research organized according to the traditional methods classification.

Table 6: Summary of the most typical architectural methods organized according to their designs.

Methods	Qualitative	Quantitative	Mixed (quali+quanti)
Most typical Methodologies in architectural research	-Case studies	- Simulation and Modeling	- Case studies + with experimental or simulation techniques
	-Historical research	-Spatial Analysis	-Case Studies with Performance Metrics
	-Literature Review	-Experimental research	-Design Research (ideation + validation)
	-Content and visual Analysis	-Performance analysis	-Post-Occupancy Evaluation (POE): user feedback +performance data
	-Interpretative Analyses	-Correlational studies	-Ethnographic observations + statistical analysis
	-Interviews and focus group	-Survey: Statistical analysis of questionaries	-Development of solutions: qualitative insights + quantitative evaluation.
		- Bibliometric review	

As *qualitative architectural research*, the methodologies focus on understanding meaning, context, and human experience in relation to the built environment. The qualitative methods are particularly prevalent in architectural research, for example of the 11 articles presented in Tables 2, 3, 4, and 5, the majority adopted qualitative methodologies (n = 9). These methodological approaches are exemplified by case studies^{29,30}, literature reviews^{24,25}, content and visual analyses^{27,28}, and interpretative analyses^{31,33,34}.

Case studies are a cornerstone of qualitative architectural research, offering detailed explorations of individual projects, buildings, or sites. This method provides insights into design intentions, cultural and historical significance, and the spatial impacts of architectural decisions. By focusing on specific contexts, case studies illuminate broader themes and patterns relevant to the discipline³⁵. For example, Gornova³⁰ explored the visual semiotic aspects of the Omsk city identity.

Historical research involves the interpretative analysis of archival documents, drawings, and photographs to uncover the evolution of architectural styles, construction techniques, or urban development patterns. This aligns with qualitative traditions, as described by Creswell⁶, which prioritize textual and contextual data. As an example, Sarhaddi-dadian, *et al.*²⁹ used this approach to analyze and describe the architecture of the Dezzak mosque.

Literature reviews, another common qualitative methodology, synthesize existing knowledge to establish theoretical foundations or identify gaps in research. This method often informs architectural inquiry by contextualizing new studies within established frameworks¹². Examples include Sun, and Li²⁴ critical review of Collaborative geographic information systems (cgis) and Pottmann²⁵ review of digital design tools in architecture.

Content and visual analyses focus on interpreting representations of architecture, such as drawings, photographs, or renderings. These methodologies help researchers uncover underlying narratives or recurring themes in architectural discourse³⁶. Jolshin²⁷ used this approach to analyze the secular architecture of the old Rus' in pre-mongol period (10th–13th centuries), while Wdowiarz-Bilska²⁸ examined urban planning documentation of a project undertaken in Cracow to identify strategies of revalorization.

Interpretative analyses delve into understanding subjective and experiential aspects of architecture, often using philosophical or cultural lenses. These methodologies are particularly effective for exploring how users perceive and interact with spaces¹². For example, Kiyanenko³¹ investigated the sociology of architecture, Kling³³ discuss a series of aspects that could help strengthen the links between Situational analysis, architecture, and urbanism, and Seumpornroj³⁴ developed an Inductive framework that reveals new themes derived from cross-cultural comparisons in art and architecture.

Interviews and focus groups are also common in literature about qualitative methodologies, it can facilitate direct engagement with architects, stakeholders, or users to gather their perspectives on design intentions, spatial experiences, or satisfaction levels.

In sum, qualitative methodologies are essential in architectural research for their ability to capture the nuanced, contextual, and human dimensions of design and the built environment. By emphasizing interpretation and meaning, these methods enrich the understanding of architecture as a cultural and spatial practice.

Quantitative approaches in architectural research involve methodologies that prioritize numerical data, measurement, and statistical analysis. Of the 11 articles presented in Tables 2, 3, 4, and 5, only one employed a quantitative methodology, therefore, examples from the literature review, specifically the books introduced earlier, were also utilized to better illustrate quantitative approaches.

The approach of the sample involved statistical analysis using SPSS software to tabulate data collected from applied questionnaires³². This illustrates the relatively limited application of quantitative methods in architectural research compared to qualitative approaches, despite their significant potential for analyzing measurable aspects of architectural performance and user satisfaction.

These methods are particularly valuable for evaluating the physical and functional aspects of buildings, urban environments, and user interactions. For example, surveys and questionnaires, like the one used by El-Kholei, and Yassein³², are common tools for gathering quantitative data on user preferences, satisfaction, and behavior in architectural spaces. The subsequent analysis allows researchers to identify trends, correlations, and patterns that inform design decisions.

Other prevalent quantitative methodologies in architecture include simulation and modeling. These approaches use computational tools to predict building performance, such as energy efficiency, acoustics, and lighting conditions^{12,15}. By providing empirical evidence, simulations help architects optimize designs to meet environmental and functional requirements. Similarly, experimental research allows for controlled testing of variables, such as material properties or structural load capacities, to develop innovative solutions in construction and design conditions^{12,15}.

Correlational studies, another quantitative method, examine relationships between variables such as building density and social interaction or material properties and structural performance. These studies use statistical tools to draw connections that inform evidence-based design practices. In this case the researchers do not control and manipulate conditions as in experiment⁹.

Bibliometric reviews also play a significant role in quantitative architectural research. This method involves analyzing large volumes of academic literature to identify publication trends, research impact, and collaborative

networks. Through the systematic mapping of citations and keywords, bibliometric studies provide insights into the evolution of architectural knowledge, highlighting emerging areas of inquiry and influential works¹².

While quantitative methods may be less frequently applied in architectural research compared to qualitative approaches, they remain indispensable for addressing specific research questions that require empirical validation and precision. Their integration into architectural studies, particularly through approaches like correlational studies and bibliometric reviews, complements qualitative methods and offers a balanced perspective that combines interpretive insights with measurable outcomes. This duality underscores the importance of quantitative research in advancing the scientific and technical dimensions of architecture.

The integration of qualitative and quantitative methods, also known as mixed methods, is particularly prominent in architectural research, reflecting the complexity and interdisciplinary nature of the field. Of the 11 articles presented in Tables 2, 3, 4, and 5, only one employed a mixed-methods approach, combining qualitative and quantitative methodologies. This study mapped consumer responses using questionnaires, blending user feedback with data-driven insights²⁶.

In addition to the single article in the sample, examples of mixed-methods (qualitative and quantitative) approaches were also drawn from the books included in the introduction and theoretical framework. Mixed methods often involve combining case studies with experimental or simulation techniques. In such instances, qualitative case studies provide a contextual foundation, while simulations or experiments test specific design hypotheses or predict performance outcomes. For example, an architect might study how a building's layout influences occupant behavior through observational case studies and then validate these findings using computational modeling to simulate alternative layouts. This approach bridges the gap between theoretical understanding and practical application¹².

Similarly, case studies combined with performance metrics offer an effective mixed-method strategy. While the qualitative component explores the experiential and functional aspects of a design, quantitative metrics such as energy consumption, thermal comfort, or spatial utilization provide measurable data to assess performance. This methodology ensures a holistic evaluation of architectural projects, particularly in areas such as sustainability and building efficiency.

Post-Occupancy Evaluation (POE) is another area where mixed methods are extensively used. This involves collecting user feedback through qualitative interviews or surveys while simultaneously analyzing performance data such as energy efficiency, air quality, or spatial usage. By integrating subjective and objective data, POEs provide actionable insights into how buildings perform in real-world conditions and how they align with user needs³⁷.

Ethnographic observations paired with statistical analysis exemplify a mixed-methods approach that combines the richness of lived experiences with the rigor of numerical data³⁸. For example, an ethnographic study of how users interact with public spaces can be enhanced by quantifying user frequency, movement patterns, or demographic distribution. This combination deepens the understanding of spatial behavior and informs evidence-based design interventions.

Lastly, the development of architectural solutions often employs mixed methods, leveraging qualitative insights to identify problems and opportunities and quantitative evaluation to assess the effectiveness of proposed solutions. For example, a researcher might use interviews or focus groups to understand barriers to accessibility in urban design and then apply statistical analysis or performance metrics to evaluate the impact of new accessibility features.

CONCLUSION

What do architects research, and how do they construct their research designs? These questions guided this study, which sought to identify and propose an updated classification of architectural research problems and methodologies. Drawing on 68 peer-reviewed articles published between 2013 and 2024 and indexed in Scopus and Web of Science, the review used the PRISMA protocol and Bibliometrix tools to systematically map the methodological and thematic contours of the field.

The findings revealed four dominant categories of research problems: Innovation, historical heritage, diagnostics, and education. Alongside methodological approaches commonly organized as qualitative, quantitative, and

mixed methods. Although not exhaustive, this dual classification offers a coherent and transferable framework for understanding the current landscape of architectural research and for making its internal logic more explicit.

The review also showed a strong predominance of qualitative methods and a very limited use of mixed-methods approaches. This imbalance suggests a degree of methodological conservatism in architectural research, despite the hybrid and interdisciplinary nature of the field. In this sense, the study not only maps current practices but also highlights an important tension between the complexity of architectural problems and the relatively narrow range of methodological combinations currently employed.

At the same time, the study faced limitations that are characteristic of interdisciplinary domains. Some articles did not clearly formulate their research problems, while others used the term “architecture” in meanings unrelated to the discipline, which complicated the filtering and analysis process. Even so, these limitations reinforce one of the central conclusions of the study: architectural research would benefit from greater methodological clarity, more explicit problem formulation, and stronger transparency in the justification of research design.

Taken together, the results demonstrate that architectural research can be more clearly understood when its problems and methods are classified within a shared analytical structure. The main contribution of this study lies in providing that structure in an updated, accessible, and pedagogically useful form.

IMPLICATIONS FOR PRACTICE AND RESEARCH

The contribution of this study extends beyond classification alone. By organizing architectural research problems and methodologies into a clearer framework, it offers a practical tool for research supervision, curriculum design, and methodological training. In particular, the proposed structure can help students and early-career researchers articulate research intent more precisely, justify methodological choices more consistently, and relate research design to expected outcomes more effectively.

The study also has implications for how architecture positions itself as a field of knowledge. Architecture has long moved between creative practice, technical reasoning, and scholarly inquiry, and this often makes its research identity difficult to define in consistent methodological terms. The framework proposed here responds to that difficulty by offering a vocabulary that is systematic enough to support academic rigor while remaining flexible enough to reflect the discipline’s hybrid character.

In this sense, the study contributes to a broader effort to reduce the fragmentation of architectural knowledge. The frequent absence of explicit research problems and methodological rationales in the reviewed articles suggests that methodological literacy remains an important challenge in architectural education and publishing. Strengthening this dimension may improve pedagogical effectiveness, support more reflective and critical forms of inquiry, and make architectural scholarship more legible within wider academic debates.

The implications are also interdisciplinary. By aligning architectural research practices with broader methodological standards used across education, the social sciences, and health-related fields, the study supports greater comparability and dialogue without erasing the specificity of architectural thinking. This can help expand the visibility of architectural research beyond the design studio and create stronger connections with adjacent fields that also deal with complex human, spatial, social, and material questions.

More specifically, the classification proposed here may assist educators in structuring research training, support institutions in developing more coherent curricula, and help researchers navigate methodological decisions with greater confidence. It also provides a basis for future studies to test, refine, or expand the framework through larger samples, different databases, or more specialized thematic domains.

Ultimately, this article contributes to the consolidation of architecture as a research-driven discipline. One that can combine epistemological reflection, methodological rigor, and social relevance. By reframing how architectural research problems and methods are classified, the study also helps clarify how architectural knowledge is produced, taught, communicated, and valued in contemporary academic discourse.

REFERENCES

1. VIOLETT-LE-DUC, Eugène Emmanuel. *Dictionnaire raisonné de l'architecture française* 1863. https://upload.wikimedia.org/wikipedia/commons/5/54/Dictionnaire_raisonné_de_l%27architecture_française_du_XIe_aux_XVIe_siècle_%28IA_raisonnedelarchi09viol%29.pdf
2. VITRUVIUS, Pollio. *Ten books on architecture*. Translated by MORGAN, Morris Hicky and WARREN, Herbert Langford, BiblioBazaar, LLC, 1914. <https://dn790007.ca.archive.org/0/items/vitruviustenbook00vitruoft/vitruviustenbook00vitruoft.pdf>
3. ANDERSON, John R. "The Architecture of Cognition." Psychology Press, 2013/11/19 2013. DOI: <https://doi.org/10.4324/9781315799438>.
4. HENNESSY, John L and PATTERSON, David A. *Computer architecture: a quantitative approach*. Elsevier, 2011. <https://books.google.com/books?id=gQ-fSqBLfFoC>
5. LYNCH, J. "Root Architecture and Plant Productivity." *Plant Physiology*, 1995, vol. 109, no. 1, pp. 7-13. DOI: <https://doi.org/10.1104/pp.109.1.7>
6. CRESWELL, J.W. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications, 2014. https://books.google.com.pk/books?id=4uB761C_pOQC
7. GIL, Antonio Carlos. Como elaborar projetos de pesquisa. , 2002. *Como elaborar projetos de pesquisa*. 4th ed., 2002. <http://bds.unb.br/handle/123456789/1132>
8. MARCONI, Marina de Andrade and MARIA, Lakatos Eva. *Fundamentos da metodologia científica*. 7th ed., São Paulo: Atlas, 2010. <https://books.google.com/books?id=Y2WFRAAACAAJ>
9. NEUMAN, Williams Lawrence. *Social Research Methods- Qualitative and Quantitative Approaches*. British Library Cataloguing-in-Publication Data, 2014. https://letrunghieutvu.yolasite.com/resources/w-lawrence-neuman-social-research-methods_-_qualitative-and-quantitative-approaches-pearson-education-limited-2013.pdf
10. SALAMA, Ashraf. *New trends in architectural education: Designing the design studio*. Arti-arch, 1995. <https://books.google.com/books?id=J0HzIyF8RfK>
11. MALARD, Maria Lucia. "Alguns problemas de projeto ou de ensino de arquitetura." In *Cinco textos sobre arquitetura*. Belo Horizonte: UFMG, 2005, pp. 80-114. <https://books.google.com/books?id=lpdczB0-cFUC&pg=PA9>
12. GROAT, Linda N and WANG, David. *Architectural research methods*. John Wiley & Sons, 2013. https://nexasarquissucr.wordpress.com/wp-content/uploads/2016/03/architecturalresearchmethods-groat_wang.pdf
13. PATIL, Madhavi P. and SALAMA, Ashraf M. "Shaping a future research agenda across diverse knowledge spaces in architecture and urbanism – through the lens of Archnet-IJAR." *Archnet-IJAR: International Journal of Architectural Research*, 2024, vol. 18, no. 4, pp. 693-718. DOI: <https://doi.org/10.1108/arch-10-2024-0450>
14. YOUSSEF, Maged. "Theorising the contemporary architectural trends in the context of the twenty-first century variables." *Frontiers of Architectural Research*, 2025. DOI: <https://doi.org/10.1016/j.foar.2025.10.011>
15. AKŠAMIJA, Ajla. "Research Methods for the Architectural Profession." Routledge, 2021/01/20 2021. DOI: <https://doi.org/10.4324/9781003002932>.
16. COHEN, Louis; MANION, Lawrence and MORRISON, Keith. *Research Methods in Education*. 8th ed., Routledge, 2018. <https://www.routledge.com/Research-Methods-in-Education/Cohen-Manion-Morrison/p/book/9781138209886>
17. TASHAKKORI, Abbas and TEDDLIE, Charles, editors. *SAGE Handbook of Mixed Methods in Social & Behavioral Research*. SAGE Publications, Inc., 2010.
18. JOHNSON, R. Burke and ONWUEGBUZIE, Anthony J. "Mixed Methods Research: A Research Paradigm Whose Time Has Come." *Educational Researcher*, 2004, vol. 33, no. 7, pp. 14-26. DOI: <https://doi.org/10.3102/0013189x033007014>
19. BAUM, Howell S. "Research and planning both have methods, but research is not planning." *Journal of Architectural and Planning Research*, 2005, pp. 121-128. <https://www.jstor.org/stable/43030730>
20. FURNISS, Lara; DEEG, Lohren; METZ, Taylor and TURSKY, Richard. "Beyond Discipline: Evolving Design Practice and Design Education in the Twenty-First Century." *Architecture_MPS*, 2020, vol. 18, no. 1. DOI: <https://doi.org/10.14324/111.444.amps.2020v18i1.004>
21. PAGE, Matthew J.; MCKENZIE, Joanne E.; BOSSUYT, Patrick M.; BOUTRON, Isabelle; HOFFMANN, Tammy C.; MULROW, Cynthia D. et al. MOHER, David. "The PRISMA 2020 statement: an updated guideline for reporting systematic reviews." *BMJ*, 2021, p. n71. DOI: <https://doi.org/10.1136/bmj.n71>
22. BELLIS, Nicola De. "Bibliometrics and Citation Analysis." Scarecrow Press Inc., 2009. DOI: <https://doi.org/10.5040/9798216415817>.
23. ARIA, Massimo and CUCCURULLO, Corrado. "bibliometrix : An R-tool for comprehensive science mapping analysis." *Journal of Informetrics*, 2017, vol. 11, no. 4, pp. 959-975. DOI: <https://doi.org/10.1016/j.joi.2017.08.007>
24. SUN, Yaqin and LI, Songnian. "Real-time collaborative GIS: A technological review." *ISPRS Journal of Photogrammetry and Remote Sensing*, 2016, vol. 115, pp. 143-152. DOI: <https://doi.org/10.1016/j.isprsjprs.2015.09.011>
25. POTTMANN, Helmut. "Architectural Geometry and Fabrication-Aware Design." *Nexus Network Journal*, 2013, vol. 15, no. 2, pp. 195-208. DOI: <https://doi.org/10.1007/s00004-013-0149-5>
26. FEKRY, Ahmed Ahmed; ELZAFARANY, Abbas Mohamed and SHAMSELDIN, Amal Kamal Mohamed. "Develop an environmental assessment technique for human comfort requirements in buildings." *HBRC Journal*, 2014, vol. 10, no. 1, pp. 1-9. DOI: <https://doi.org/10.1016/j.hbrj.2013.05.013>

27. JOLSHIN, Denis D. "Masonry Civil Architecture of 14th–15th-Century Novgorod in the Context of History of the Research of Secular Buildings of Premongol Rus." *Actual Problems of Theory and History of Art*, 2019, vol. 9, pp. 416-428. DOI: <https://doi.org/10.18688/aa199-3-36>
28. WDOWIARZ-BILSKA, Magdalena. "Tramway Depot Complex Restoration and Shaping the Public Space along św. Wawrzyńca Street in Cracow: Selected Fragments." *Journal of Heritage Conservation*, 2022, vol. 71, pp. 94-106. DOI: <https://doi.org/10.48234/WK71TRAMWAY>
29. SARHADDI-DADIAN, Hossein; MALEKZADEH, Sabereh and RAMLI, Zuliskandar. "The Architecture of Dezzak Grand Mosque, Iranian Baluchestan With Reference To Prophet Mohammad Mosque in Medina." *Journal of Islamic Architecture*, 2022, vol. 7, no. 2, pp. 279-288. DOI: <https://doi.org/10.18860/jia.v7i2.17018>
30. GORNOVA, G. V. "visual semiotics of city identity." ПРАΞΗΜΑ. *Journal of Visual Semiotics*, 2019, no. 3, pp. 62-74. DOI: <https://doi.org/10.23951/2312-7899-2019-3-62-74>
31. KIYANENKO, Konstantin. "Paradigms of Social Knowledge and Validation in Architecture." Социологические исследования, 2018, no. 9, pp. 30-39. DOI: <https://doi.org/10.31857/s013216250001956-4>
32. EL-KHOLEI, Ahmed O. and YASSEIN, Ghada A. "Embedding sustainability and SDGs in architectural and planning education: reflections from a KAP survey, Egypt." *Archmet-IJAR: International Journal of Architectural Research*, 2023, vol. 17, no. 3, pp. 459-477. DOI: <https://doi.org/10.1108/arch-07-2022-0156>
33. KLING, Norbert. "Linking situational analysis to architecture and urbanism: An interdisciplinary perspective." *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, vol. 24, DEU, 2023. <https://doi.org/10.17169/fqs-24.2.4084>.
34. SEEUMPORNROJ, Pat. "Globality in Teaching Art and Architectural History: A Case Study of the Glossary Assignment." *Nakhara : Journal of Environmental Design and Planning*, 2021, vol. 20, p. 109. DOI: <https://doi.org/10.54028/nj202120109>
35. YIN, R.K. *Case Study Research and Applications: Design and Methods*. SAGE Publications, 2017. <https://books.google.com.pk/books?id=6DwmDwAAQBAJ>
36. CHING, Francis DK; JARZOMBEK, Mark M and PRAKASH, Vikramaditya. "A Global History of Architecture." 2017. <https://content.e-bookshelf.de/media/reading/L-9701529-6db7bea660.pdf>
37. PREISER, Wolfgang F. E.; WHITE, Edward and RABINOWITZ, Harvey. "Post-Occupancy Evaluation (Routledge Revivals)." Routledge, 2015/07/24 2015. DOI: <https://doi.org/10.4324/9781315713519>.
38. SCHENSUL, J.J. and LECOMPTE, M.D. *Specialized Ethnographic Methods: A Mixed Methods Approach*. Bloomsbury Publishing, 2012. <https://books.google.com.pk/books?id=jReJNF4reloC>