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Original Research Article

A Theory for Explaining Levels of Participation in Architecture Based on the Logic of Decision-making Processes for The Built Environment*

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Abstract

Problem statement: Most of the existing theories of participation in the fields related to the built environment, refer to external theories in politics, sociology, or economics, to apply their explanatory foundations. Unrelated theoretical roots have created various disconnected branches in the field, causing many confusions and insufficiencies. Developing explanatory theories inside the fields related to the built environment can resolve this problem. Accordingly, this study has proposed this question: "What are the distinguishable and evaluable shared concepts that can explain the substance of participation in decision-making for the built environment?"

Research objective: To develop an applicable and examinable framework, which can explain the main components of participatory decisions, considering the substance of such decisions in the fields related to the built environment.

Research method: This research was conducted in four phases by using a qualitative method which is based on the logical argumentation strategy. The steps included: 1. Proposing a definition that includes the main concepts and components of participation and decision-making in the fields related to the built environment 2. Explaining three main components of the proposed definition and leveling each of the three components in an assessable way 4. Examining the explanatory model that explains the relations among the components.

Conclusion: It is possible to explain the substance of participation in the fields related to the built environment based on two concepts of "Decision Cycles" and "Cultural-Epistemic-Praxis Units" and by three components: "Process of participatory decision-making," "Distribution of the power of decision making," and "Communication among the participants." The total level of participation in such decisions can be estimated using three criteria: the level of spontaneity in the decision-making processes, the level of communication in decision-making, and the level of power distribution in decision-making.

Keywords: *Architectural Theory, Participatory Architecture, Participatory Decision Making, Built Environment, Cultural-Epistemic-Praxis Unit.*

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Introduction

Nowadays, due to technological advancements and cultural transformations, participation has become an inevitable, everyday necessity and an increasing demand in various fields. In the field of architecture and other related areas concerning the built environment, there exist numerous experiences and ideas related to participation that have either not been executed based on a specific theory or cannot be easily explained within the framework of existing theories. Additionally, no structured conceptual connection has been formed among the numerous theories related to participation in architecture that would allow for their comparison or further development, particularly for evaluating or explaining new experiences. The goal of this research is to establish a theoretical framework that explains a structural relationship among different theories and experiences of participation in the field of architecture, thereby making their evaluation and development possible. The fundamental issue in developing and addressing participatory theories, especially in practice-oriented fields such as architecture, is that a connection must be made between normative theories and positive theories. Simply explaining the substance of participation does not necessarily aid in creating good and appropriate participation, and achieving participation at a higher level does not necessarily lead to better architectural outcomes. Most existing theories are intermediary theories and act as bridges to link various concepts from political science, social sciences, or economics with more practice-oriented fields such as architecture and urban planning. Consequently, no common conceptual foundations have been formed among them, their scope of influence is often limited, and they are primarily prescriptive and procedural. This issue makes the critique and development of participatory theories more challenging in the field of architecture. As Horelli (2002) suggests, the key to resolving this dilemma lies in the development of substantive theories[1] concerning participation within the relevant fields of the built environment. In this research, following Groat's perspective (Groat & Wang, 2013, 111-116), the term "explanatory theory"[2] is used for this purpose. This explanatory theory should be capable of providing a comprehensive explanation for the substance of participatory decision-making processes in the fields related to the built environment and establish a new relationship between theories and practical experiences. An explanatory structure that can elucidate the nature of participation in the processes of decision-making for the built environment would be able to eliminate the constant and ambiguous reliance on external theories, and might also provide common criteria for evaluating and developing participatory theories and practices in the field of architecture. To achieve such a structure, the research follows this question: "What are the distinguishable and evaluable shared concepts that can explain the substance of participation in decision-making for the built environment?"

Literature Review

Given the multifaceted nature of the research topic, the literature review encompasses studies related to the theories and conceptual frameworks of participation concerning the built environment, as well as studies that have examined conventional theoretical models in practice. Wulz's research (1986) is one of the earliest and most influential studies that offers a framework for understanding different types and levels of participation in architectural design and practice. By examining various examples, he has differentiated seven types of participation: representation, questionary, regionalism, dialogue-driven, alternative (multi-option), co-design, and self-decision (self-build). The basis of this classification is the spectrum of decision-making power in the relationship between the architect (the specialist) and the user/client, which is heavily influenced by Arenstein's ladder of citizen participation (1969). The ladder provides a metaphorical representation of the levels of citizen power which includes three main stages: non-participation (levels of manipulation and therapy of citizens), tokenism (levels of informing, consulting citizens, and placation), and citizen power (levels of partnership, delegated power, and citizen control over decisions) (Arnstein, 2015). Wulz's classification spectrum also ranges from decision-making power

being entirely in the hands of specialists to users making decisions for themselves (Wulz, 1986). Sanoff (2006), in explaining approaches to participation in architecture; Jenkins & Forsyth (2009), in elucidating the unique characteristics of social (or collective) architecture; and Kamelnia (2020) & Islami et al. (2009), in defining the theory of collective architecture, have all referenced to Wulz's classification.

In some studies, this spectrum of levels has been redefined as a range from users being passive to actively involved in architectural design (Caixeta et al., 2019). In the field of architectural design, other similar models concerning the nature and levels of user involvement have been proposed. For example, differentiating three stages of "designing for," "designing with," and "designing by" users by Ho & Lee (2012), or classifying the role of users into three categories of "users as subjects" "users as informants" and "users as co-operation partners" by Olsson et al. (2022), are following a similar logic and can reasonably be aligned with the levels of Arnstein's ladder (Caixeta et al., 2019). Thus, it is evident that the logic of power distribution in Arnstein's model had an undeniable impact on explaining the substance of participation and its levels. However, this model itself has been criticized and revisited multiple times due to its simplification and conceptual conflations. Some researchers have noted that the classification and explanation of participation are essentially influenced by different models of governance and planning processes and, therefore should not be addressed solely based on defending citizens' rights (Kasymova, 2014; Waheduzzaman & Mphande, 2014). Romariz Peixoto et al. (2022) have confronted the explanatory logic of Arnstein's model with real examples of participation in architecture, concluding that this model is more of a biased nomenclature for types of participation and faces serious shortcomings in explaining the realities of participation.

The aforementioned studies have not investigated an explanation for the logic of participatory decision-making processes for the built environment. In this field, there are very few theories that offer a clear explanatory framework for participation that can be understood and utilized without reference to external domains. Albrecht (1988) developed one of the earliest frameworks that explains the logical relationship between conceptual components of participation in architecture. He distinguishes between two intertwined problems in the concept of participation: consensus building for decision-making (approachable with the theory of active society), and bridging the knowledge gaps to connect architectural specialists with laypeople (approachable with the theory of social learning) (ibid.). Although this framework can provide a suitable basis for explaining the conceptual components of participation in architecture, it still refers to theories from external fields and does not offer a clear and evaluative explanation for different levels of participation in architecture. The clearest explanations in this regard are found in the level-and-phase matrices of Horelli (2002), Wates & Knevitt (2013) and Wates (2014), which also adopt a pre-planned approach to participation but face shortcomings in explaining complex participatory experiences in this field. According to Horelli (2002), there have been deficiencies in the substantive theories related to participation. She is one of the theorists who has scrutinized the theoretical frameworks in this field in an attempt to provide a definition for participatory planning, and to explain the nature of its processes, methods, and enabling tools (Horelli, 1997, 2002; Horelli & Wallin, 2010). She argues that the core problem in participation theories lies in the fuzzy relationship between the concept of participatory planning (or other specialized fields of participation) and real decision-making or in that between direct and representative democracy (Bechtel & Churchman, 2003, 607 & 608). There has been almost no solution for this issue among the explanatory theories related to the built environment, leading to many conceptual ambiguities and making it more challenging to explain the substance of participatory decision-making for the built environment and its levels. For instance, some studies have considered users' perception as a fundamental element in the concept of participation, thus defining an intrinsic relationship between the concepts of landscape design or architectural design and the concept of participation

(Majidi et al., 2021; Mansouri & Foroughi, 2018). This intrinsic interpretation can be explained by the category of "representation" in Wulz's framework, followed by other researchers like Kamelnia (2020) as a repeating terminology. By accepting such definitions and categories, any process that pays attention to the user in a way could be considered a participatory experience, according to a particular interpretation. This would blur the boundaries between participatory and non-participatory decision-making processes in this field and result in more ambiguity. Wang & Uygur (2010) have largely resolved this ambiguity by utilizing the concept of the Cultural-Epistemic-Praxis Units (CEPs) in a heuristic framework. This unit refers to any group of people with a recognizable cultural-epistemic-praxis character in participatory or collaborative processes. However, their explanation also seems insufficient in distinguishing the domains of participation and collaboration in architecture, and the framework does not offer a clear basis for evaluating or categorizing various participatory or collaborative experiences in practice. Explanatory theories need to overcome such deficiencies and offer more precise and evaluative explanations of participation in decision-making processes related to the built environment. The explanation of substantive levels of participatory decision-making in this field needs to go beyond merely conceptual classifications that lead to contradictory interpretations in practice.

Research Method

The research question is a type of "what" question, and to address it with a qualitative approach, a method based on a logical argumentation is employed, which also facilitates a semi-structured analysis of both theories and experiences related to participation in architecture. Groat & Wang (2013, 385-387) puts various logical argumentation approaches on a spectrum ranging from formal/mathematical to cultural/discursive. This research employs conceptual modeling to explain and examine the relationships among different conceptual components of participation and can be placed in the middle of Groat's spectrum named as a mathematical/cultural approach. Based on this main strategy, the research design is configured in three stages. In the first stage, the primary definitions (a priori) related to participatory decision-making for the built environment are used to form a preliminary logical framework. This preliminary framework provides a foundation for analyzing relevant theories and practices. Accordingly, in the second stage, the substantive components of participation are distinguished from each other, the necessary relationships among these components are explained, and the evaluable levels of each component are outlined referring to relevant theoretical models and logical reasoning. In the third stage, to examine the applicability and validity of the explanatory framework, three participatory experiences in architecture are analyzed. The most important criterion for selecting these cases was the availability of precise and deep information through semi-structured interviews regarding the decision-making processes, interactions, and power distribution among participants. Table 1 shows the general information of the three cases and the primary and secondary sources used in their analysis. Finally, the results of this analysis are presented in the form of an explanatory model with specific concluded propositions.

• Step 1: Configuration of the preliminary theoretical framework and a priori

In this step, a preliminary theoretical framework is proposed based on an a priori to explain the substantive components of participatory decision-making for the built environment. This preliminary framework is supposed to create a basis for enabling a semi-structured analysis of various theories and experiences of participation in architecture. Essentially, the phenomena of participation take place if individuals lacking formal authority or expertise are involved in decision-making; which according to Albrecht's explanation (1988), immediately brings forth two fundamental problems. The first problem is that the power of decision-making needs to be distributed among individuals and professionals with diverse knowledge and skills (while authority is an essential feature of any profession); meaning that different individuals may influence decisions to varying extents. The second problem is that participants, due

Table 1. Description of the case studies and the primary and secondary sources used in the case study analysis. Source: Authors.

	Case Study	Project Descriptions	Primary Sources	Secondary Sources
1	Eishin School Campus in Tokyo, Japan (1981-1985)/ An example of applying Pattern Language Theory and the "System A" Paradigm	In this project, the local community of Eishin (in the western part of Tokyo) decided to establish a larger campus for their high school. The school principal, Mr Hosoi, representing the local authorities, consulted with several local architectural firms, and the project was eventually assigned to Christopher Alexander and the Center for Environmental Structure (CES) based in the United States. Many responsibilities and authorities were delegated to the architects. According to the architects, in this project, the nature, extent, and duration of participation were highly dependent on the clients and users, and participation occurred in a "pyramidal" structure, based on the "System A" design paradigm and pattern language theory. The participation process at each stage is detailed in Aurelio David's interview with Joachim Neis on March 25, 2017.	Interview with Hans Joachim Neis, part of the design team of the Eishin project in March 25, 2017 (David, 2017, 325-335)	Plans, images, and other available documents (Alexander et al., 2012)
2	Design of Market and Market Street in Newbury (2013-2015)/ An example of applying the Charrette method and systematic approaches	In a historic district of Newbury in England, there was a vacant site often used as a parking lot. The Berkshire Association approved a project with specific goals to transform this place into a market street, and in 2013, the JTP architects were tasked with developing the neighborhood plan. Feasibility studies and the formulation of design principles took two years, and in 2015, participatory sessions were started to refine the plans according to the needs and desires of the residents. The architects used a charrette-based method to engage the locals. Participation occurred in public workshops and group sessions, with about 100 people participating in each. The participation process at each stage is detailed in Aurelio David's interview (2017) with Arch C.C. on July 11, 2017.	Interview with Arch C.C (Architect at JTP. Part of the design team at Cowes and Scarborough – CC) in July 11 (David, 2017, 321-324)	Plans, images, and other available documents in the reports available on (JTP Architects, 2015)
3	City Kit, Improvement of a residential neighborhood in Hong Kong (2009-2010)/ An example of applying digitally gamified methods for participation	In 2009, the Hong Kong Public Housing Authority launched a competition, asking private firms to propose design solutions to engage the youth of a residential neighborhood in the improvement of their neighborhood. The Hybrid-Space-Lab responded to this challenge with an unconventional solution. Collaborating with computer science and programming teams, they developed a web-based computer game incorporating various stages of participation, environmental decisions, and the necessary design language. The game simulated all buildings and areas of a residential neighborhood. The young residents could evaluate and improve their living environment using modular building elements and pre-designed components. Players could place pre-designed forms for exhibition decks, swimming pools, theaters, or other amenities in their neighborhood, interact with each other, and make decisions within the game to reshape their neighborhood.	Interview of Authors with Elizabeth Sikiaridi (a founder of Hybrid Space Lab) (Elizabeth Sikiaridi, 2024, May 5, personal communication)	Images and available documents from the game's environment (Sikiaridi & Volegar, 2012)

to their varied experiences, different knowledge, and understandings, need to communicate and interact with each other to achieve a common understanding of issues and subjects. Some theories address these two components under the notion of consensus building. Consequently, it appears that participation is a phenomenon that finds meaning in a process of interactions (aimed at reaching a shared understanding and common language) and distribution of decisions (aimed at reaching a common decision) among participants. In other words, any participatory decision-making is facilitated through a process that allows for a certain level of interactions and power distribution among participants. For the decision-making process to commence, a minimum level of interaction (information exchange) seems to be necessary. With the initiation of interactions and distribution of decisions among participants, the participatory decision-making process also begins. Therefore, by taking the decision-making process as the basis, the level and form of participation in each stage could be understood by analyzing the levels and forms of interactions and power distributions. In other words, at each stage of the decision-making process, any level of participation cannot be expected without a certain level of interaction or a certain level of power distribution.

The concept of the Cultural-Epistemic-Praxis Units (CEPs) can help to explain the participatory relationships among diverse individuals and groups. This notion, developed by Wang & Oygur (2010) in the field of collaborative architecture has received relatively little attention in participation theories. A CEP Unit refers to a distinct and identifiable set of activities within a culture, typically characterized by a specific symbol system and attendant operations. Howard Gardner, an educational psychologist, refers to this term as "domain" (Gardner, 2000, 82 & 83). By their normative definitions, "discipline" and "profession" can both be encompassed within this definition; however, Cultural-Epistemic-Praxis Units are not necessarily specific disciplines or professions. For instance, a university, a company, a neighborhood, or a local council could represent a CEP Unit because of their recognizable cultural-epistemic-praxis character. Wang & Oygur (2010) claim that at least two distinct CEPs should exist in the collaborative architecture processes. Considering the aforementioned pre-definition of participation, the presence of at least two CEPs is essential for the emergence of participatory processes as well. In other words, explaining participation requires acknowledging the existence of individuals and groups with different CEP characteristics and the cultural, epistemic, and praxis gaps between them. Based on this preliminary theoretical foundation, a first principle can be proposed for identifying participation in architecture: "Participatory processes in architecture are the processes in which individuals from different CEPs communicate to influence decisions in the decision cycles related to the built environment." This definition encompasses three components of participation: communication among participants, distribution of decision-making power among participants, and decision-making processes. Now, it would be logically helpful to investigate different levels of each component (by analyzing relevant theories and practices) to understand different levels of participation in architecture.

• Step 2: Explaining and leveling each substantive component of participation

The first component that can be investigated to explain different levels of participation in architecture is the distribution of decision-making power among different participants. The distribution of decisions is a fundamental and perpetual component of participation (Hamdi, 1995, 133). According to the priori definition, participation in architecture takes place when various individuals and groups (from different CEPs) can influence a set of decisions in the decision-making cycles related to the built environment. Therefore, in participatory decision-making, we always face the challenge of explaining and deciding to what extent different participants exert influence. Arnstein's model (2015) and many other models influenced by Arnstein's ladder of participation, provide explanations for the different levels of power distribution. The ladder model illustrates a linear order for different types of participation and provides a perspective that makes sense on possible distributions of citizens' power in decision-making. Models like Connor's ladder (1988), Davidson's wheel of participation (1998), and many other models of empowerment are influenced by Arnstein's ladder (Cavalieri & Almeida, 2018). Some of these models have reconsidered the ladder to consider some level of dynamism and complexity in human relationships alongside the political perspective of Arnstein's model, but most still consider the three main levels of tokenistic participation, limited participation, and genuine participation (Munoz Aparici, 2016). Many participatory models and frameworks in the fields related to the built environment refer to the same levels of power distribution. For example, Horelli's matrix of participation levels and phases (2002) and Wates' participation matrix (2014) and Wates & Knevitt (2013) consider the levels of information, consultation, partnership, and community control at all stages of the decision-making cycle (Bechtel & Churchman, 2003, 617; Wates, 2014, 12). Arnstein's model has faced various criticisms in terms of explaining different levels of power distribution. One fundamental criticism addresses the premise in this model that the citizens are powerless in the face of a ruling power, while decision-making processes concerning the built environment are complex processes

involving several powers (Lane, 2005). Besides the problem of explaining complex decision-making processes, another major ambiguity of this model is its failure to consider different levels of communication and the necessity of information flows at any level of participation (Romariz Peixoto et al., 2022). To avoid such ambiguities, it is better to separate the levels of power distribution in participatory decisions solely based on the extent to which the decisions are shared. Accordingly, three general levels of non-distribution of decisions, limited distribution of decisions, and full distribution of decisions can be distinguished in the power-distribution axis (Fig. 1).

Another main component that is always present in participatory decision-making, based on the priori definition, is the communication among individuals with diverse explicit and tacit knowledge, different expertise, and skills. The participants communicate to reach a common language and a mutual understanding for sharing decisions. In other words, for collaboration or participation among individuals belonging to different CEPs, there must be an exchange of information and knowledge brokering (Wang & Oygur, 2010). In making architectural decisions, communications are not easily encapsulated in logical and verbal propositions and often rely on visual languages, sketches, diagrams, conceptual models, and digital representations (Laing, 2018; Scheer, 2014). According to Albrecht (1988), compromise and the smallest common dominator, both acceptable norms in political decisions, are conducive to convincing design solutions. Moreover, verbal propositions alone, due to the linguistic complexities of this field, cannot easily facilitate consensus-building among participants. Knowledge gaps and value differences among participants further complicate this issue. Albrecht (1988) refers to this problem as the problem of understanding. In the planning domain, Friedmann (2011) provides a comprehensive explanation of this issue, highlighting the barriers to effective communication by linguistic differences among the specialists and their clients, which stem from the differences between the processed formulated knowledge of the specialists and the personal, experience-based knowledge of clients (ibid., 15 & 16). Therefore, achieving a common language can be considered the ultimate level in interactions related to participatory decision-making in architecture. Other levels of interactions can also be elucidated using communication models. The linear communication model, or transmission model, the interactive communication model, and the transactional communication model, developed in succession, offer some criteria for explaining and evaluating different levels of information transfer and communication (Fiske, 2010, 5–35) (Fig. 2).

The third component of participatory decision-making

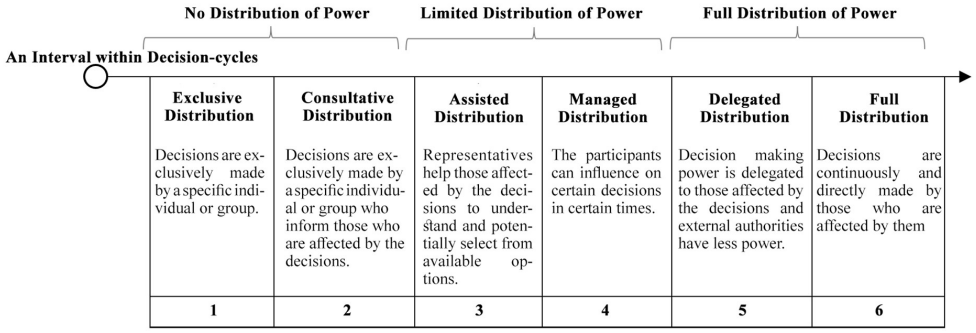


Fig. 1. The power-distribution axis, the spectrum illustrates 6 levels of sharing decisions among participants. Source: Authors.

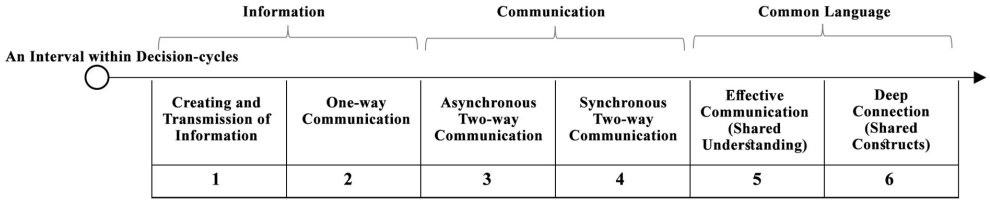


Fig. 2. The communication axis, the spectrum illustrates 6 levels of communication among participants. Source: Authors.

is the decision-making process itself. Theories of participation concerning the built environment are predominantly normative and procedural; typically prescribing methods and stages for participatory decision-making. These theories share many commonalities in explaining or prescribing the participation process. For example, Hamdi refers to the stages of identifying and organizing the actors, observing (looking, listening, and measuring), planning, and deciding interventions (ibid., 109–166). Wates considers four general stages of initiation, planning, implementation, and maintenance in participatory design (Wates, 2014, 10). Sanoff also mentions four general stages of goal-setting, planning, design, and implementation while explaining the levels of awareness, perception, decision-making, and implementation for participation (Sanoff, 1999, 9–16). While these theories clarify the proper processes of participation for specialists, many participatory phenomena, such as citizen movements or guerrilla architecture, cannot be explained through managed or pre-determined processes (Kotus & Sowada, 2017). Therefore, it is clear that explaining the process of participation must account for the dynamics of these processes. Few substantive theories have been developed to explain the complexity and dynamics of collective decision-making processes for the built environment. In this regard, Turner's theory (Turner & Fichter, 1972) explains the contrast between heteronomous systems (externally controlled) and autonomous systems (self-controlled) in architectural decision-making. Similar models place the levels of participation on a formal-informal spectrum, depending on whether they are spontaneous and bottom-up or structured and top-down (Schwartz & Schejter, 2024). To explain the different levels of complexity and dynamism in decision-making processes, it's better to focus on the processes themselves, differentiating the level of spontaneity or pre-determinism at each stage. Accordingly, three main levels can be proposed to explain the degree of spontaneity in participatory decision-making processes for the built environment: predetermined process, managed process, and emergent process (Fig. 3).

Now it is possible to provide a clearer explanation of participatory decision-making processes for the built environment, based on logically essential components of it. The built environment is defined by the continuous influence of human decision-making processes on the natural environment over time. These decisions, both explicit and implicit, impact the environment through a cycle of stages (programming, design, implementation, maintenance, and improvement) that may be integrated with one another. The influencers (practitioners) may enter or exit the participation space at any point within the decision-making cycle. Decisions become participatory (or enter the participation space) when individuals from different, and at least two, Cultural-Epistemic-Praxis Units (CEPs) influence the decision cycles through communicative processes aimed at reaching a common decision. The greater the distance between the CEP units, the larger the "Scale of participation," requiring more extensive and numerous communicative cycles to bring them closer within the participation space. In the participation space, there is an intrinsic relationship between the three components of "Decision-making process," "Distribution of decision-making power," and "Communication among participants." At any stage of the process, the overall level of participation in decision-making can be determined by identifying the substantive levels of each of these three components. According to this model, in decisions related to the built environment,

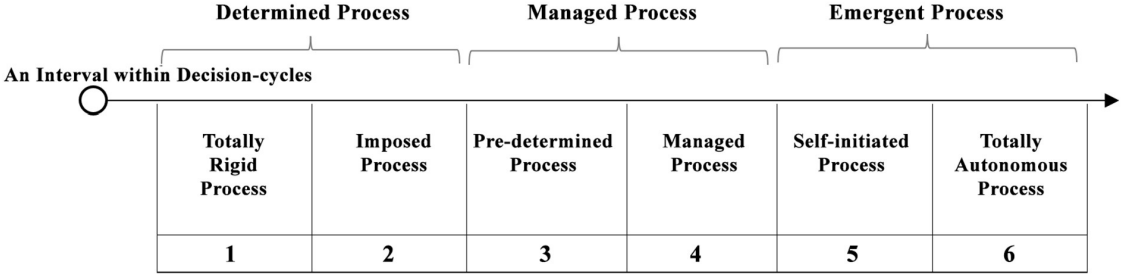


Fig. 3. The process axis, the spectrum illustrates 6 levels of spontaneity in decision-making processes. Source: Authors.

the level of spontaneity in the decision-making process, the level of power distribution in decision-making, and the level of communication in decision-making can explain the overall level of participation (Fig. 4).

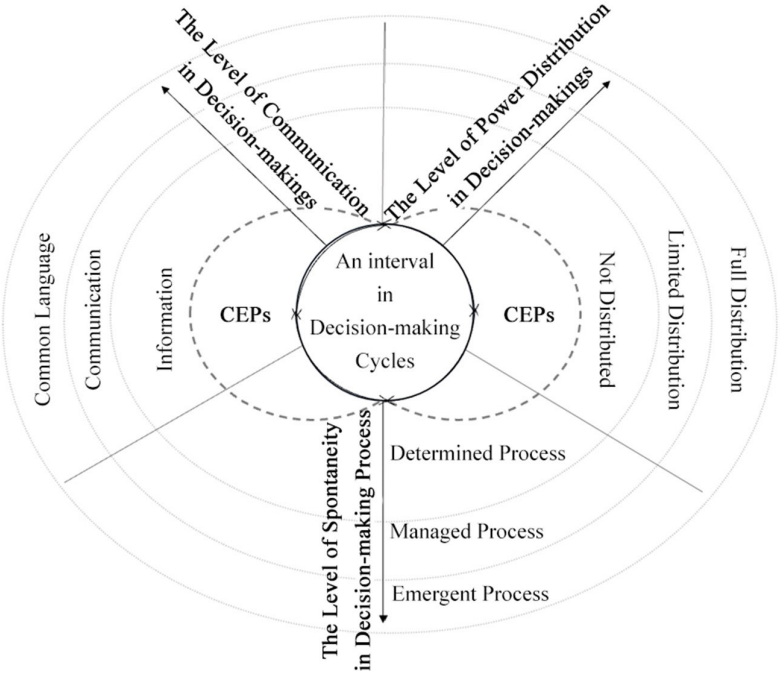
- **Step 3: Application of the Explanatory Model**

In this step, practical examples and existing theories can be examined based on the explanatory model and its five main components of it, namely "Spontaneity level of the decision-making process," "Distribution level of decision-making power," "Communication level of the participants," "Relationships among Cultural-Epistemic-Praxis Units," and the participation intervals and collaboration intervals in the "Decision-making Cycle".

The analysis of the three cases is carried out based on the logic of decision-making processes, meaning that at each stage of the process, the levels of communication, spontaneity, and power distribution are investigated. The weighting of the participation levels is based on estimating the levels of each component, ranging from 1 to 6, according to the tiered spectrums (Figs. 1, 2 & 3). In each example, the first chart (Figs. 5, 7 & 9) provides a summary of the analysis of these components in the decision-making process. In these depictions, the stages that have entered the participation space are distinguished from other stages. Another analysis is also conducted for each case, based on the logic of the explanatory model, identifying the CEP units and the form of their relationships (whether bidirectional or unidirectional communication) (the right side of Figs. 6, 8 & 10). Additionally, to illustrate the period of participation space in each case, an estimated range of the decision-making cycle is colored (the center of Figs. 6, 8 & 10). Finally, a comprehensive summarized analysis (the left side of Figs. 6, 8 & 10), illustrates the overall level of each participation component in that case study.

Analysis of the Eishin Project (1981-1985)

The decision-making process of this project can be summarized in seven stages, and the level of participation can be estimated separately for each of these stages (Fig. 5). This analysis reveals that the decision-making process entered the participation space in stage. In stages 6 and 7, although participation was possible, decisions were ultimately made within a collaboration space among specialized teams, as some CEP units were not involved. In stage 3, individual interviews were



Participatory decision-making for the built environment can be defined as "Processes in which individuals with different knowledge and skills (from different Cultural-Epistemic-Praxis Units) engage in communication over a period within the decision-making cycle related to the built environment to reach a common decision."

Fig. 4. Explanatory model elucidating the substance and levels of participation in decisions related to the built environment. Source: Authors.

conducted where participants described their perceptions and desires for various school spaces. These interviews led to the development of preliminary guidelines and frameworks, referred to by the architects as a crude pattern language. For instance, one of the crude patterns was: "I see the main entrance as a gate, where I can greet students and teachers in the morning." In stage 4, the participants started developing these initial crude patterns into 110 more detailed patterns in small groups, with the help of the architects. Each group had more power in making decisions for their relevant spaces in the school. These patterns were also formulated in linguistic propositions, such as: " Many rooms have traditional gallery spaces to one side, where light comes in beyond, and shines through screens." In stage 5, collective site visits, the use of marking flags to determine locations of imagined spaces, and on-site design sketches helped resolve many conflicts and disagreements. In stage 7, although local participants and project stakeholders had the opportunity to be involved in construction, most decisions were pre-determined by technician groups. The participatory method in this case study, which was based on pattern language, had the most significant impact on achieving a common language in communication, and the participatory decision-making process was managed in an orderly manner (pyramid involvement).

Analysis of the Newbury Market Street Project (2013-2015)

In this project, the decision-making process can be divided into seven main stages, with three stages entering the participation space (Fig. 7). Applying the explanatory model shows that the decision-making process concerning the built environment entered the participation space in a managed manner at specific and limited periods (stages 3, 5 & 7).

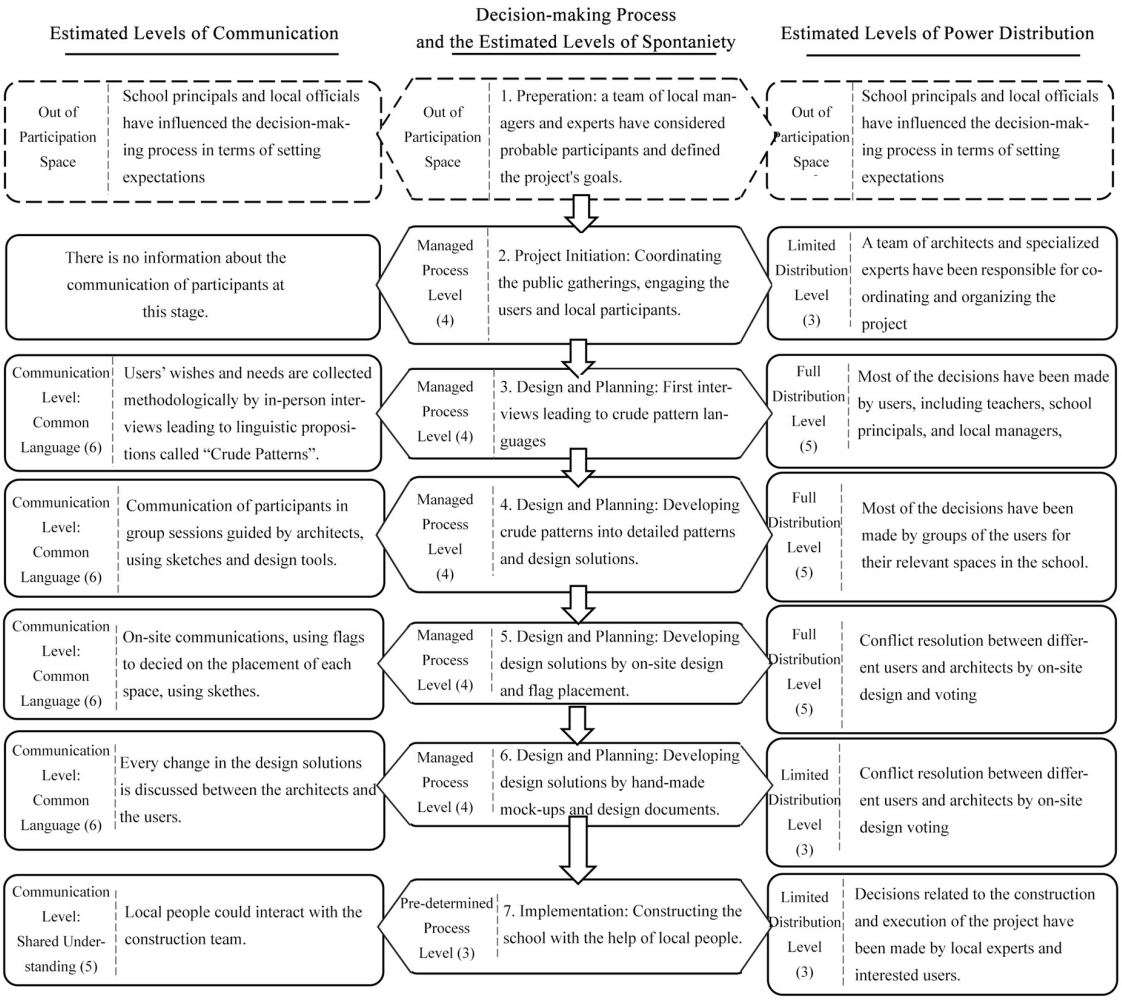


Fig. 5.The decision-making process in the Eishin project with estimated participation levels at each stage (stages that have moved out of the participation space are marked with a dashed border). Source: Authors.

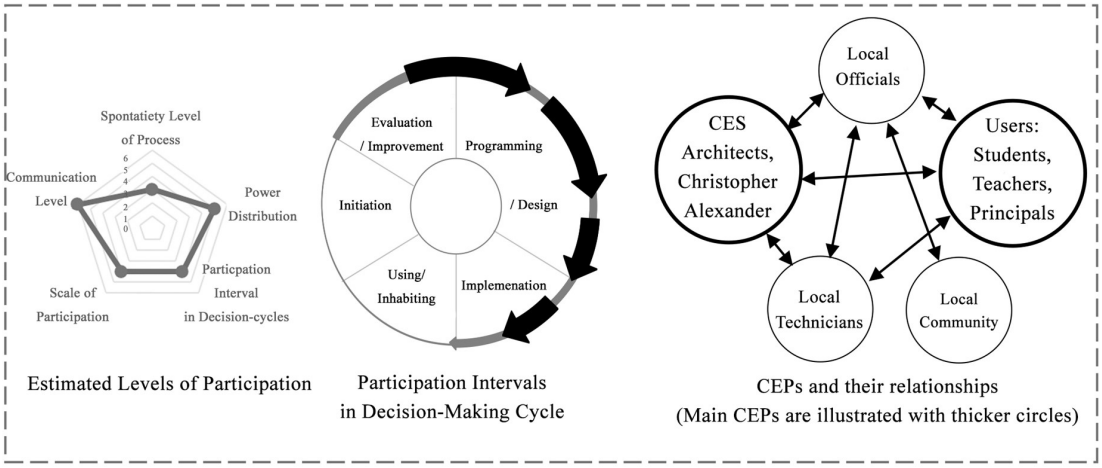


Fig. 6. Explaining the substance and levels of participation in the Eishin project - Right: The relationship between CEP Units, Center: The decision-making scope in the decision-making cycle (gray bar) and the stages that have entered the participation space (black bars) - Left: Summary of the estimated level of participation in this project (gray pentagon). Source: Authors.

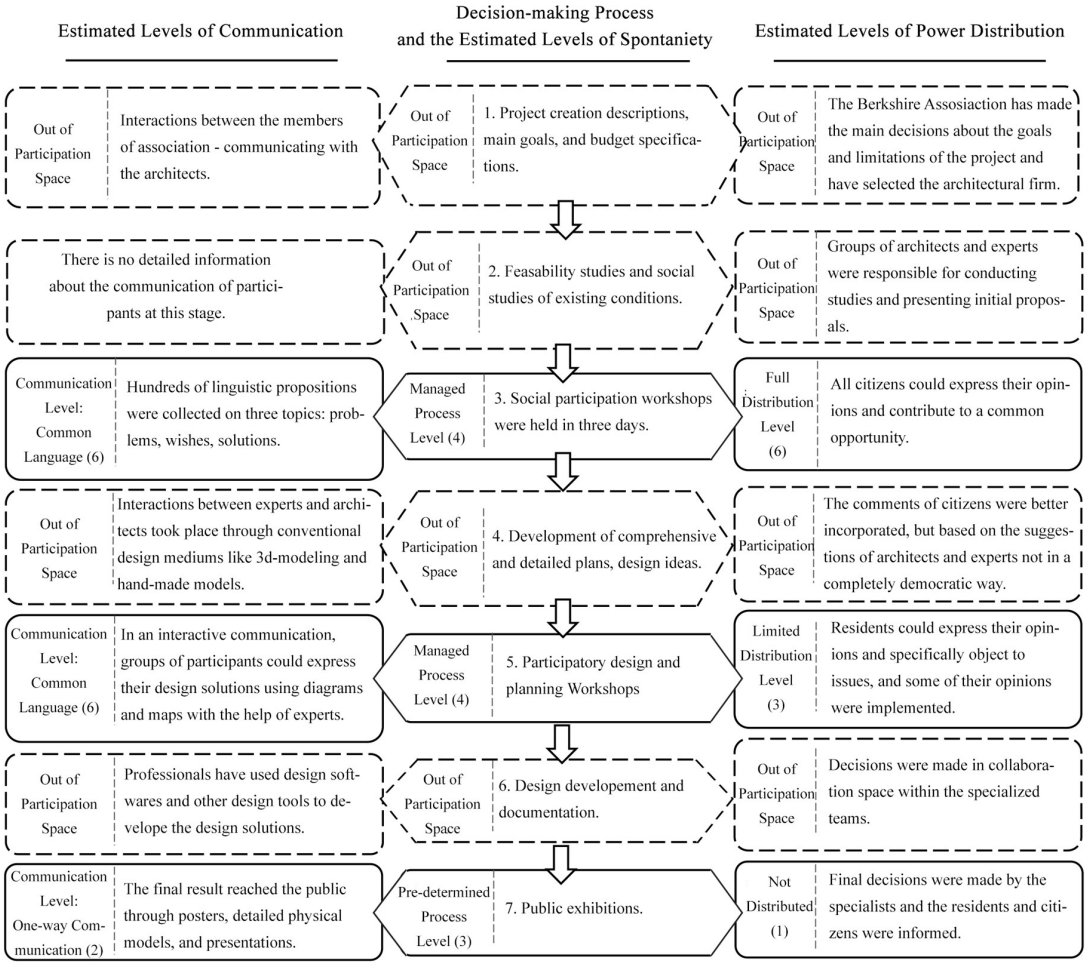


Fig. 7. The decision-making process in the Newbury project with estimated participation levels at each stage (stages that have moved out of the participation space are marked with a dashed border). Source: Authors.

Initially, in stage 3, citizens had the most significant opportunity to participate, and their problems, dreams, and solutions were collected in the form of hundreds of linguistic propositions. The selection and response to these propositions were undertaken by architects and designers. However, these decisions were revisited in participatory design workshops (stage 5), where diagrams, maps, three-dimensional drawings, and wooden models were used to align with the participants' expectations. In this method,

the role (and power) of the audience and citizens in decision-making gradually diminished, and in the final stage, the final decisions were presented to the citizens in a public exhibition.

Analysis of the City Kit Project: Improvement of a Residential Neighborhood in Hong Kong (2009-2010)

The decision-making process in this project can be

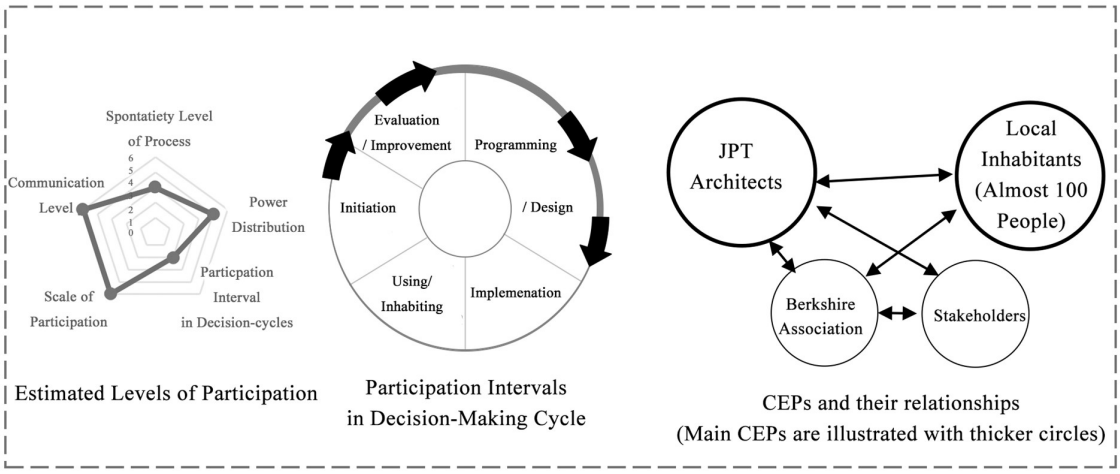


Fig. 8. Explaining the substance and levels of participation in the Newbury project - Right: The relationship between CEP Units, Center: The decision-making scope in the decision-making cycle (gray bar) and the stages that have entered the participation space (black bars), Left: Summary of the estimated level of participation in this project (gray pentagon). Source: Authors.

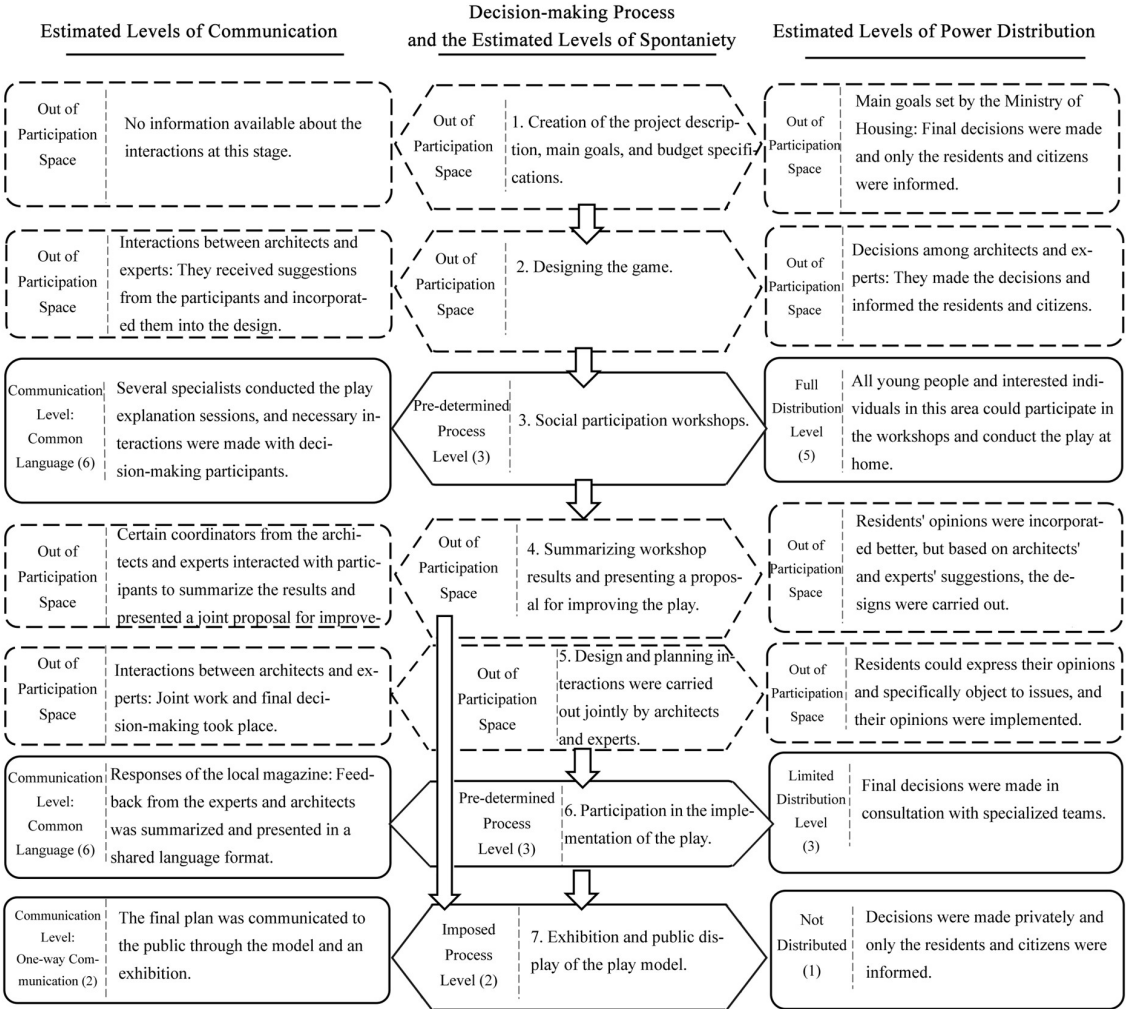


Fig. 9. The decision-making process in the City-kit project with estimated participation levels at each stage (stages that have moved out of the participation space are marked with a dashed border). Source: Authors.

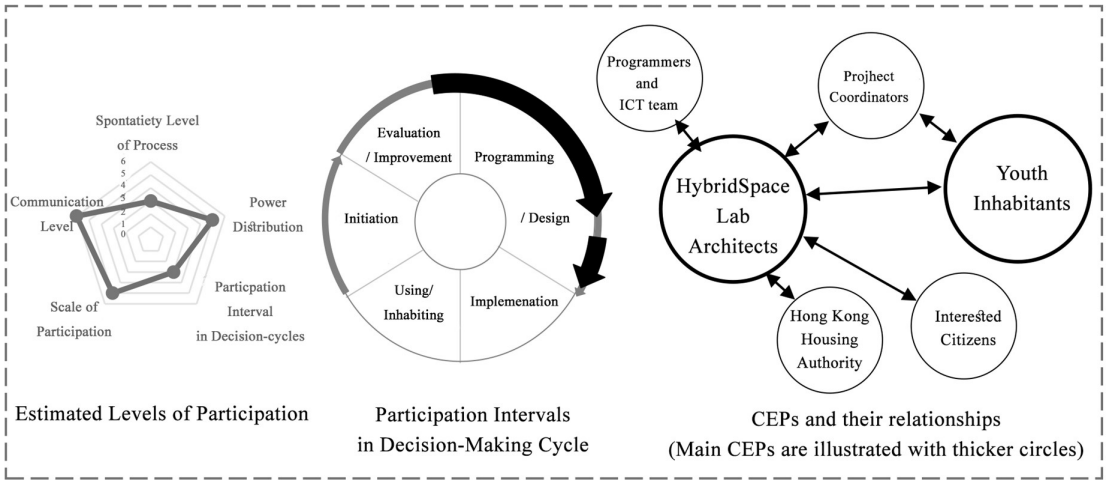


Fig. 10. Explaining the substance and levels of participation in the City-kit project - Right: The relationship between CEP Units, Center: The decision-making scope in the decision-making cycle (gray bar) and the stages that have entered the participation space (black bars), Left: Summary of the estimated level of participation in this project (gray pentagon). Source: Authors.

summarized in seven stages, three of which occurred within a participation space (Fig. 9). Analysis of this case study reveals that participatory decisions were made entirely within the framework of a predefined process, in the form of a computer game, yet it still maintained a high level of communication and decision distribution. In this case, the formal and functional elements embedded in the computer game created a common language among participants and also allowed communications to occur without necessarily being face-to-face or in person. Additionally, the participation space could be extended at any time without the presence of experts, utilizing the same mechanism if residents desired. Compared to other examples, this project benefited from an established process that ensured the continuity of the participation space, encompassing a longer duration within the decision-making cycle. While such innovative practices can be described through gamification methods in design and planning, there is a lack of explanatory theories to understand and evaluate the levels of participation within them. The proposed framework of this study could facilitate the assessment and development of such experiences.

Discussion

The introduction and literature review of the research highlighted the deficiencies in pre-existing explanatory frameworks and models for understanding and evaluating participation in different contexts related to the built environment. To better understand this issue and compare the results of previous research with the proposed explanatory model, the study by Romariz Peixoto et al. (2022) can be examined as an example. These researchers have developed a new explanatory model for evaluating participation in architecture by critiquing Arnstein's ladder of participation and comparing it with the realities of four participatory experiments in Europe. In this model, the levels of participation are summarized into five stages: Information, Consultation, Concertation, Co-design, and Co-management. To account for the complexities inherent in architectural decision-making processes, it is claimed that these five levels correspond to the management models (from centrally administered to self-administered), the autonomy of processes (from the general public to the involved people), and the equality of power among participants (hierarchized expertise to equivalent expertise). This means that the more autonomous a process (or management model) is, the more balanced the distribution of power is likely to be, enabling co-design. However, adopting such a model does not allow for the examination of process spontaneity levels independently from the power distribution levels they are presumed to correlate with. It also cannot explain how different levels of complexity correspond to different levels of power distribution. It is logically obvious that a

complex and spontaneous process may exhibit a low level of power distribution, or managed (centrally administered) processes may exhibit varying levels of power distribution. Moreover, this model emphasizes the necessity of information for all levels of participation, but it cannot explain different levels of information flow and communication among participants, whereas the explanatory model proposed in this research considers different levels of communication for evaluating the level of participation. Such logical flaws can be frequently found in the models developed based on the logic of Arnstein's model, or by critiquing it. Such models generally do not propose a comprehensive explanation for the concept of participation and its' substantive components. There have been very few explanatory foundations on this subject, and suggestions offered in some studies, such as those by Albrecht (1988) or Wang & Oygur (2010), are not examined with existing realities. Another issue with these two studies is the lack of clear differentiation between participatory and collaborative decisions in architecture. This research proposed a novel application for the concept of CEP Units in differentiating participatory and collaboration spaces in architectural decisions, supported by case study analysis. Although this framework still needs to be tested against various theories and experiences, a more precise validation could enable its widespread use for understanding, evaluating, and developing theories and practices of participation in architecture.

Conclusion

This study presented an innovative theoretical model to explain the substance and levels of participation in architecture, which is based on the logic of participatory decision-making processes for the built environment. This explanatory framework can be summarized in the following propositions:

-To understand the substance of participation in architecture, the components of "communication" and "power distribution" can be explained within the "decision-making processes" and the scope of the "decision-making cycle" for the built environment.

- In any participatory experience, the overall level of participation can be evaluated by specifying or estimating the level of each component: "level of communication," "level of spontaneity in decision-making processes," and "level of distribution in decision-making power."

- By identifying the "Cultural-Epistemic-Praxis Units" in each part of the decision-making process, one can explain the "Scale of Participation" and the "Form of Communication."

- By identifying the main CEPs that influence each stage of the decision-making process, it is possible to determine which decisions have entered or exited the "Participation Space."

- For an architectural experience to be considered participatory, there must be a distinguishable distance between at least two CEPs within decision-making cycles. As CEPs approach each other with iterative communication cycles, the substance of decision-making tends to shift towards collaboration, and participation or collaboration cannot exist within a single CEP Unit.

- If decisions within the decision-making cycle related to the environment are made within predetermined processes, without communication, without the influence (power) of individuals on decisions, or within a single CEP Unit, such decisions will exit the participation space.

By providing measures and tools for each component axis within this model, it will be possible to critique and develop a participatory experience or theory in architecture. For instance, one can identify deficiencies in a theory's explanation of the spontaneity of participatory processes and possibly develop that theory by addressing this deficiency. Additionally, it is possible to analyze and critique a specific practice by determining the level of participation's components at any stage, or by distinguishing the intervals of participation spaces in the decision-making cycle. This model allows

for going beyond conventional classifications and provides a new logical and conceptual connection among the diverse theories and experiences of participation in architecture, independent of the personal interpretations of specialists.

Endnotes

1. In this study, substantive theories refer to a category of theories that aim to explain the nature of phenomena. In the context of participation in architecture, substantive theory is concerned with the nature of human relationships in decision-making processes related to the built environment, encompassing the "human-human" and "human-environment" relationships. Traditionally, these theories are contrasted with procedural theories. Another commonly used classification divides theories in this field into positive theories and normative theories. The relationship between the dualities of positive-normative theories and substantive-procedural theories can be elucidated through John Lang's matrix of theories (Lang, 1987, 22–26). In his recent book, Lang has proposed the term functional theory as a replacement for positive theory in the field of architecture noting that substantive theories comprise functional theories (Lang & Moleski, 2016, 28–30).

2. What is pursued in this research as explanatory theory aligns with Groat's classification of architectural theories. The scope of explanatory theories, concerned with a plausible body of principles offered to explain phenomena, extends beyond the classification of (substantive) theories into positivist and post-positivist epistemological frameworks and it is not limited to the dichotomy of subject and object (Groat & Wang, 2013, 111–116; 76–79).

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