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TRANSFORMING FIELD DATA INTO DIAGRAMMATIC INDEXES: AN ARTISTIC TECHNOLOGICAL APPROACH IN CONTEMPORARY INTERIOR DESIGN PROCESS

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Abstract. Interior design is a complex multi-disciplinary field of study. As novice designers, interior design students require effective methods to convert the multitude of field data in the early stages of the design process into those that can be understood for further analysis. This paper develops the idea of transforming field data on site into diagrammatical indexes with the help of digital software. The aim is to provide a more practical method of analyzing user behavior and site conditions in which students focus on identifying intensities or patterns of the data observed on site rather than making descriptions of physical details as often done in conventional field surveys. Methods include identifying the aspects to be analyzed (occupancy, lighting, circulation, noise, ventilation, etc), creating suitable graphic indexes for each aspect of analysis, overlapping each diagrammatic index into one single diagram and analyzing the holistic data based on the interconnections between indexes formed. Results show that this method of representing data provide a visually artistic yet efficient way of making quick readings of the site as compared to conventional ways of collecting field data. Interior designers can also directly provide design solutions and produce innovative designs based on the site patterns observed.

Keywords: *interior design*; *diagrammatic index*; *design process; technology; graphic thinking*

1 Introduction

Interior design is a complex, multi-faceted field of study requiring connections to other fields of knowledge in the design process [1]. This is especially the case at the initial stage of the process when designers need to observe information in order to understand various types of problems before devising a suitable solution through design. The information to be analyzed can range from those related to the human aspect, such as user behavior, activity, occupancy and circulation, to physical aspects of the interior space such as the lighting quality, ventilation, view, access, acoustics, etc. With a wide range of different data that needs to be observed, interior design students as novice designers need an efficient way of viewing, documenting as well as communicating the data observed as the resulting designs must respond to the physical location as well as the social context of the design project [2]. This paper aims to develop a new artistic method for analyzing user behavior and site conditions using vectored digital software. In this method, students focus on identifying intensities or patterns of the data observed on site rather than making descriptions of physical details as often done in conventional field surveys. The paper starts with analyzing the flaws of documenting conventional field surveys, and identifies the significance of visual presentation in the whole part of an interior design process. It then proposes a new technological perspective on viewing field data using graphic indexes, inspired by contemporary landscape urbanism techniques With this new method, it is hoped that students can make a quick holistic reading from a given site through a more quantitative

graphical method of observation. Consequently, novel design solutions can be produced based on the graphic patterns observed.

2 The Role of Graphic Thinking in Interior Design Process

The teaching process of interior design often begins with an understanding of the problems that need to be solved in connection to a physical site and the context of its user. This requires the process of visually decoding the relationships among spaces, and evaluating their performance with regard to a set of criteria [3]. However, much of visual coding performed in an interior design process today are mainly focused on the ideation or the design phase rather than from the very beginning of the design process itself. Meanwhile, the important stage of gathering information through field surveys depend on photographs, written descriptions or rigid database tables as the popular modes of recording information (figure 1). Hence, interior design education has been disadvantaged from a shortcoming of documentation of the many possible modes of presentation and a scarcity of specific information for students [4]. As a result, there is often a gap in the connection of the information gathered at the beginning to the design offered by the students, as novice designers. This is because the data are gathered and documented in such a way that they are visually disconnected from the site and the template they work with in the ideation phase.

Figure1 Conventional documentation of field data on lighting and ventilation in the form of photographs and written descriptions that remain visually detached from the site observed.

A holistic design process is one where the designer's creativity is put to use throughout the design process even from the first phase: the preparation or the fact-finding phase [5]. The method in which designers study and understand information is a crucial factor in influencing idea generation [6]. Hence, when teaching the process of interior design, graphic thinking should not only be adopted during the ideation phase but at the beginning from data exploration or Understand-Observe phase before proceeding to Programming, Ideation, Prototype and Test phases. With the implementation of graphical communication and documentation from the start of the design process, the problems discovered at the initial stage can lead to a more concrete form of ideation that is tightly connected to the site and the template for implementing design ideas.

2 Diagrammatic Index Method of Field Data Observation

At present, the design methodologies of the built environment have staggeringly developed in line with the emergence of various digital software. Contemporary landscape and architectural design concept visualizations have become more structured, dimensioned and tend to become more quantified in the nature of their form with the aid of parametric digital software. In contemporary landscape urbanism process, designers often convert the data analyzed on site into patterned diagrams known as indexes, in which each index correspond to different landscape variables such as topography, streams, roads, land use, etc [7]. According to Charles Sanders Peirce's theory of Semiotics, an index is an implicated sign having a close, causal or tactile relationship with the object it signifies [8]. In this case, the index of topography is usually signified by curved vectored lines in which the proximity of lines correspond to the steepness of the slope. When different landscape indexes are overlapped into a single image, landscape designers can find a relation between one variable to another (i.e. how topography influence the dimensions and nature of the streams, etc.) [9]. This research develops the same technique of transforming interior design field data into diagrammatic indexes such that interior design students can make quick readings of the

site and also document them in a professional and artistic manner as popularly done in contemporary landscape urbanism. In this research students were given a task to observe a public space and document all the variables of their field data into different diagrams of index, with the boundaries of the site or the floor plan as the background template for each index. Methods include identifying the aspects to be analyzed (occupancy, lighting, circulation, noise, ventilation, etc), creating suitable graphic indexes for each aspect of analysis, drawing the indexes with the use of any vectored software (i.e. Autocad, Rhino, Grasshopper, Adobe Illustrator, Corel Draw, etc) and then overlapping each diagrammatic index into one single diagram. The intensity of the variable observed can be quantified through the units of the vectors. In this way, the role of computer technology in contemporary design process does not merely act as medium for presentation but as a partner in the design process of knowledge integration, decision support and design tools, as argued by Reffat (2007) [10]. Students were then expected to analyze the overlapped index in a holistic approach based on the interconnections between the indexes they could observe and make statements of the site problems that need to be solved before proceeding to the stage of interior design programming and ideation.

3 Results and Discussion

There were two objects taken as samples for this research. The first object for field analysis is a local serviced restaurant located in an electronics mall in Surabaya, Indonesia. Visitors have to pay for their meals first before they get seated. When ready, the food will then be served to the table by the employees.

Figure1 Initial documentation of field data of a local restaurant on a weekday afternoon.

The field survey was conducted during a weekday in the afternoon. In this research, the goal of the observation was to analyze user occupancy in relation to the interior design quality observed. At the initial stage of the observation, students first measured the dimensions of the restaurant and drew out the floor plan (figure 2).

Figure1 Diagrammatic Index of Occupancy.

Students then determine the variables they were going to analyze and planned the form of index for each of the variables. They observed the user activity and site conditions for a duration of two hours. The first aspect they analyzed was occupancy. The index for occupancy was signified by dots in which each dot correspond to a single user (figure 3). Many dots in an area signified high occupancy while little or no dots signified low occupancy. Based on the observation, there were twice more visitors who preferred sitting on the west than the east area of

the restaurant, despite the same capacity on both areas. To identify what aspects influenced the visitors to prefer sitting on the west area, the students observed the interior quality of the restaurant. The first aspect they observed was the lighting quality. As the field survey was conducted in the afternoon, most of the lighting used at that time was natural lighting. Hence, they analyze the spread of natural light inside the restaurant. The index for natural light was signified by a gradient of yellow colour (figure 4). Darker shades of colour signified low light intensity whereas lighter shades of colour signified high light intensity. Based on observation, areas close to the windows on the north and the south received much more light intensity, whereas the middle areas were darker. The area on the west wall was also well lit due to the presence of mirrors on the wall.

Figure2 Diagrammatic Index of Natural Light.

The next aspect observed was the noise intensity of the restaurant. This was signified by a range of circles, having three different diameters (figure 5).

Figure3 Diagrammatic Index of Noise.

Noisier areas were signified by circles with larger diameters whereas quieter areas were signified by smaller diameters of circles. It was found that the area on the north-west was the noisiest area because it was close to the kitchen. Areas close to the main entrance was also noisy because of the activities outside the restaurant. Hence, the direction of noise came mostly from the kitchen and from the mall visitors outside the restaurant.

Figure4 Diagrammatic Index of AC diffuser location.

The next aspect analysed was ventilation. This restaurant only used artificial ventilation through a central air conditioner. Hence, the index of the ventilation was the mapping of the location of the air diffusers with a blue square shape. The air diffusers were equally distributed in all the areas of the restaurant.

The last aspect analysed was the seating facility. This was important in determining which form of seating facility was prefered by the visitors. There were two types of seating that were used in the restaurant. The first type of seating facility was a plastic chair, that was the dominant seating facility in the restaurant, placed around every rectangular table. This was signified by a brown square. The second type of seating facility was a rectagular sofa placed right in front of the west wall, the middle are and on the south east along the glasswall of the entrance area. This was signified by a red rectangle (figure 7).

Figure2 Diagrammatic Index of Seating Facility

With the completion of variables to be analyzed, students then overlapped the indexes into a single diagram and observed the data by drawing relations between the variables observed (figure 8). From the indexical observations, several conclusions could be drawn. First visitors favored the areas that were brighter and closer to natural light. This could be seen from the diagram that shows that the lighter areas on the west appear to have more dots that signified more occupancy. Second, visitors also preferred sofa seats compared to the plastic chairs. This is evident from the diagram that there were twenty dots on the red rectangles (sofa) and only eight dots on the brown squares (plastic chairs). Noisier areas close to the kitchen on the north-east tend to be avoided by the visitors. Meanwhile, the design of artificial ventilation did not have any significant effect on the occupancy. Hence, based on analysis of the diagrammatic indexes, the areas close to the kitchen were areas that needed design solutions as they were areas that were least favored by the visitors.

Figure3 Overlapped Diagrammatic Index of Field Data

Another indexical observation project conducted was a school canteen of a private university. Students were required to analyze the visitor behavior in relation to the interior design elements of the canteen. The canteen has a buffet mode of service in which visitors first pay their lunch with their smart cards before entering the building

and proceed directly to the buffet table on the north-east to collect their food before eating them on the table. With the same diagrammatical indexing method, students analyzed various aspects they could determine such as the occupancy, circulation, lighting, wind flow, views and greeneries. Based on the overlapped diagrammatical indexes produced (figure 9), the students have observed that visitors of this canteen preferred the tables that were far from the high flow of circulation from the entrance to the buffet counters. They also preferred the areas on the south-west because of the mild wind from the southern windows, views to greeneries outside and the brightness of the space. Meanwhile, the areas on the north-west were less favored because of the darkness and the high wind flow from the large windows. Hence, based on the observation, the areas on the northwest would need some design solution in the ideation phase.

Figure4 Overlapped Field Data Diagrammatic Index of a School Canteen

4 Conclusion

Through this research, an artistic and technological approach of interior design field observation and documentation has been developed. By adopting graphic thinking from the early stages of an interior design process, interior design students benefit from a more quantified and visual understanding of the problems they need to solve. The use of the floor plan as the template or boundary for indexing and the focus on patterns or intensities of the research variables also assist in representing material conditions on site and target the exploration more concretely. This addresses the problems frequently encountered in interior design studio projects in which the design solutions offered by students are often focused on the inside space while the atmosphere rendered are disconnected from the material quality of the site [11]. Students become more aware of the potentials of the site that should be maximized through their designs, thus enabling a more environmentally-conscious mind-set in the design process.

Moreover, with the use of vectored computer software not just in the ideation and prototype phases but from the very beginning of the design process, interior designers as art students become more accustomed to quantified and dimensional thinking rather than purely abstract thinking. Hence, the role of computer technology in art education becomes more as a partner for design thinking rather than merely a medium for presentation [10].

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