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CONTEXT LEARNING TRANSFORMATION IN DATA-BASED ARCHITECTURAL DESIGN STUDIO

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Abstract

This paper reflects the shifting understanding of the idea of context and its learning process in a data-based architectural studio. With the school closure at the beginning of the COVID pandemic, the studio was largely conducted online. Big Data became a vital discourse that provides some transformative benefits and opportunities of the design and learning process in an architectural studio, particularly on how students may explore and understand their context. Exploring the works of third-year architectural students in the Department of Architecture, Faculty of Engineering Universitas Indonesia, this paper explores the ways students capture and organise urban information and construct their intervention contexts. The study points out that time, flow, and narrative are key in transforming understanding of the context in digital urbanism, analysing the variety of students' data visualisation outputs based on such three aspects. Based on such analysis, the study categorises the unseen urban patterns; emerging in the imbalance relationship between the user and the environment, the disconnection of urban services, and the hidden variety of urban experiences. The study reflects how these urban patterns inform how students define and situate themselves in the context, shifting existing ideas of context and its corresponding methodologies in architectural education.

***Keywords**: context; data; architectural education; pandemic*

INTRODUCTION

This study examines how the use of data redefines the understanding of the context in an architectural studio. The massive advancement of digital technology has lead to widespread changes in operating the city based on the flow of information, goods, and services, defining the city as a networked condition (Lyster, 2016). These networked flows generate a large amount of data produced by sensor systems, user-generated platforms, administrative governmental data, private sector (e.g., e-commerce), and archival platforms (Thakuriah et al., 2017). Such a digital network of flows disrupts our understanding of city spaces' design and management (Burry, 2020).

This article is particularly interested in how such disruption exists in understanding the context as part of architectural education during the pandemic. The COVID-19 outbreak that currently captivates the civilisations is part of the long-running history of the world attacking-plague (Berger, 2018; Cowell, 2020). With the virus's severity and large distribution globally, discussions regarding its challenges to the architectural design process have arisen (Giacobbe, 2020). The paper argues that focusing on how online-accessed data inform the context can address such challenges.

The process of understanding context in architectural practice has been limited to exploring the physical qualities of architectural objects in a defined boundary (Butterworth & Vardy, 2008; Lyster, 2016; Sennett, 2006). The process of understanding a context, often commonly described as site survey, relies on a rigid abstraction of the site, which then reinforces other propositions of architecture as object-based instead of as a relational construct (Butterworth & Vardy, 2008). There is an emerging architecture that begins to offer the more whole, creative and engaging forms of understanding the context (Butterworth & Vardy, 2008; Rendell, 2007). This paper points out that discussions on a data-based understanding of context can significantly expand such discourse.

This article begins with a theoretical study on the shifts of context reading in the architectural design process, followed by how such context reading exists in digital urbanism, living in how data is captured, and how it informs emerging urban patterns. It outlines the study's methodology in architectural pedagogy, utilising students' architectural works, their design process, and the students' reflection in conducting the study. The article follows by exploring different contextual understanding inquiries according to the students' works, highlighting emerging patterns of data that inform the context. The paper then reflects and outlines the shifting sense of context, both in practice and architectural pedagogy.

CONSTRUCTING THE CONTEXT IN THE DIGITAL URBANISM

This section discusses the shifting definition of context in the architectural design process and how it particularly applies in digital urbanism. Traditionally, the design process includes and often starts with designers' assimilation to a situation (Lawson, 2005). Such a process of assimilation signifies how the context is located 'outside' the design process. Therefore the designers must assimilate with the context to transform it as the 'design context.' This assimilation perspective considers and marks the context with its predefined qualities. Some literature has raised the importance of moving beyond this way of understanding the context. They suggest that context has to be understood from within or as something that traverses beyond, calling for a new way of knowing (Ewing et al., 2010; Till, 2013). Architecture is a "situated knowledge" and therefore "should not be applied as an abstraction from the outside, but developed from within the context of the given situation" (Till, 2013, p. 166).

In the context of digital urbanism, this traversing perspective is particularly significant, as the network may cross multiple spatial boundaries and geographies (Lyster, 2016). Instead of accepting the context as a predefined situation, the designer builds from such situation, organising the context as a constructed environment that enables alternative or transformative modes of practice (Rendell et al., 2007; Till, 2013). The complexity of digital urbanism data potentially leads to the urban realm's broad design possibilities, even beyond architecture (Burry, 2015, 2020).

Understanding the context as constructed shifts the definition and interpretation possibilities of a context or a site. Some literature expands the context and site by using a more fluid term such as "field" that signifies the "condition" of "operating between" (Ewing, 2010, p. 3). Understanding the context with more fluidity "renounces certain measures of control" (Allen, 2003, p. 220). Seeing context with its fluidity enables an expanding consideration of the "physical locations, relationships, bodies and texts" that encompass the "field of operation" (Chiles & Butterworth, 2010, p. 130).

The fluidity of the operating field in digital urbanism translates as an abandonment of geographical context; it addresses the context (Lyster, 2016). In this sense, distance or morphologies of a particular context no longer matter. Consideration of location is determined by its position within a connected network (LeCavalier, 2016; Lyster, 2016). Such fluidity arguably allows designers to maneuver between the different terrains of the context, highlighting the expanded, hidden, and diverse space qualities

Some expanded aspects of space, for example, include the understanding of time as the context itself. Time is an essential instrument of digital urbanism (Lyster, 2012). Architecture traditionally has never been quite fond of time, as designers often consider buildings to be permanent instead of temporal (Till, 2013). Understanding time as the context enables us to see architecture as subject to decay, wear and tear, demonstrating the imperfect, ever-changing, and ambiguous fragments of architecture (Baxter & Brickell, 2014; Handa, 2014; Till, 2013; Warakanyaka & Yatmo, 2018).

In network-based urbanism, the importance of time is amplified, as it uses the multiple dimensions of time in organising the city process. Time exists in the cycles of life and seasons, in a linear process of decay and change, and the explosion of events and momentums (Lefebvre, 2013; Till, 2013). In a digitally-managed logistical network, for example, time exists as a working cycle. It also defines the momentous deadline of arrival time (Lyster, 2012) Understanding the various presence of time arguably enables architecture that accommodates occupations and forces that comes with such multiplicity of time instead of a barrier (Till, 2013, p. 95). Organising spaces temporally instead of based on function (Lyster, 2012) reinforces the transformative architecture practice that responds to particular temporal conditions.

Other than time, an expansion of understanding of context might demonstrate an appreciation of flow. Flow is the "ceaseless force through which life is expressed" (p.66), and "(a)rchitecture is always in a condition of flow" (Yates, 2011, p. 63) where architectural boundaries transforms correspondingly. Some flow corresponds to the state of occupation, where architectural boundaries transform correspondingly. Some flow corresponds to the state of occupation, while others refer to the systems that organise movements across establishments (Ballantyne & Smith, 2011). Within the network, space of flow is defined as an interaction between three elements: the places where activities and people take place, the material

communication networks, and the content that governs the information flowing through such networks (Castells, 2009). Employing flow as the architectural context in digital urbanism replaces the focus from material goods to services, creating an "On-Demand Urbanism" which connects physical space, digital platforms, and infrastructure (Lyster, 2016, p. 119). It arranges spatial and resource possibilities between stakeholders on "as- and when-needed basis", dynamically allocating resources across society (Thackara, 2006, p. 19). Appreciating flow as the context enable different understanding of architecture not as the ones that contain particular movements, but also the system that triggers and sustain the movement itself (Castells, 2009; Soranart, 2011).

This study highlights the narrative as an expanded quality of space in digital urbanism in addition to time and flow. The architectural narrative explores how cultural and local aspects of society manifest in space and time (Atmodiwirjo et al., 2019; Psarra, 2009). The digital narrative emerges from the mundane and the personal takes of urban experience that gives variation to the otherwise generic urban fabric (Johanes et al., 2017; Valese & Natta, 2020). It also often creates a dialogue between the virtual and the real by applying the virtual content from the network within the actual space, making traces of the virtual narrative in the physical space (Kidder, 2012). Understanding the urban narrative as the context promotes an ever-evolving understanding of space, as personal and community interests change from time to time, redefining the meaning of locality within digital urbanism.

This article argues that consideration of time, flow, and narratives inform different processes of reading the context in digital urbanism. These processes inform the potential urban patterns that construct the context of digital urbanism. The following section explores these different processes and patterns within the context of an architectural design studio as a way to address how such expanded qualities of context change architectural education.

METHODOLOGY

This study examines the processes and output of context exploration in a third-year architectural design studio in the Department of Architecture, Faculty of Engineering Universitas Indonesia. This studio focuses on creating a public space based on issues they have explored within a particular context. With the school closure at the beginning of the project, the studio shifted its regular direct field exploration approach to utilisation of Big Data platforms as a way for students to grasp and define their context. The students were asked to work in four and chooses their data platforms, harvesting and analysing the data they considered relevant through mapping and other forms of data visualisations. This data analysis generated a broad yet detailed reading of context, which then informed their architecture possibilities.

Conducting a distance-learning studio employs digital technology for ideation and collaboration (Ahmad et al., 2020). The digital world "has evolved from being a space of information to a space of creation", promoting broader and more creative possibilities of the means of research (Costa & Condie, 2018, p. 1). The digital exists both as the instruments and the context (Costa & Condie, 2018; Thakuriah et al., 2017). The digital instrument deals with the digital applications and platforms to harvest and map the data data (Picon, 2015; Thakuriah et al., 2017). It also serves as an interface of learning, creating hybrid experiences of physical and virtual space that are unfixed and extendable (Dann & Lambrou, 2020). These harvesting and experiencing process demonstrate the iterative practice of understanding the network-based context. Consideration of time, flow, and narrative discussed in the previous section shape such iterative practice, narrowing the types of data, the relationship between them, and how it is experienced in the studio.

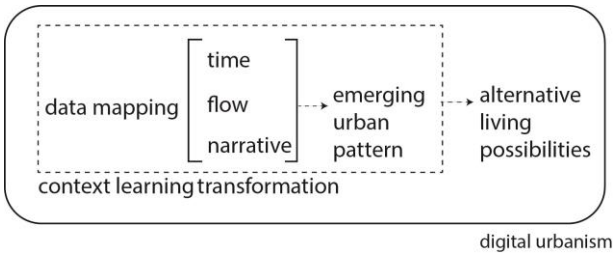


Figure 1. Diagram of research phase: understanding emerging urban patterns from data mapping in the context of digital urbanism

This study aims to demonstrate how the students' reading of digital data shape emerging urban patterns, particularly concerning aspects of time, flow, and narrative, creates a transformation of context learning (Figure 1). It addresses a variety of urban data and highlights its different types and characteristics. In differentiating the data, the study may consider the source and medium of the produced data and the data roles within society. The study highlights the different means of analysing this data based on the data variety, highlighting creativity in visualising multiple types of data to organise them. The study follows by categorising the urban pattern emerging from the data analysis, highlighting how the patterns inform the changing understanding of context based on digital urbanism data. This categorisation is informed by the way the data generates some imbalance, gap, or intensification. Informed further by the students' studio feedback, the

study reflects how such an approach of context exploration transforms understanding of context and its exploration methodologies within architectural education.

INVESTIGATING THE DATA-INFORMED CONTEXT IN AN ARCHITECTURAL STUDIO

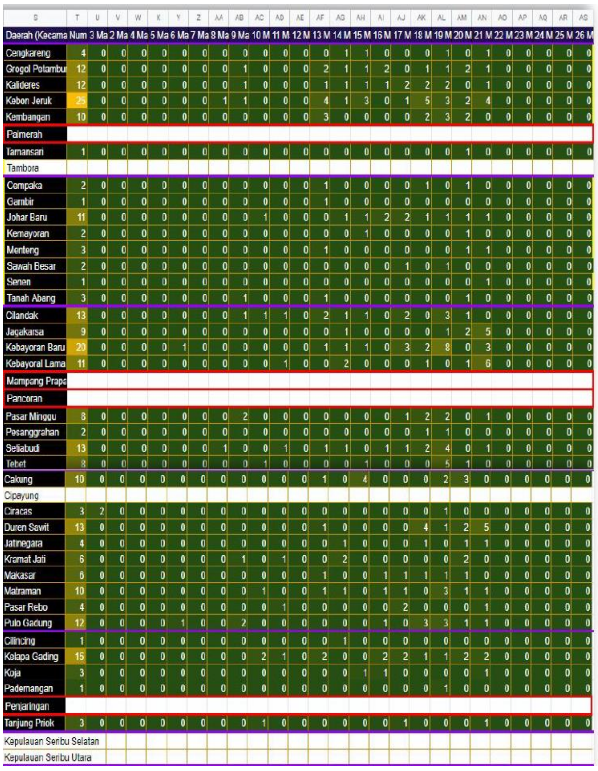
This study's studio works engaged with four different data sets, broad-ranging topics, and data sources. One of them explored text-based data mined from Twitter platform related to the narratives of BTS boyband and its overall music experience. The other data sets explored various statistical data from regional and national government digital platforms in Indonesia that observe the pervasive presence of COVID-19 across the country. Another data set also harvested their data from Twitter geotagged data and the government digital data platform, focusing on GIS-type data about the presence of flooding in Jakarta. The last data set was concerned with the emergence of beverage brands throughout Jakarta, with data acquired from multiple sources. The first source was Zomato, a consumer satisfaction information and e-commerce portal that enables different users to provide feedback to food and beverages brands in the city. The other source was Grabfood, which is a food ordering and delivery applications.

These data sets highlighted different qualities of time, flows, and narratives within the network, which creates a specific pattern of the context. The following sub-sections discuss how the urban pattern evolves from the data and the relationship between them, which then construct the design project's contextual issue.

Imbalance relationship between user and their environment informed by the multiplicity of time

Some of the Corona data sets' analysis processes demonstrated some gaps and disproportion between different data sets. The data parsed between the real-time data of COVID patients and their location in Jakarta with other types of data, from the regional data of the district's citizen profile and density, the local traffic data, and the urban facilities available around the locations of infected patients. Some of these parsing data generated various imbalance relationships between the user and their environment shaped by the time's multiplicity.

Some examples of the gapping pattern of data can be seen in the visualised comparison between the COVID-19 treatment spaces and available urban facilities at the moment (Figure 2). Despite the large presence of hospitals as the centre of infection, the surrounding pedestrian was unable to keep up in providing a significant number of urban facilities required to reduce virus transmission around the area, such as portable handwash station. This condition worsened with the mix between mask-wearing pedestrian and non-mask wearing pedestrian, creating an imbalance relationship between users and their walking environment. This imbalance was driven by a particular momentum of time that triggers additional urban functions.



Daerah (Kecama	Num	3 Ma	2 Ma	4 Ma	5 Ma	6 Ma	7 Ma	8 Ma	9 Ma	10 M	11 M	12 M	13 M	14 M	15 M	16 M	17 M	18 M	19 M	20 M	21 M	22 M	23 M	24 M	25 M	26 M
Cengkareng	4	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0
Grogol Petambur	12	0	0	0	0	0	0	0	1	0	0	0	2	1	1	2	0	1	1	2	1	0	0	0	0	0
Kalideres	12	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	2	2	2	0	1	0	0	0	0	0
Kebon Jeruk	25	0	0	0	0	0	1	1	0	0	0	4	1	3	0	1	5	3	2	4	0	0	0	0	0	0
Kembangan	10	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	3	2	0	0	0	0	0	0
Palmerah																										
Tamansari	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Tambora																										
Cempaka	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
Gambir	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Johar Baru	11	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	2	1	1	1	1	0	0	0	0	0
Kemayoran	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Menteng	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
Sawah Besar	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Senen	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Tanah Abang	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Cilandak	13	0	0	0	0	0	0	0	1	1	1	0	2	1	1	0	2	0	3	1	0	0	0	0	0	0
Jagakarsa	9	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	5	0	0	0	0	0
Kebayoran Baru	20	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	3	2	8	0	3	0	0	0	0	0
Kebayoran Lama	11	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	1	0	1	0	1	6	0	0	0	0
Mampang Prapa																										
Pancoran																										
Pasar Minggu	8	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	2	2	0	1	0	0	0	0	0
Pesanggrahan	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Setiabudi	13	0	0	0	0	0	0	1	0	0	1	0	1	1	0	1	1	2	4	0	1	0	0	0	0	0
Tebet	8	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	5	1	0	0	0	0	0	0
Cakung	10	0	0	0	0	0	0	0	0	0	0	0	1	0	4	0	0	0	2	3	0	0	0	0	0	0
Cipayung																										
Ciracas	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Duren Sawit	13	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	1	2	5	0	0	0	0	0
Jatinegara	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	0	0	0	0
Kramat Jati	6	0	0	0	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0
Makasar	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0
Matraman	10	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1	0	3	1	1	0	0	0	0	0
Pasar Rebo	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0
Pulo Gacung	12	0	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	3	3	1	1	0	0	0	0	0
Cilincing	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Kelapa Gading	15	0	0	0	0	0	0	0	0	2	1	0	2	0	0	2	2	1	1	2	2	0	0	0	0	0
Koja	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0
Pademangan	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Penjaringan																										
Tanjung Priok	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Kepulauan Seribu Selatan																										
Kepulauan Seribu Utara																										

Figure 2a. Corona patients' real-time data (Statistical data acquired by students from @KawalCOVID19)

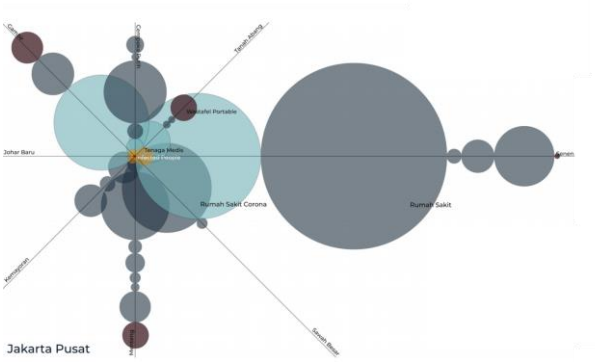


Figure 2b. COVID-19 treatment space, positions of patients and urban facilities: Visualisation by the student, data acquired from @KawalCOVID19 and www.smartcity.go.id)

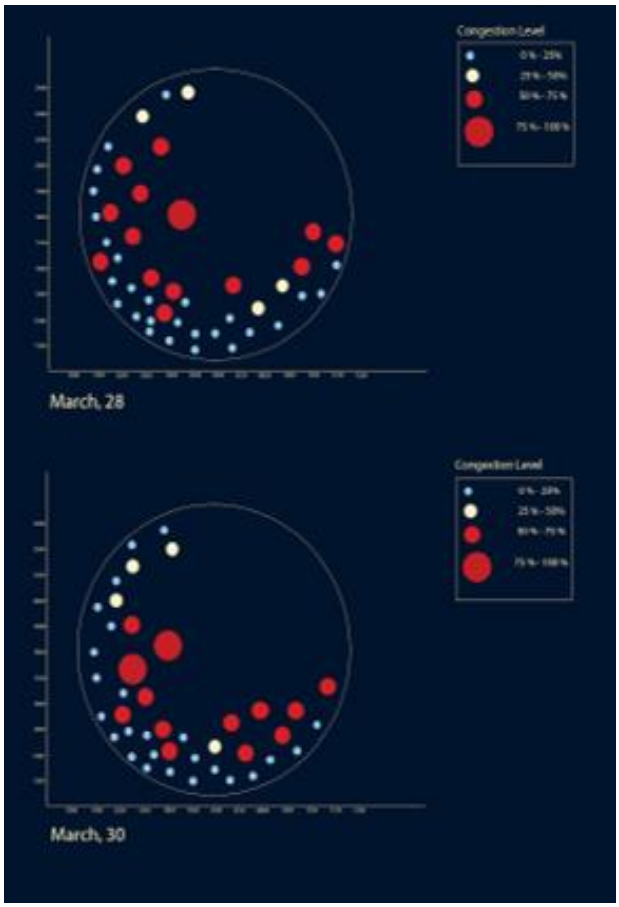


Figure 3. COVID-19 treatment space, positions of patients and urban facilities (Visualisation by the student, data acquired from @KawalCOVID19 and www.smartcity.go.id)

Another presence of imbalance relationship evolved in the visualisations of traffic data during the early days of infection compared to commuters and patients (Figure 3). The commuter profile demonstrated the lack of commuting reasons, as a large proportion of the workers are allowed to work remotely. Yet, there was a gap of proper working place for the workers, leading to persistent work-commutes traffic cycles despite the pandemic's existence. Such gap existed in a routine, cyclical presence of time, leading to a high number of infections among the commuters.

The contrasting proportion pattern of data can be seen in the analysis that compared patients' data and their corresponding age group, which demonstrated a striking jump of infection rate in elderly citizens despite their small proportion within the society (Figure 4). The linear existence of time created vulnerability of such age groups, particularly as they were entirely separated from their age group, heightening their transmission risks.

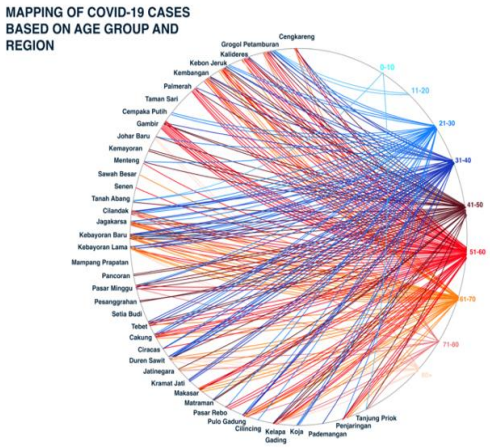


Figure 4. COVID-19 patients age group in accordance to location (Visualisation by the student, data acquired from @KawalCOVID19 and www.smartcity.go.id)

The previous paragraphs demonstrate the spatial conditions driven by multiplicity of time, be it momentous, cyclical, and linear. This different presence of time then triggers a relationship imbalance between users and their environment. Such imbalance demonstrates the contextual challenges of the limited or unfit spaces and facilities; or the limited interactions between stakeholders.

Disconnected urban services as informed by organisation of flows

The analysis of flood data sets demonstrated a disconnecting pattern of urban services. The data compared the pattern of floods happening in North Jakarta in a yearly basis (Figure 5) and the disruption it created to the local foot traffic to nearby public destinations.

	A	B	C	D	E	F	G
1	wilayah	kecamatan	kelurahan	rw	jumlah_rt_terdampak	jumlah_kk_terdampak	jumlah_jiwa_terdampak
2	Jakarta Timur	Jatinegara	Kampung Melayu	4	2	0	0
3	Jakarta Timur	Jatinegara	Kampung Melayu	5	2	0	0
4	Jakarta Timur	Jatinegara	Kampung Melayu	7	6	0	0
5	Jakarta Timur	Jatinegara	Kampung Melayu	8	5	0	0
6	Jakarta Timur	Makasar	Cipinang Melayu	3	4	0	0
7	Jakarta Timur	Makasar	Cipinang Melayu	4	2	0	0
8	Jakarta Selatan	Pasar Minggu	Jati Padang	6	1	0	0
9	Jakarta Selatan	Pasar Minggu	Pejaten Timur	5	1	18	45
10	Jakarta Selatan	Pasar Minggu	Pejaten Timur	6	2	50	95
11	Jakarta Selatan	Pasar Minggu	Pejaten Timur	7	3	89	232
12	Jakarta Selatan	Pasar Minggu	Pejaten Timur	8	1	25	52
13	Jakarta Timur	Kramat Jati	Cawang	1	1	0	0
14	Jakarta Timur	Kramat Jati	Cawang	2	3	0	0
15	Jakarta Timur	Kramat Jati	Cawang	3	2	0	0
16	Jakarta Timur	Kramat Jati	Cawang	5	3	0	0
17	Jakarta Timur	Kramat Jati	Cawang	6	1	0	0

Figure 5. Sample of data on water inundation level in Kapuk region, Jakarta. (Data acquired through www.data.jakarta.go.id)

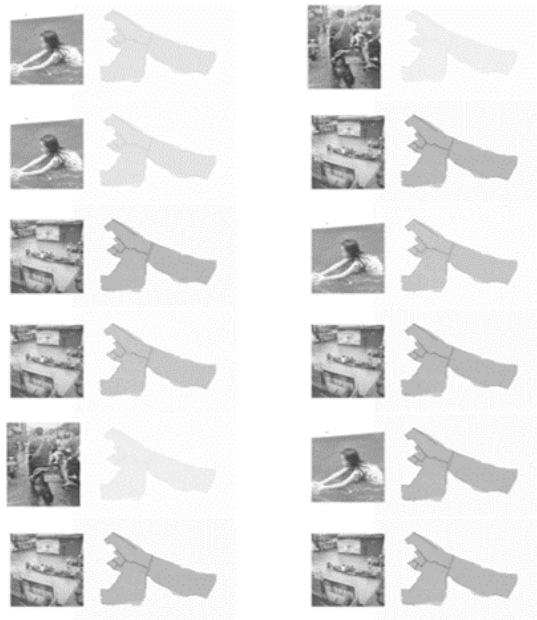


Figure 6. Sample of gradation of market activity during flooding in Kapuk region, Jakarta. (Visualisation by the students, data acquired *through* www.data.jakarta.go.id)

The analysis demonstrated disconnection of access to food due to the absence or limited access to foot traffic, creating difficulties for the local dweller to gain sustenance during flood occurrences. The following visualisation demonstrates the changing gradient of the local market and food shops activity around the flood-impacted areas, informed by the geotagged visual data of flooding victims (Figure 6). At some point, the lightest gradient demonstrates diminishing activity due to the disconnected access, leading to further health risk for the society.

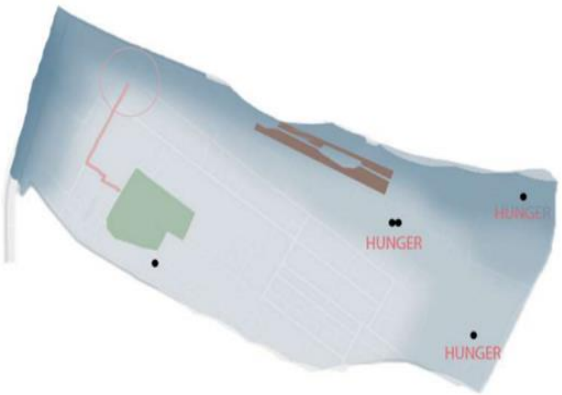


Figure 7. Layering between flood level and potential hunger points of the neighbourhood (Visualisation by the students, data acquired through www.data.jakarta.go.id)

Figure 8. Visualisation of monthly food restocking schedule, highlighting main food needs (Visualisation by the students, data acquired through www.data.jakarta.go.id)

As shown in Figure 7, the analysis demonstrated further exploration of such health risk by layering the flood depth mapping based on Twitter data and the disconnected areas to address the potential areas most subject to food shortage. Figure 8 explores further flows of urban services that highlight the distribution of different types of goods, which shows the priority of food and other household items for the neighbourhood dwellers. Figure 7 diagram lists the common household needs of a densely populated neighbourhood, and the restocking schedule. The diagram showed water, egg, milk, and instant noodle as the most sought-after items with quick turnover within the area. This diagram demonstrates which goods need to be prioritised in the future, both in terms of distribution and cultivation. Understanding the spatiality and temporality of flows enable reading of the disconnecting and intensifying patterns of urban services.

The hidden variety of urban experience informed by the digital narrative

Students working on the BTS Twitter data and Zomato-Grabfood revealed the hidden variety of urban experiences. The BTS data sets was based on a selection

of hashtag entries from Twitter and Instagram (Figure 9), from #fanmeetingbts, #faneventbts, #cupsleeveeventbts, and #fansignbts, harvesting urban narratives evolving from these entries. The data found broad activities done by BTS fans all over the world. These consist of the experience of hunting and buying different kinds of merchandise, creating a meeting with other fans, showing appreciation when there were new work (album, merchandise, photograph) being launched, and having a meet and greet session with the BTS themselves.

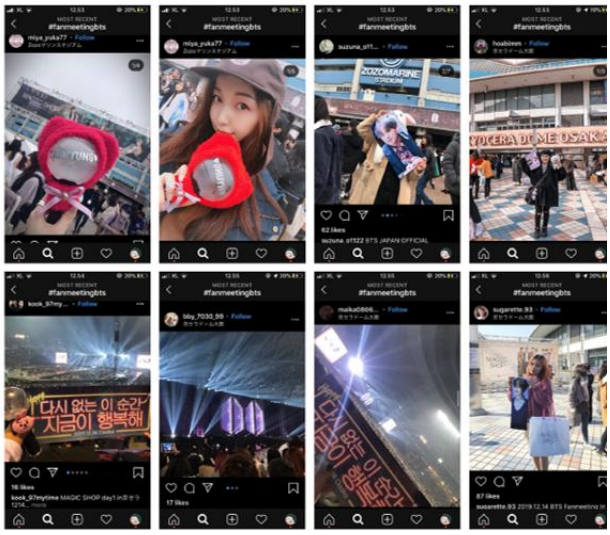


Figure 9. Screen captures of Instagram entries of the selected hashtags (Data acquired through Instagram)

On the other hand, the beverage brands based on Zomato-Grabfood data sets explored multiple data from the web, applications, and the physical space data, from locations, variety of promotion contents, satisfaction rates, the booth configuration, and drinking space of different beverage brands in Jakarta. The data analysis reflected how these brands perform during the pandemic using various advertising strategies by analysing their posting on social media and promotion activity in delivery applications and offline stores. Such promotion activity drove various urban experiences through buying the beverage, such as sharing with the medical workers or buying for the family.

Both datasets analysis demonstrated a hidden variety of urban experience based on shared interest people have with particular cultural narrative aspects which creates other cultural events that provide the experience. The BTS Twitter and Instagram entries data mapped different emotion people have during different BTS-related events, expressed through their photograph or their chosen words (See Figure 10 diagram), such as 'cute,' 'beautiful,' and 'cool.' Such words became part of the urban narrative, signifying people's feeling during their shared experience. These varieties of shared experiences also demonstrated different preferences for participating in the BTS-related event. Some fans like to have a shared meeting together with other fans, while some are more content with the experience of collecting, trading, and hunting merchandise. Such a variety of preferences potentially demonstrate alternative architectural programming that is rich in narrative.

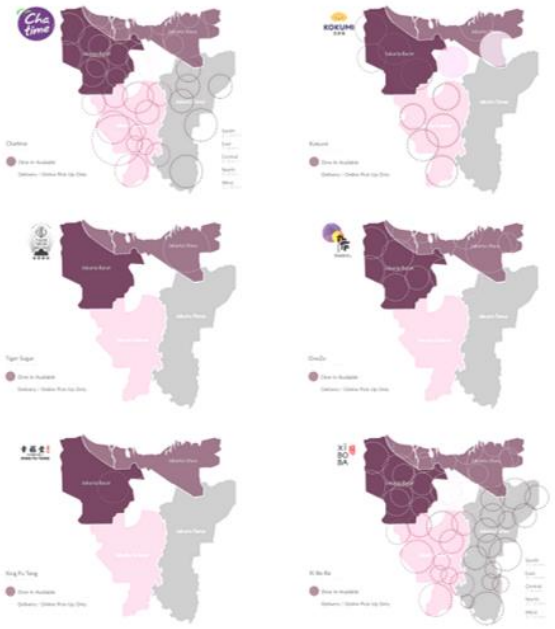


Figure 9. Mapping of different beverage brands locations throughout Jakarta (Visualisation by student, data acquired through Zomato and Google Maps)

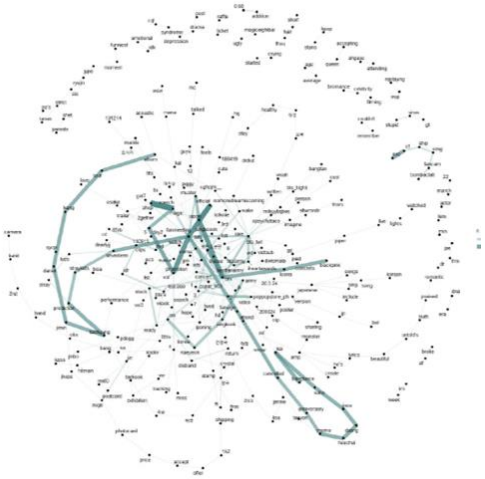


Figure 10. Mapping words often used by BTS fans to express their emotions (Visualisation by students, data acquired through Twitter and Instagram entries)

Figure 11. Example of Instagram post by BanBan brand which demonstrate different marketing strategies (Data acquired through Instagram entries)

The beverage brands' data set demonstrated different customer engagement strategies during the time of the pandemic. With decreasing sales, they created different promotion strategies that will reach potential customers both individually and collectively. As part of such promotion strategies, their posting entries (See Figure 11) informed some important urban narratives within the time where the pandemic has just begun, such as the need to clean house, clean hands, and the need to share with others. Such customer engagement then drove the customer share among each brand (Figure 12) based on the rating and sales rate.

The presence of these brands collectively created a new culture of the society in consuming such kinds of beverage. Some cultural variation also exists within the narrative, such as how, when, and where people consume the beverage, individually and with friends, depending on the menu, promotion, and location distribution. The beverage brands data analysis demonstrated how urban narrative is ever-changing and driven by personal engagement to events happening across the network, creating new architecture possibilities.

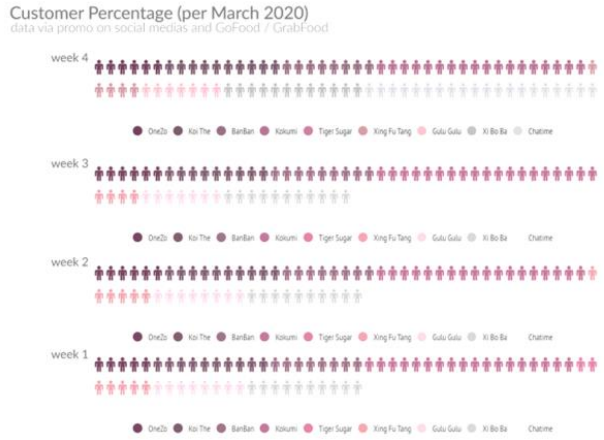


Figure 12. Market share across different beverage brands (Visualisation by student, data acquired through GoFood and Grabfood promotion entries)

TOWARDS THE TRANSFORMATION OF CONTEXT LEARNING IN ARCHITECTURAL EDUCATION

This study explores the transformation of context learning in architectural design education, particularly as informed by data. It argues that there is a need to address the context more fluidly and openly, reinforcing architecture as situated knowledge. Exploring digital urbanism provides such transformation opportunity, as it changes our living spatialities and its corresponding design process.

The study points out the three aspects that potentially expand understanding of context, consisting of time, flow, and narrative. The article reflects how these aspects exist in urban patterns explored by the students through their data sets. Time as the context exists in multiple dimensions in digital urbanism, defining the architectural space's occurrence and capability. Furthermore, the flow as the context highlights the network of urban services, defining disconnections and intensification of flows that then leads to such services' performance. The narrative uncovers a hidden variety of urban experiences, creating new possibilities of architecture from the collective and individual experience of the urban dwellers.

In addition to transformation of contextual understanding, this study outlines some critical lessons for context learning in architectural education based on the students' feedback. First, the data-based context-learning enables students to find alternative modes of urban life, creating more contemporary and more open living possibilities that they were not aware of before. Secondly, in dealing with data, the students needed to

process and transform the data in multiple phases to inform design. This need for data transformation demonstrates a shift from traditional field survey, which often generates information directly applicable within the design process. Thirdly, various data availability across contexts requires creativity and adaptability to integrate different data types from other resources. Such different data selection practices enable the students to utilise different analysis methods instead of applying a one-size-fits all approach. The openness, rigorous process, and adaptability are essential aspects of transforming context learning in architectural education. Further research is vital to address how the transformation of context-learning may apply beyond the data-driven studio.

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