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Abstract

Architectural academic publications are essentials elements in defining and establishing the architecture academic discourses in institutional context. A critical, retrospective reading of past and present architectural publications could reveal the current development of the field and provide an empirical basis for future actions. This paper digitally maps the notion of 'design' within the published articles in Indonesian architectural journals from the past decade to understand the current situation and present the country's challenges in developing the architectural design discourse. Through consideration of architectural academic journals' role in establishing the field's boundary, a bibliometric mapping was performed on a corpus of 1031 abstracts collected from prominent Indonesian architectural journals. This paper reflects on the extracted key terms from the corpus through different mapping strategies using bibliometric analysis methods. From the mapping findings, and by extending the notion of design as a transformative agency in architecture, this paper retrospectively suggests a more diverse, creative, and provocative development of design discourse in Indonesian architectural academic scholarship.

Keywords: architecture, design, scholarship, bibliometric analysis, discourse mapping

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Tracing the design discourse in academic architectural publications

The notion of design is very pervasive in architecture, yet it has a wide range of articulation. Forty (2000) suggested that the pervasive use of design is due to the implied polarisation of the word, the separation between construction as a physical entity and design as its abstraction or ideas underlying its creation. Design as a cognitive process promotes the notion of design as an act of problem-solving in which the problem is often ill-defined or 'wicked', compared to scientific problems (Buchanan, 1992). On the other hand, there is a limit to seeing design as a problem-solving strategy, as it limits its capacity of transforming society by emphasising the idea of design as an act of sense-making (Till, 2009). The act of design itself can be seen as a mode of inquiry of gaining specific design knowledge (Downton, 2003). Some examples of how knowledge, thinking and design are intertwined in architecture can be found in (Lawson, 2006, 2009) that demonstrated the diversity of creative thinking, guiding principles, strategies, tactics, and knowledge in theory and design practice.

As design plays a unique role in architecture both as a method of inquiries as well as a subject of research itself (Downton, 2003; Groat & Wang, 2013), the trace of design discourse in the academic journals is an important marker for the institutional development of the field. Academic publications offer a unique role in establishing the limits of architecture's institutional knowledge (Parnell, 2018; Parnell & Sawyer, 2020). Academic journals conventionally have been the primary media for communicating their research (Borgman & Furner, 2002). They play roles in defining the institutional presence, often referred to as a community in which its members are supposed to actively exchanging ideas and constantly redefining the limit of the field. Consequently, the development in Indonesian academic journals will reflect the country's institutional existence on a broader scale and define the country's state of the art in architectural discourse.

This paper attempted to uncover the trace of design discourse through bibliometric mapping, which is usually used to monitor and measure scientific development (Ellegaard & Wallin, 2015). The mapping is seen as an act of revealing the hidden potential to provide a ground for speculation, critique, and invention (Corner, 1999). Jencks's evolutionary map of 20th-century architecture is a well-known example, which was an attempt to capture the continuous evolution of different competing movements of the architecture of the 20th century in response to the changes in society, technology, and ideology (Jencks, 2000). The map effectively captures the eclipsing, struggle, and rise of the various architectural movement in that period.

As a mapping strategy, bibliometric analysis has been used to discover useful information from a large corpus of literature by leveraging the statistical and quantitative analytical tools. Identification of state-of-the-art and research gaps are the primary purpose of the analysis (Oliveira et al., 2019). An example

is the bibliometric analysis of the two decades of journal Design Studies, as a critical scholarly publication in design research, to identify its core themes and references (Chai & Xiao, 2012). It has been found that the discourse has been revolved around the core themes of design processes, cognitions and methods. Furthermore, the analysis indicated that the field was becoming more cluttered by the other references over time. It indicated that the field is steadily getting richer and diverse, marked its steady expansion. The insight of the development of a field could provide implications for the larger society as exemplified in (Geng et al., 2020), in which the generated insight of the user-centered sustainability design could offer practical insight for enterprises and industries.

Architecture is a complex field, where the nature of its knowledge is constantly being exposed by a constant flux of change (Till, 2009). This paper argues that academic publications should further reflect the role of design in architecture as a transformative agency and be the frontier of the field. Academic publications can extend their role as a catalyst of change beyond its institutional role if it opens up to the new forms and values of architectural practices that have emerged to respond to the changing society and that promotes diversification, locality, and disruptions beyond conventional practice (Bryant et al., 2018). This study attempts to investigate the notion of design in Indonesian architectural scholarship to understand its current status concerning its transformative potential. The study uses a bibliometric analysis to construct semantic maps of keywords and terms relevant to design and architecture. From the mapping results, several significant findings will be highlighted and described. Simultaneously, the final discussion of this paper will attempt to reflect, in a retrospective manner, the state of design discourse and the possible future direction that could be taken to expand the agency of academic publications in Indonesia.

Mapping of design discourse in Indonesian architectural journals

A bibliometric analysis was conducted to map the design discourse from the abstract of published articles in Indonesian architectural journals from 2011 to 2020 (Figure 1). English abstracts were collected from 13 Indonesian architectural journals listed on the Indonesian Association of School of Architecture (APTARI/IASA)'s portal, ranked by Science and Technology Index (SINTA) 1 to 3 per the year of 2020. The following criteria were used in the abstract collection: (1) It is written by Indonesian authors or authors affiliated with Indonesian institutes, or (2) if the authors are foreign nationals, the article should demonstrate a relation to Indonesia's issue or context.

Table 1 provides the number of collected abstract per year for each journal. In total, 1031 abstracts were successfully collected manually from the journal's archive. In general, the number of published articles and journal titles were increased over time. Six journal titles can be considered new and have been publishing articles for the past five years, and five journal titles have been publishing their articles for the last ten years.

While the more established titles have often maintained their institutional and scholarship presence in the field, the new titles are hoped to bring new fresh air to the architectural discourse. Such assertion will be investigated further in this study.

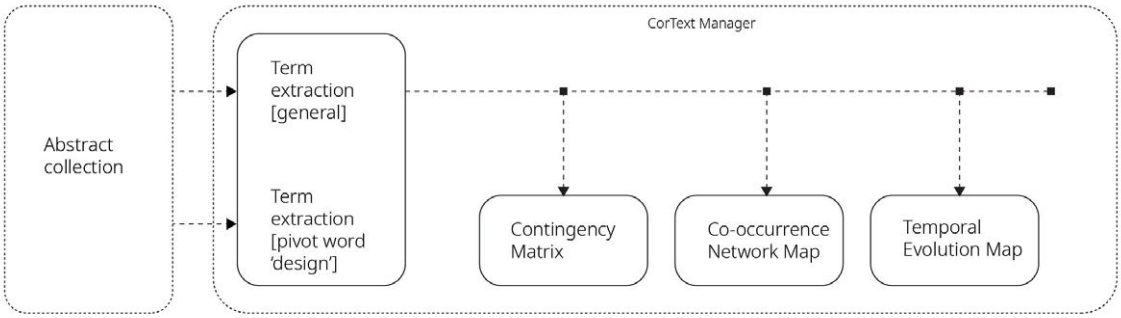

Figure 1. The framework of bibliometric analysis used in the study

Title (Sinta Ranking)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ARTEKS: Jurnal Teknik Arsitektur (S2)	-	-	-	-	-	6	12	14	23	42
DIMENSI: Journal of Architecture and Built Environment (S2)	7	9	7	12	10	16	23	18	16	11
EMARA: Indonesia Journal of Architecture (S3)	-	-	-	-	-	9	8	9	6	4
Interiority (S1)	-	-	-	-	-	-	-	2	2	1
Journal of Architecture & Environment (S3)	12	12	10	13	12	5	7	9	10	11
Journal of Islamic Architecture (S1)	1	5	6	3	6	2	2	6	5	5
Jurnal Arsitektur Arcade (S3)	-	-	-	-	-	-	12	24	38	44
Jurnal Arsitektur dan Perencanaan (S3)	-	-	-	-	-	-	-	1	20	5
Langkau Betang: Jurnal Arsitektur (S3)	-	-	-	15	12	8	13	10	11	14
Local Wisdom : Jurnal Ilmiah Kajian Kearifan Lokal (S3)	-	-	-	-	-	-	1	6	12	15
NALARs: Jurnal Arsitektur (S3)	12	10	11	12	15	16	15	16	16	11
NATURE: National Academic Journal of Architecture (S3)	-	-	-	16	22	10	15	18	18	20
RUAS (Review of Urbanism and Architectural Studies) (S3)	6	9	17	11	11	7	13	10	12	12

Table 1. The number of collected abstract per journal title from 2011–2020

The selected abstracts were analysed using bibliometric analysis tools CorText Manager (LISIS, 2021). CorText Manager is a bibliometric analysis online platform capable of performing different quantitative semantic analyses on publication data. The platform has been used to establish the status of research and its emerging fields and allow various discourse analysis from different resources (Gray, 2019; Marvuglia et al., 2020; Valese & Natta, 2020). Term extractions were performed from the collected abstract. Two categories of terms were extracted to provide a specific discourse mapping of the corpus. First, a set of general keywords was extracted, which provided general architectural interest in the corpus. Second, the keywords were extracted using a pivotal word 'design,' which provided a specific set of terms concerning the notion of design.

Three mapping strategies were performed to allow different reading using the extracted key terms. The contingency matrix provides a correlation mapping between the extracted terms and the journals to see the inclination to specific themes or fields. The co-occurrence network mapping enables a panoramic, holistic view of clusters of terms that emerged between 2011 and 2020. On the other hand, the temporal evolution mapping provides a dynamic view of this clusterisation in a particular periodical division. The notion of 'design' was observed from these maps, and reflections upon the results will be discussed.

Contingency map and institutional affinities

Contingency matrices are used to see the correlation pattern between specific topics and the journals (Figure 2). The contingency matrix shows the correlation degree between the terms (vertical axis) and journals (horizontal axis) with a colour scale from red to blue. Red cells show the positive correlation between a term and a journal, blue cells show the negative correlation, and white cells show no correlation between the two. For readability, only ten nodes were included in the matrices.

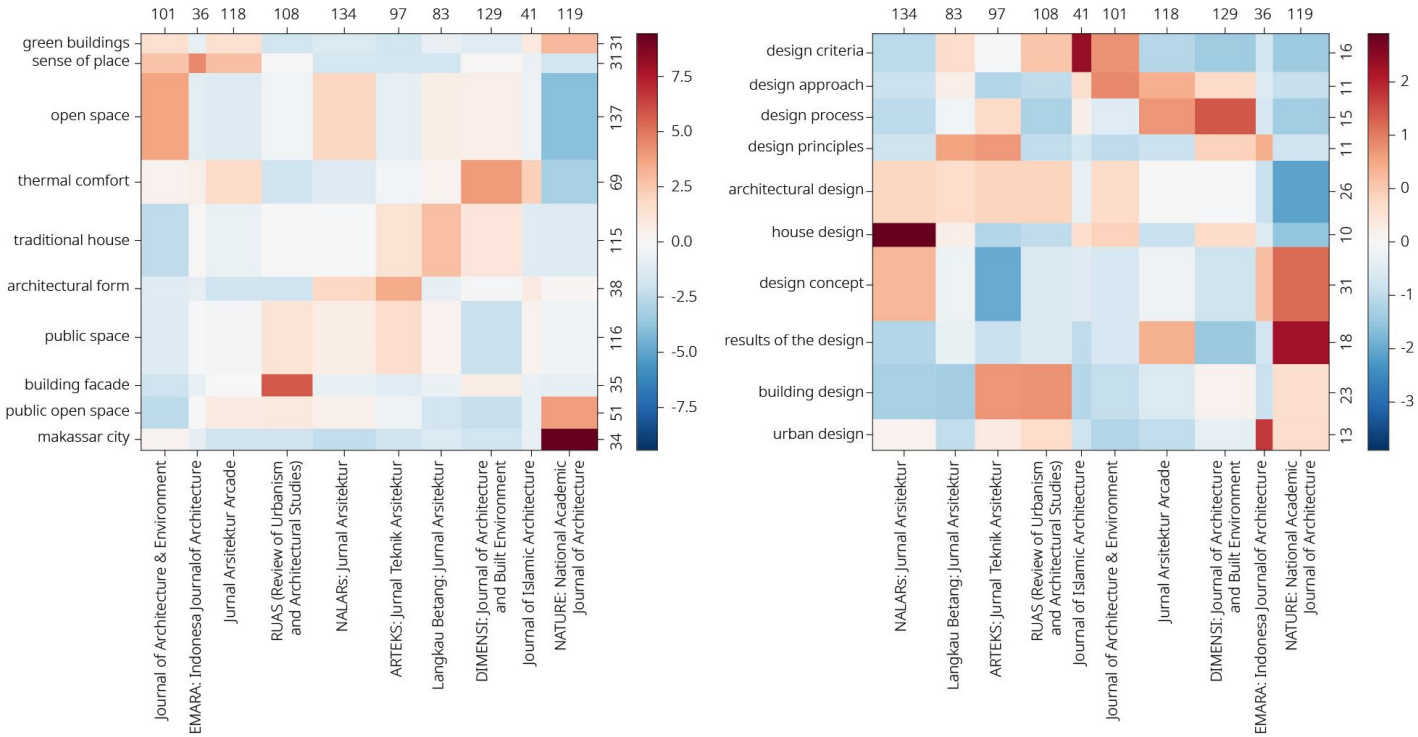

Figure 2. The contingency matrices are showing a heatmap of the correlation between the two sets of extracted terms and the analysed journals

From the observation, each journal tends to have a few terms that have a higher correlation among others, distributed and intersected differently from one journal to another. For example, *Journal of Architecture & Environment* is positively correlated with *open space*, *sense of place*, *green building*, *design criteria*, *design approach*, and *architectural design* while NALARs: *Jurnal Arsitektur* is positively correlated with *open space*, *architectural form*, *public space*, *house design*, *architectural design*, and *design concept*. The two journals were positively correlated with *architectural design* and *open space* yet diverging with the other topics. Some distinguishable pairs, such as *house design* with NALARs: *Jurnal Arsitektur*, could indicate the journal's substantial inclination toward particular topics.

A key takeaway from the contingency maps is that many examined journals tended to have specific issues and contexts manifested in the specific extracted terms, resulting from different scientific communities that actively contributed to particular journals. The various distributions could be the result of each journal's aims and scope or contextual/institutional affinities, leading to a different preference for a specific field or scientific community.

Cooccurrence map and topic affinities

The co-occurrence network map (Figure 3) shows the interconnectivity of the extracted term-sets. The node's size denotes the frequency of occurrence of the terms in the corpus. The edge represents the term's co-occurrence within the corpus, expressing the discursive relation among the terms. The node's colour and circles denote the detected clusters based on the tool's Louvain algorithm. The keywords with the highest frequency of occurrences, such as '*building design*, *architectural design*, *design concept*, *design principles*, and *urban design*, have the most significant nodes on the map.

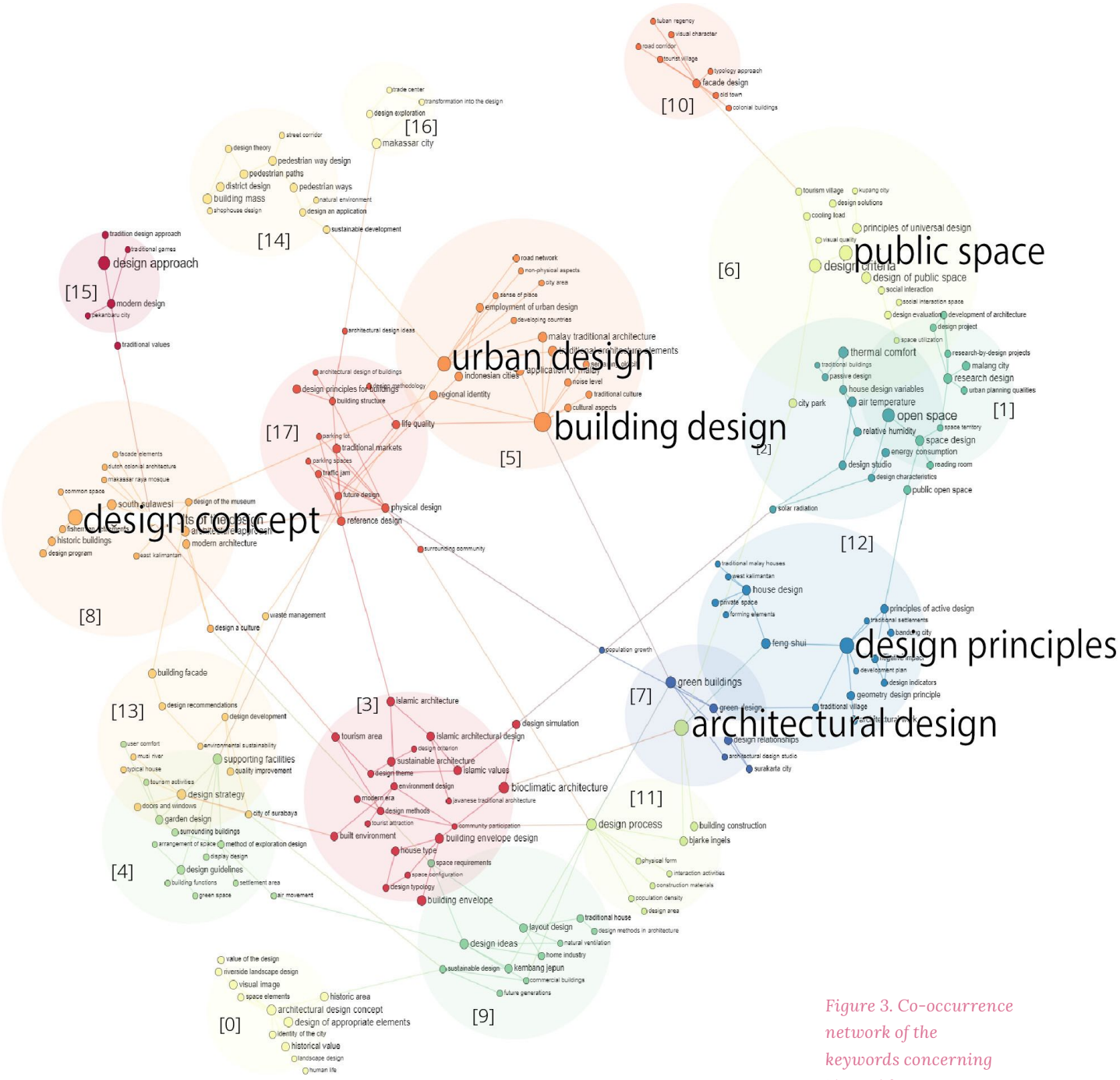

Figure 3. Co-occurrence network of the keywords concerning 'design' from 2011–2020

The most co-occurring nodes are placed closer to each other by the algorithm, which leads to the identification clusters that shows the terms' affinity and interconnectivity. The detailed list of terms in each cluster can be seen in (Figure 4). It should be noted that while the algorithm identified the cluster, most of the clusters do not demonstrate strong ties among its nodes. Instead, most of the identified clusters are composed of a single or two nodes that branch out to smaller ones.

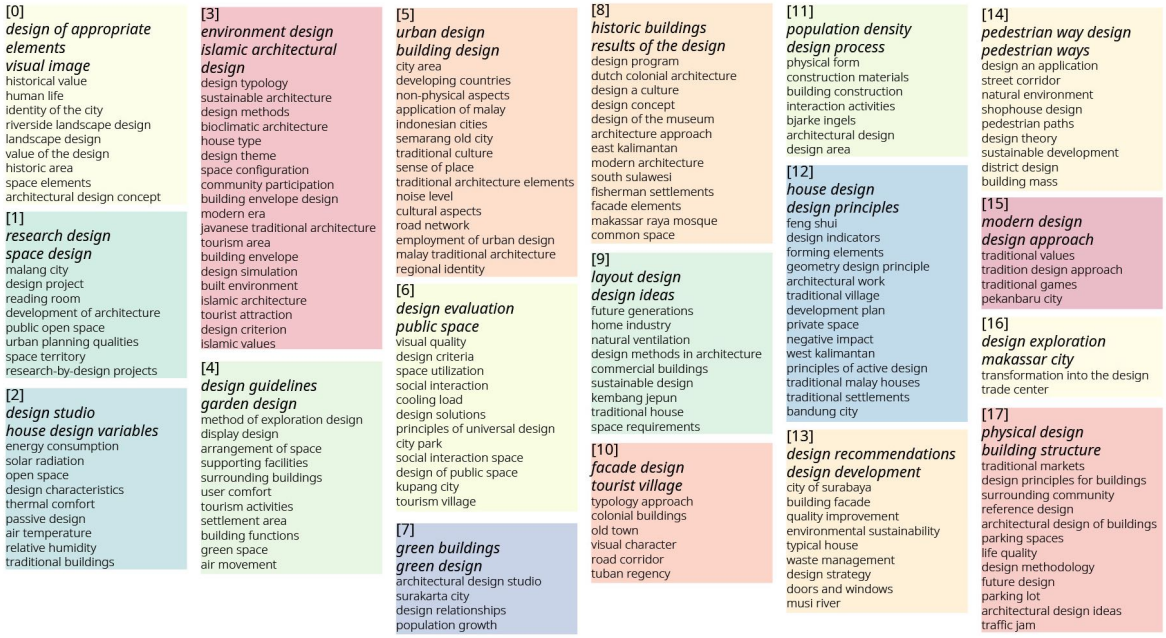

Figure 4. The list of terms in each cluster

For example, cluster [5] are composed of two significant nodes, *urban design* and *building design*, bridged by few nodes related to traditional architectural elements. Another example is cluster [8], where the two most prominent nodes, *design concept* and *design result*, were connected by a single node, *South Sulawesi*, suggesting the contextually preferred topic that arose from a particular community in the field. A similar case also happened in the cluster [12], where the term *feng shui* bridged the mini-cluster *house design* and *design principles*. Some clusters are also composed as groups of nodes that are sparsely inter-connected that resulting in a potpourri of seemingly unrelated terms, such as cluster [3], that harbours terms such as *environment design*, *Islamic architectural design*, *bioclimatic architecture*, *tourist attraction*, and many others.

Due to weak ties in the big clusters, the smaller clusters show some more interesting topical relationships. Cluster [10] focused on the node *facade design*, connected with the nodes *tourism village*, *visual character*, *road corridor*, *old town*, and *colonial buildings*. It suggests the preference of facade design in the development of tourism and historic areas, in which the visual character of the area was one of the main concerns. Similar tendencies with visual and historical components of the design are also suggested in the cluster [0]. The focus appeared to be composed of terms such as *architectural design concept*, *historical value*, and *visual image*. Some clusters are

developed around the notions of typology, such as cluster [14], which focuses on the pedestrian areas. The small cluster can also signify under-developed topics as the case with cluster [7], which focused on *green buildings* and *green design*, yet this field's development appears to be still limited.

The most prominent clusters, such as the cluster [3], [5], [6], [8], and [12], represent the collections of terms that have the highest co-occurring frequency among the others. It also represents the use of different notions of design for each cluster. For example, *public space*, *design criteria*, and *design of public space* were clustered together in the cluster [6], which potentially suggests the common interest in finding or formulating design criteria for public space. The cluster also contains lesser-used terms such as *principle of universal design*, *social interaction*, *visual quality*, *cooling load*, which may represent different aspects that were considered into the discourse.

Temporal map and topics dynamic

The temporal map (Figure 5) shows the evolution of terms' co-occurrence clusters in three successive periods from 2011 to 2020. By observing this evolution, the terms' dynamic can be identified compared to the previous network map. Each cluster is packaged into small, coloured rectangles in the diagram, where the interconnectivity between two periods is denoted by tubes. The term list below the diagram shows the corresponding keyword clusters in detail (Figure 6). The number of clusters is growing over time, as the increasing number of articles allows more diversity of the field's topic. The detailed reading of the clusters can reveal the recombination of terms into different clusters, denoting the terms' dynamic use and the lack of strong ties among the terms. The lack of tubes represents the lack of evolutionary dynamics of the field. It suggests the occurrence of erratic changes instead of a continuous development of the discourse.

Figure 5. Evolution of the links between clusters of design keywords over time between 2011–2020

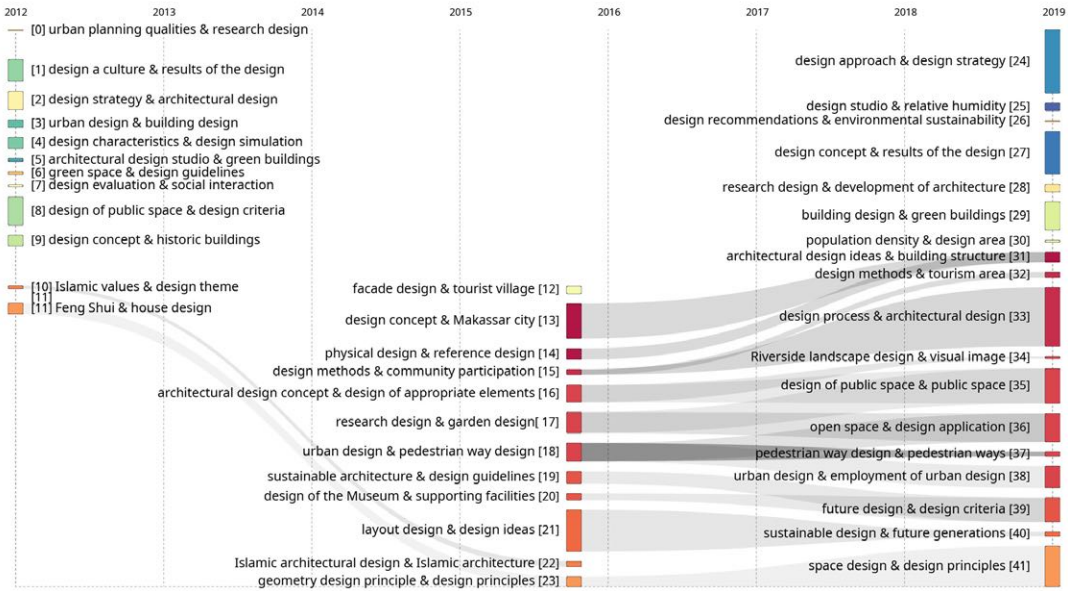

Figure 6. The list of terms in each cluster per episodic period

From 2011 through 2014, the biggest clusters focus on the topic concerning the design of public space [8] and showcasing a design result [1], while different notions of design are beginning to appear. Between 2015 and 2017, different clusters appeared in different ways, where the clusters related to design concept [13, 16], design ideas [21], design guidelines and sustainability [19], and urban environment/typology [17, 18] populates the corpus. There were also clusters related to cultural/religion values [22], design principles [23], and design of specific typologies [12, 20].

From 2018 to 2020, different spectrum clusters appeared at once, usually as recombination or spin-off from the previous clusters. For example, cluster [24] combines different terms such as *genius loci*, *thermal comfort*, *traditional house*, and other relevant terms with *design approach* and *design strategy*.

It denotes the preference of specific topics in the development of a design approach or strategy. Some clusters seem to maintain the specific interest in specific terms such as *design concept* [27] or create a superset from the previous cluster in the cluster *design approach* and *design process* [33].

Some other clusters were formed from the detailed typological division and its correlated topic [25, 34, 37], in which its term of combination is also interesting to scrutinise. For example, in the cluster [25], *house design* is clustered around the terms *design studio*, *house design variables*, *relative humidity*, *air temperature*, and *solar radiation*, which could indicate the prominence of these term as variables in housing design in particular publications. The term *riverside landscape design* is also clustered with *visual image* and *value of design*, which could indicate the emphasis of visual quality in landscape design in some publications. By seeing the dynamic development of clusters over time, we could derive some idea on how the terms are related to each other to develop particular discourse.

Toward the agency of design discourse

The role of architectural publication in the development of design discourse can be inferred through the three mapping strategies as hypothetical lenses. The contingency map (Figure 2) shows the certain preferences or biases for each journal titles toward particular terms. It indicates certain biases or preferences on particular topics that could reflect some community's preference behind the publications. On the other hand, the co-occurrence network map shows the instead weakly constructed clusters from the collected terms (Figure 3). It could suggest the sparse development of the field, which is indicated by the lack of terms interconnectivity than in a well-developed discourse. The sparse development of the design discourse is also highlighted in the temporal map that presents the discontinuity in the development of clusters (Figure 5). The following discussion will highlight some of the observed sparsity in the development of design discourse and retroactively reflect it toward a more diverse, creative, and provocative development of design discourse in Indonesian architectural academic scholarship.

Criticality over the design concept

The notion of the design concept is pervasive throughout the reading of the maps in different ways. It has a strong correlation with two journal titles (Figure 1). It also has been used concurrently with the terms related to different urban and architectural typologies and description of architectural works and their relation to contextual, cultural, historical, and traditional identities, as shown in the cluster [8] in Figure 4 as well as with cluster [9, 13, 27] in Figure 5. It indicates the different appropriation of design concepts in a different circumstance that is worth to be scrutinised.

The notion of design concept incorporates a top-down process where the major organisation of the proposal is first determined, thus acting as heuristic guidelines for aligning

more minor elements into the bigger scheme (Plowright, 2014). Zeisel & Eberhard (2006) suggests that the design process is a series of conceptual shifts or creative leaps as responses to new information and insights, which suggested the constant situated revision of the concept. Thus, the concept provides cognitive tools for the designer to frame the design and revise if the fitness with the new information fails to materialise or a new point of view is taken.

As explanatory knowledge, the rational and creative impulses in the formulation of design concepts need to be demonstrated in different artefacts (Harahap et al., 2019; Wagner, 2000) to convey its whole meaning. The embodiment of different knowledge into a concept can be seen as a lossy compression strategy that eases the communication and cognition of an architectural proposition which also entails a hidden danger of misunderstanding and over-simplification. This remark calls for various experiments that touch different architectural techniques and representations of concept (Allen, 2009) and be framed into a robust theoretical discourse to clarify its knowledge.

Academic publications could act as a critical medium in reflecting this multifaceted meaning of design concept. Downton (2003) points out that the concept can be valued as knowledge if its emergence or becoming is remembered and recorded. It enables the production of 'situated knowledge' in which some can be novel or exceptional, thus expands the frontier of architectural knowledge. It is essential to clarify the often-opaque design concept through different experimentation artefacts and representation into valuable architectural knowledge that brings critical dimension to its formulation.

Challenging the normative

There was an increasing tendency to discuss design strategies, principles, guidelines, and criteria over time, as shown in the cluster [4, 6, 12, 13] (Figure 4). It can be seen as attempts to find the best possible answer for a particular problem in each field. This tendency demonstrates the normative theoretical point of view (Downton, 2003), which often prescribes manifestos, principles or guidelines based on the ideological position of an ideal world, good design, good architecture, or good cities. Normative design knowledge can inform what is done in practice, suggesting its importance values in the field (Groat & Wang, 2013). Therefore, academic publications must engage the very ideological and theoretical stances of developing these normative principles.

Till (2009) suggested that the normative problem-solving approach would hinder the transformative agency of architecture and proposed the idea of 'sense-making,' which brings the sense of reconciliation of different points of view. The increasingly polarising worldview reveals the need to shift our attention from the mere production of principles to a more multidisciplinary exchange and creative endeavour to enrich the development of such principles. To engage means to provoke, argue, or contest the status quo, which requires the exercise of architectural intelligence to produce 'artefacts'

that embody a particular worldview. Highlighting theoretical positions can be productive as it exposes the different worldview of a design problem and improves the intellectual breadth of the suggested norms. Design can also become the instrument for proposing speculation or counterexamples from a certain point of view, which invites future debates and re-examinations of its ideological or theoretical stances.

Reframing the cultural, historical and traditional references

The extracted terms showed that a significant part of the articles brings the cultural, historical, and traditional aspects of their topic of interest, embedded in the more salient terms such as design concept and approach, as shown in most clusters in (Figure 4). The direction can be a considerable asset for Indonesian architectural discourse, as demonstrated by other non-western countries (McGrath, 2018). The challenge is less the richness of the references than the need for theoretical framing. Those values can be reflected in contemporary design practice, thus enabling new cultural discourse to emerge (Atmodiwirjo & Yatmo, 2021).

Reflecting on Hannah Arendt's view of tradition, Demirel (2009) suggested that tradition is condemned to a dead-end if we only repeat and render it as things of the past. He suggested that to enable the renewal of tradition, the appraisal of tradition must go beyond depiction that put appearances and values in a frozen time and allow a more evocative approach that allows the resonance between past and future. Scholarly publications, therefore, should be the platform to re-contextualise the past values without compromising the current urgent need for a more sustainable building environment (Mhearáin & Kennedy, 2020).

Broadening the issue of sustainability

The issue of sustainability is increasingly urgent and necessary. However, the notion of sustainability is not pervasive yet concerning the development of design discourse. The issue of sustainability is narrowly associated with the development of certain principles and standard and themes, as exemplified by cluster [19] (Figure 6), that is often restricting instead of broadening the discussion of sustainability. It also revealed that green buildings discourse has gained some popularity in 2018–2020 as in cluster [29]. It gains more elaborations of topics related to energy, materiality, constructions, development, and climate change that are heavily linked with green building research (Darko et al., 2019).

However, the creative endeavour in tackling sustainability in architecture beyond the mainstream and often pragmatic view of sustainability is still missing from the map. For example, the depiction of sustainability as a planetary narrative could provide a more affectionate framework that helps realise its urgency and highlight the earth's fragility as a complex system (Ghosn & Jazairy, 2018). The development of post-digital procedures that enable architectural designing the ecological complex that goes beyond the seduction of digital virtuosity

or environmental moralism is also being urged to reconcile the technology and the environment (Picon, 2020). It is the role of architectural publication to provide a platform and provocation of such urgent issues.

Activating design research and participation

The absence of research-related design action is also the concern of this reflection; while some related terms indicate some *niche* move in the field—such as *research by design project* and *community participation* in the cluster [15, 29] in (Fig. 6)—its echo is nowhere to be seen. Research is indispensable for a field to maintain its relevance to society or doomed to obsolescence. However, it is understood that research in architecture has a unique challenge.

The production of architectural knowledge has a different epistemological logic from science and humanities. The generation of the architectural theory can be empirically grounded in a single case to build themes within research (Luck, 2019). Groat & Wang (2013) also highlighted different research strategies of architectural research that accommodates different worldview from positivism to constructivism. Furthermore, as a spatial agency, participation in research and design is necessary to enable transformations in society (Awan et al., 2011). Considering architecture publications as the primary platform for research dissemination, the lack of design-related research could indicate a big void that needs to be filled to avoid stagnations in the development of Indonesian architecture scholarship.

Conclusion

This study depicts the overall picture of design discourses in architectural academic publications by analysing and mapping the abstract of scholarly articles published by Indonesian architectural journals from the past ten years. The results showed a different topic of interest concerning 'design' in tackling different architectural and built environment issues. From these distanced readings of the discourse, it is showed that in Indonesia such field is still in its infancy; where the topics are constantly recombined and reconfigured, while the institutional agency of the academic publishers is still developing.

Several highlights regarding the sparse development of the design discourses in Indonesian architectural academic publications are retroactively reflected from the different mapping. The needs of improving criticality over the design concept, challenging normative thinking, reframing the past historical and cultural references, broadening the issue of sustainability, and activating design research are some highlights issued in this study. This study have also demonstrated the architectural publications as both the lens and vehicle in expanding the agency of architecture. It is suggested that in order to enable the development of architectural discourse in Indonesia, the engagement of design criticality, the discursive provocation, the re-contextualisation of values, and the increased activity in sustainability and design research should

be more present in the future Indonesian architectural academic publications, thus potentially bringing a positive change to the development of the discourse.

The lack of complete data effectively limits the analysis that relies on the term extraction method, thus discards essential detailed data describing the authors, citations, and institutions information. This study aims to elicit a similar study with richer data to be performed in the future as a continuous reflection of the agency of architectural publications in the development of architectural discourse, enabling active contributions to take place as a response.

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