Virtual and Factual Space Mutualism in Society 5.0: Spatial Architecture Studies

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Abstract. In the era of Society 5.0, research on architecture has considered the combination of factual and virtual space as the primary focus. The aim is to find principles of spatial design that can accommodate productive communities' social and economic development. However, the relationship between the combination of virtual space and factual space in the context of designing a dimensioned space based on activity is a question that needs to be reviewed. In this study, the tool used to answer the question is the concept of needs put forward by Abraham Maslow, which will be collaborated with the idea of spatial orientation through architectural phenomena proposed by David Seamon; the research method used is a qualitative method to reveal the needs of productive society. An exploratory approach is used in collecting data by observing productive community activities from factual spaces outside the workspace and residence. In addition, research also dives into virtual space or the transition from a single activity to a dual activity through observation and analysis. The results showed the need for mutualism as an intermediary space for a productive society between factual and virtual spaces. Thus, this study highlights the importance of understanding the relationship between factual and virtual space in designing spaces that can accommodate the needs of productive societies in the era of Society 5.0. The mutualism space that becomes an intermediary space can help create an environment supporting productive communities' social and economic development.

1 Introduction

Virtual space is a digital environment created through engineered simulated experiences similar to physical reality [1]. Virtual space cannot be separated from factual reality, and vice versa. There are several reasons why the two elements are related [2]. Although technology continues to evolve, there are still limitations in the ability of virtual space to completely replace factual space. For example, although virtual reality (VR) headsets can provide immersive visual experiences, there are still limitations in depicting touch, smell, taste, and other physical sensations with the same precision as in the real world [3]. Virtual spaces often rely on infrastructure technologies such as stable and high-speed internet networks [4]. One of the practical problems related to internet connection over inadequate infrastructure quality can disrupt or completely stop the virtual space experience. Humans are social creatures who
need direct interaction with others in factual space [5]. While there are virtual communication platforms such as video conferencing or online games, social interaction in virtual spaces often cannot replace the face-to-face interaction natural in the real world [6]. Verbal and non-verbal communication, the quality of facial expressions, and the context of the physical environment hardly move into feedback that can affect the mind entirely in the virtual space.

Some activities or activities still require a physical presence in factual space [7]. Practically present in some jobs, such as the construction industry, physical examination and direct interaction with equipment or materials can only partially be replaced by virtual space. Finally, regarding security and trust. Some people may feel more comfortable and believe in live experiences in the real world compared to virtual spaces. They may have doubts about privacy, data security, or even health concerns related to the long-term use of virtual space technology.

Several problems have been raised, explaining that the progress of Society 5.0 must be connected to the progress of digital-based Industry 4.0 [8,9]. The combination of the two slowly erases the existence of space, distance, and time. The sense of desire from the community's soul has forced the order of needs in the joints of human life. No exception to the development of architectural knowledge, activities in producing space are interpreted to adapt to the conditions of his era.

The existence of space in Architectural knowledge is designed by considering the human activities that will occur in it [10]. Human activity can be essential in determining a space's size, layout, and function. A good space design unit always considers the complex relationship between human activities and the physical form of space that supports the development of the human body, mind, and mind [11]. As an act of knowledge responsibility, a study is needed to find meaning about the existence of space capacity interpreted from current activities during Society 5.0 [12] so that space production is well manifested and able to answer the changing problems of space production.

2 Materials and methods

To answer the actualization of architectural knowledge related to society, 5.0 will be used in Abraham Maslow's thought with the hierarchy of needs in his journal entitled 'A Theory of Human Motivation' in 1943. This idea will be combined with the Phenology thought put forward by David Seamon with the essence of lifeworld, place, and home interpreted to the quality of space in his book entitled 'Place Attachment and Phenomenology: The Dynamic Complexity of Place.'

2.1 Values of Needs

Victor Papanek, in his book entitled Design for the real world, said that people seem to prefer decoration over plains because they prefer daydreaming to thinking and mysticism to rationalism [13]. From these words, it can be taken to mean that at this time, humans only satisfy desires and needs momentarily. In contrast, the actual needs of humans are often ignored, such as self-qualities related to economic, psychological, social, intellectual, technological, and spiritual.

The term need means it must because it is forced; it is material that must not exist. In psychology, Maslow measured the level of needs he conveyed through a hierarchy based on innate human curiosity through the development of psychology described by the following stages.
From the diagram, it can be explained that the need for psychology is a universal necessity for every human being. This fundamental need must be met before it can move on to the next need. Then security. That is, the need that can be felt after human psychology is well satisfied; security is the stage where the dominance of behavior is due to the quality of spatial power or existence that it can control [14].

Next, social ownership needs interaction in fostering interpersonal social reality because it involves a sense of belonging. Then appreciation is a need that involves human existence individually or in groups towards recognition, mastery, trust, independence, and freedom due to self-esteem. Finally, self-actualization is a need that is rarely met because humans are only concerned with aspects of needs that are physiological, security, social, and self-esteem. The need for self-actualization is not only to achieve success but also to master a field.

The hierarchy of needs is the stage in which the cycle of organization of every human mental rolls around. A single space category cannot represent spatial orientation in architectural knowledge; Each orientation will be represented by its space category. The more orientation manifested, the wider the space needed to be designed.

### 2.2 The Phenomenon of Architectural Space Activity

Phenomenology always offers a potential that can provide a space for dialogue between two professions, namely designers and social sciences [15]. David Seamon refers to any environmental locus that collects experiences, actions, events, and meanings spatially and temporarily. Where every event ever experienced by humans is always based on activities that produce a very similar event, everything is shrouded by time [15].

David Seamon concluded that environmental behavior researchers put forward three ideas: lifeworld, place, and home. These three aspects are essential in creating activities and inhabiting human life's physical eye, space, and environmental aspects.

Lifeworld is defined as a coherent universal horizon of existing objects; each of us and all of us together belong to the living world of each other. This can be understood by referring to an entity in which every object in the world is unknowingly interconnected because of a sense of ownership over the world. Entities that exist as objects that vary according to orientation and need manifest the creation of events in the envelope of space and time. Lifeworld is an idea that offers a way to clarify the intimacy of life between humans and a world that cannot be separated from experience.

The place is where we live, the land we stand, and the body we have. Humans are inseparable from the place to run life, interrelated even with different forms. Places are dynamic, shifting, and always encountered differently by different experiences [16]. The place is a significant concept because, according to its constitution, it offers to articulate and
understand the wholeness that people of the world experience. The concept of place in this context is dynamically adaptive by man’s orientation to his needs. Changes in the meaning of place depend on the existence that humans form of their orientations and needs.

Home is the lasting quality of the place where human life resides. Home can also imply the exceptional quality of being a place of healing and well-being of the human person. This is where the real human personality is incarnate, and he no longer needs adaptation, like being in a particular environment [17]. A concept of interpretation of space is produced into the birthplace of eternal self-quality.

In answering the problem of space production related to existential architectural knowledge of society 5.0, which is strongly influenced by the development of industry 4.0, the two ideas that explain the needs and phenomena of architecture will collaborate in analyzing research objects that can produce findings in the form of architectural propositions that are useful for intellectual designers both in the realm of academics and professionals architect [18].

2.3 Research methods

The research method used to reveal the dynamics of space production motivated by human needs and orientation in Society 5.0 is descriptive qualitative [19]. Qualitative methods can bring research answers based on honesty and validity to space needs based on the orientation of the research object. The object of research will communicate its existence clearly through observation with a specific time and form of space that is able to consume to meet the orientation and needs of activities.

Descriptive is a way of research to display visuals of the composition of the research mindset. From this method, a mapping of the activity of the research object will be displayed, which is motivated by its orientation and needs based on a specific collection of its proximity to previously established ideas and ideas of knowledge [20].

While the selection of research samples uses random sampling, which gives a particular emphasis to the symptoms of experience based on human orientation and needs on activities outside the work and living productive community, the third place or informal space is a place that accommodates the dominant of human behavior dynamically being the target of the validity of this object of study [21]. The third place in question is a coffee shop located in Lhokseumawe City Center, Aceh Province, outside the time of his work, which is above 19:00 WIB. The time of the study is a time when people are productive in socializing with relatives in fulfilling personal and group orientations outside the space where they live.

3 Result and Discussion

Analyzing further answering the problem of adaptive spatial concepts in architectural knowledge of factual and virtual space mutualism in society 5.0, it is necessary first to understand the emphasis on the variables of the research object [22]. Society 5.0 is a condition where society can solve various social challenges and problems by utilizing various innovations born in the era of the industry 4.0 revolution, such as the Internet of Things (IoT), Artificial Intelligence (AI), Big Data, and Robots that can improve the quality of life.

The translation approach of society 5.0 in Indonesia is represented as a productive society. These namely people have the empowerment of expertise and the ability to participate in the process of change in economic, social, political, and other sectors affecting human life. The category of productive society in question is the category of humans aged 18-60 years. The age of 18 years is in the student period and works, and the age of 60 is the average human age limit to work in formal institutions. Humans at this age have an almost unlimited richness of orientations and needs, reflected in the production of space based on their activities.
on the two tables above, the product developed in the form of science learning videos on socioscientific issues content is declared feasible to use.

3.1 Society 5.0 between Factual and Virtual Spaces

Practical research activities in fulfilling the validity of the analysis where a place that is a pocket of orientation for productive community activities takes a coffee shop as a representation of public space to be a place of research. The distribution rate of coffee shop points in the Lhokseumawe City Center area is very high. Coffee shops are still desirable for all levels of urban society to socialize. From the place of the coffee shop outside the time of the work will show various kinds of activities represented by one place.

Fig. 2. Reading activity.

In the picture above, you can see a female student who is active in completing her lecture assignments. Reading, evaluating reports, typing, and looking for reading references are academic activities outside the campus environment. The movement and movement from one activity to another has shown a collaboration of factual space (reading, checking reports, and typing) with virtual space (surfing the internet to find the reading reference he needs). The collaboration of the two spaces allows him to complete his task.

Academic activities carried out by these students can occur because of the initial observations they make about the place. Her status as a female student is a lifeworld or role for the activities she must do now. A coffee shop is where he aims to provide facilities to support her performance in completing her academic assignments. In contrast, the collaboration between needs and orientation in doing tasks is home as a maturity of space that can lead her to dive further into completing his task and sometimes pay less attention to the conditions around her.

Fig. 3. Formal Discussion.
When the place can collaborate between needs (factual) and orientation (virtual), productive communities will only need a small space capacity to support their activities. They no longer need a place to put the stack of books they need because the virtual space can provide several references far more complete than they need (lifeworld). In addition, coffee shops as a place can provide support for biological consumption activities of productive communities without needing space to process the food and drinks they want (place). The combination of lifeworld and place of female students as part of the productive community population is a node of factual and virtual space mutualism for society 5.0. Good quality mutualism will produce a home for productive people doing multi-activity in one place. Therefore, it can be concluded that the mutualism of virtual and factual space for female students as part of a productive society is stated that the existence of the capacity of their activity space is no longer widespread, with the existence of virtual space that has represented factual space for its orientation and needs, showing the existence of space becomes narrower. That is, in various academic activities, female students can be represented in one place in a coffee shop.

3.2 Productive Community Performance Space

The vitality (lifeworld) in playing in public spaces is diverse, such as chatting, eating, drinking, playing gadgets, and others. When the choice falls to playing gadgets, many activities on the gadget screen can be done; again, it all depends on the wants and needs of the individual in determining his virtual activities.

Fig. 4. Team Gamer.

Fig. 4. Personal Gamer.

The list of applications on the gadget is a lifeworld activity menu that can be selected according to its orientation. Before heading to the place, productive people already have the
purpose of previous activities to take the coffee shop into a place that can serve their activity orientation.

They were starting from watching movies, playing games, working, to playing social media. All virtual activities in this gadget will be repeated until the individual chooses the most comfortable virtual activity according to his wishes (place). The individual will begin to open a selection of virtual activities continuously and settle on one virtual simulation activity that can serve their wants and needs (home).

3.3 Frequency of Room Orientation Society 5.0

The existence of virtual space has shown its capacity to serve surfing activities individually and in groups, just like the existence of factual space so far. The capacity of the virtual space can be used as a place to work, study, to play to form a particular social environment [23]. The aspect of place and time seems relative, and technological advances have united people's activities into very dynamic ones bound by the same orientation and needs in life.

Frequency is a transmitter that discharges to form an individual capacity emitted by each orientation and needs of specific individuals and groups. The virtual space will be carefully immersed in the status of a home if each individual or community group receives the burst of frequency well. In this case, the higher the frequency of virtual activities formed, the more widespread virtual space will exist; Activity is more active than ever. In contrast, the capacity of factual space is not expanding or fixed. Vice versa, when the frequency of orientation and activity needs of the virtual space decreases, the range of the virtual activity space slows down; tends to be relatively passive. Here the factual space is also not expanded or fixed. From the research analysis of the combination of ideas, needs, and orientations, it can be explained that the nature of the existence of virtual space is fast and slows down productive community activities, in contrast to the nature of factual space, which has a narrowing and expanding nature depending on the capacity of the number of actors and activities that occur in it [24]. Virtual activities are not space-limited, but factual activities are space-limited. This trait is a combination that complements each other in triggering the acceleration of the formation of society 5.0 progress. In one space, a variety of different activities can be carried out.

The fading of aspects of space and time capacity in the mutualism of virtual space and factual space has given particular attention to planners and designers to involve visual design that can provide support for virtual space society 5.0 activities. Productive societies can play, learn, discuss, and work in one place at a time. They do not need to move space to experience different events. Now the factual activity space has become smaller because of the orientation and needs that the virtual space can represent.

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3.4 Space Mutualism on the Dynamics of Architectural Knowledge

The involvement of virtual space in fulfilling multi-activity in factual space has indirectly changed the doctrine of design thinking in architecture[28]. The factual visuals in the bag of design footage become architectural design propositions only related to substantial experience. Factual visual space is less attractive when used as a reference to a concept of thought that can be used as a reference to form the atmosphere of virtual space in specific designs [22].

As an approach to architectural planning and design, design should have the ability to translate the context of virtual space dominated by society 5.0 as a reference to shape the atmosphere of their virtual space [6]. Space capacity becomes less critical, but context, concepts, and domains can meet lifeworld society 5.0, which determines the formation of mutualism space, an intermediate space or transition between virtual and factual space [29]. Mutualism is the name of space because there is a relationship between virtual and factual space bound by good frequency, orientation, and needs. The thicker the reflection of the character of the user's mutualism space, the better the frequency of orientation and needs formed.

4 Conclusion

The based-on research analysis, the current industrial revolution in the era of Society 5.0 has changed the designer's view in designing space based on a productive society's orientation and performance needs. Some activities in factual space can be interpreted in virtual space. This provides a new understanding for architectural knowledge that multiactivity in Society 5.0 does not only require increasing spatial capacity dimensionally according to the number of activities carried out by productive communities.

However, the focus of architectural design shifts to how to design mutualist spaces that can provide orientation and needs for productive communities to carry out core activities that support the frequencies generated from the content of these orientations and needs. Thus, space design becomes more flexible and adaptive to changes in the needs and patterns of productive community activity.

This conclusion shows that space design in the era of Society 5.0 involves not only the physical dimension but also the virtual dimension. Virtual space can be used as an alternative to accommodate activities that do not require ample physical space, thus allowing for more efficient and optimal use. Thus, architectural knowledge needs to continue to develop to face changes in the needs and patterns of productive community activity in the era of Society 5.0. The design of mutualist spaces that combine factual and virtual spaces is essential in creating an environment supporting productive communities' social and economic progress.
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