

Difference of Place Vitality in Two Central Plazas

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A Comparison of the Diag on the Central Campus and the Lurie Bell Tower Plaza on the North Campus of the University of Michigan

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Abstract

This study seeks to clarify reasons for the different vitality between two central plazas at the University of Michigan: the Diag on the central campus, and the Lurie Bell Tower Plaza on the north campus. By analyzing the plazas in each campus, this study seeks to interpret the topological meaning of each plazas well as to determine the characteristics of the plazas.

Two maps from the campus archives are selected and analyzed with the Depthmap. Axial maps are analyzed with the global ($r=n$) and local ($r=3$) integration, and visual integrations are compared with former researchers' study of the Campus Plan (Venturi, Scott Brown, and Associates, 1998). The axial maps of car, pedestrian, and overlapped circulation are compared with each other by the integration values of axial elements. The visual integration includes analysis between the plaza, the buildings around the plaza, the streets around the buildings and some parts of the buildings across the streets.

Urban places on the central campus are integrated with the Diag, while places on the north campus are less integrated and remain separate, falling into categories such as research, teaching, studying, living with friends, and living with families. According to the history of the central campus development and the spatial analysis, the Diag in the central campus has been located topologically and syntactically at the center of the central campus. In addition, the Diag is appropriate to attract natural movement into this plaza. The Diag is easily recognized globally and locally by the pedestrian. However, although the plaza in the north campus is centrally located, the syntactic position is not the center of the north campus. The highly integrated space on the north campus is located in the streets connecting each area of the north campus, such as Murfin and Hubbard.

As a result, the difference of the experienced vitality in the plaza of each campus is derived from the different organization of the spaces. The organization of the central campus is a centralized spatial configuration within urban spaces, and the north campus is organized with areas distributed as a matrix based on the purpose of each space. The Diag in the central campus is a good fit for the outside activities while the Lurie Bell Tower Plaza in the north campus is separated from the activities on the campus. The Diag is more connected from the outside to the inside area of the place. However, connecting places among buildings and places around the plaza of the north campus usually exist within buildings. These enclosed areas are a multiplier of the natural movement in the plaza of the north campus since students' movements pass through the buildings. Thus, the vitality of the plaza in the north campus is affected by the fact that surrounding buildings have connecting places on the north campus at the University of Michigan.

1. Introduction

This study focuses on the spatial analysis of two public plazas, the Diag on the central campus and the Lurie Bell Tower Plaza on the north campus of the University of Michigan. It is possible that these plazas might be designed and planned as the central place in the life of the each campus

since they are located in the middle of each campus and many main buildings have been constructed around them. However, there is a different kind of vitality on the central and north campus which is intuitively sensed by the students, faculty and staff who live, study and work at the University of Michigan. It seems that the characteristics of programs, the numbers of people, and the specific circumstances of each campus affect their vitality. In addition, some spatial elements are also different between the two plazas and seem to be related to the activities that can induce the vitality of everyday life in each campus.

This study seeks to clarify the reasons for the different vitality of these two central plazas (Figure 1). The research question of this study is whether the designs of these plazas are appropriate for everyday life in each campus in terms of vitality. The central plazas in each campus are the places where everyday university life happens. Thus, the appropriation of each place to the way people live there can explain the characteristics of the places in relation to the vitality in the places. Furthermore, by analyzing the plazas, this study seeks to interpret the topological meaning of the plazas in each campus as well as to find the characteristics of the plazas. Moreover, by comparing the characteristics of the central and the north campus in relation to the Diag in the central campus and the Lurie Bell Tower Plaza in the north campus, this study will propose strategies for future development of each campus.



Figure 1

The Diag and The Lurie Bell Tower Plaza at the University of Michigan
(<http://map.mapnetwork.com/destination/ann Arbor/>)

2. Literature Review

The relationship between place and vitality at the University of Michigan is a main element that this study analyzes. Thus, the literature review focuses specifically on the University of Michigan and the vitality in a place.

2.1. How has the University of Michigan changed?

With the 1998 *Campus Plan* (Venturi, Scott Brown and Associates), the University of Michigan started to plan for a physical expansion of the campus. This report outlined the development of new places in the eastern and southern locations of the University of Michigan based on the analysis by Venturi, Scott Brown and Associates of the data from the University. Venturi, Scott

Brown and Associates compiled a report, "Building Development of Changes of Use Over Time," to show how the University of Michigan has been developed over time. The report showed that the university, especially the central campus, has been growing from the Diag area, and blocks that were divided by streets has been intensified. In addition, the *Campus Plan* referred to the original campus plans of Lorch, Pitkin and Mott, and Eero Saarinen to show how each campus has developed. The central campus started from the square block that had the Diag in the center, and then expanded to outside of the square. However, the original north campus plan designed by Eero Saarinen had a broad scope and overall organization; the current north campus still has a similar size and spatial organization as his original plan.

In addition to these development plans, Robert Beckely, who headed the Campus Plan Advisory Committee, created five development guidelines in 1998 to enhance, create, and sustain the university's growth. These guidelines outlined the important elements at the university:

- (1) Missions of the University of Michigan: academic, scholarly, and research missions
- (2) Vitality of the University as a community
- (3) Relationship between town and university
- (4) Principles of aesthetics and environment design of the University
- (5) Adaptation of the changing needs of the University

(Venturi, Scott Brown and Associates, 1998).

Ann Arbor is a university town in which the city and university have developed a close relationship over time. When the University of Michigan has developed, the City of Ann Arbor has also followed its changes and vice versa. According to Adhyo and Amorim's study (2005), the processes of development in Ann Arbor are categorized into "creation", "extension", "deformation", and "consolation" periods. These analyses of Ann Arbor using the chronological and syntactic approaches explain the appropriation of the development of Ann Arbor for activities of the University of Michigan. According to Adhyo and Amorim's findings, the high integration values of the axial maps are located in StateSt., Main St., Jackson Rd., Washtenaw Ave., and Plymouth Rd., all of which connect the outskirts to the center of Ann Arbor. These are major arteries that interweave the central campus of the University of Michigan with the City of Ann Arbor.

Thus, while the University of Michigan keeps being developed, the central campus has highly integrated space (the State Street area), the north campus does not have a high value of integration in Ann Arbor. This syntactic explanation of Ann Arbor can be a starting point for the analysis of the University of Michigan.

2.2. How can vitality in a place be measured?

Diversity is an element that vitalizes city living (Jacobs, 1961). Jacob's observations of everyday life in big cities in the US explain that the diversity of activities is natural but the development following the modernists' ideas prevented everyday life from affecting the vitality of a place. In addition, Montgomery (1998) explains activity with vitality and diversity in relation to urbanity, and vitality is a significant factor of whether a place is successful for the people who live there.

Vitality can be induced by movement patterns in a place. Pedestrian movement and existing things to do can explain the vitality in a place (Montgomery, 1998). Montgomery explains these various happenings as patterns in a place. Thus, measuring the movement patterns can explain the degree of vitality in a place.

The movement pattern in a city is correlated with the integration value from the configuration of urban spaces that is derived from the global characteristics of the city (Hillier et. al., 1993). For example, in Dutch cities, the occupancy of people in public space is correlated with the analysis of the spatial configuration by the space syntax (Read, 1997). The occupancy of people is also one of the movement patterns in a place. The high occupancy in a place is correlated with the high integration value. This study of people's occupancy in a public area is an example for using the method of the measurement by the integration value. In addition to the European examples, in the

town of Cary, North Carolina, an American suburb, the spatial analyses with the increasingly globally segregated streets, the declined intelligibility, and the relatively stabilized values of the local integration explain the characteristics of the suburbanization between 1989 and 2002 (Toker et. al., 2005).

Thus, the measurement of the integration by the space syntax can explain the vitality of the place at the University of Michigan. Ann Arbor is a university town that is integrated with University of Michigan; thus, the plazas in the University of Michigan can be considered as urban spaces, similar to the urban spaces in the previously mentioned studies.

3. Methodology

This study follows the space syntax theory in order to analyze the plazas at the university. In order to find the relationship between a spatial configuration and a socio-cultural element in a place, the space syntax is appropriate both in terms of theory and methodology. According to previous research (e.g. Hillier et.al., 1993; Read, 1997; Toker et. al., 2005), the space syntax will find the correlation between a spatial configuration and a socio-cultural factor in a place.

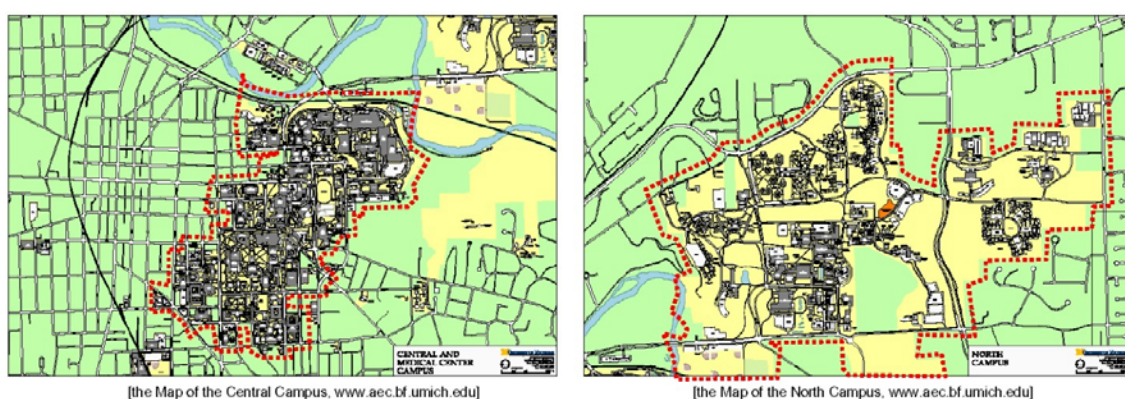


Figure 2

The Selected Maps Of The Central And The North Campus

(from www.aec.bf.umich.edu, red dotted line added to indicate the boundaries of this study)

Two maps from the campus Architecture, Engineering, and Construction Division of Facilities and Operations at the University of Michigan are selected as they cover the entire central and north campus (Figure 2). The map of the central campus includes the medical campuses; because the central and the medical campuses are located close to each other and are interwoven, they will be analyzed together and referred to as the central campus in this study.

The axial maps of each campus and the building outlines for the visual analysis are drawn with CAD based on the selected campus maps and the aerial photos from Google Earth. In addition, the axial maps are drawn within the boundaries that include the university property, which are shown as yellow lots on the maps. The axial maps are drawn with three types of circulation: car, pedestrian, and overlapped circulation. The axial map of car circulation follows the streets that cars can access and the axial map of pedestrian circulation is drawn on the paved paths while the axial lines follow the rule of "longer and fewer." The axial map of the overlapped car and pedestrian circulation represents all movement of the area in relation to people's movement.

In addition, these analyses of both campuses by the space syntax are compared with the results of a questionnaire of freshmen and seniors used by Venturi, Scott Brown, and Associates (1998). This questionnaire was a survey about the movement patterns of freshmen and seniors from their residence to their first class on a Wednesday. The movement patterns were drawn with lines of different thickness, where more students were represented with thicker lines on campus maps.

Overall, the Depthmap¹ is used for the analyses of the axial map of each campus and the visual integration of each plaza. Since each axial map of the central and the north campus is analyzed with the integration value of both $r=n$ and $r=3$, totally, six axial maps are drawn for three types of circulation and two levels of $r=n$ and $r=3$ in each circulation. Each axial map of car, pedestrian, and overlapped circulation is compared by the mean value of the integration of all axial elements, the mean value of the integration within the Diag in the central campus and the Lurie Bell Tower Plaza in the north campus, and the intelligibility between the global ($r=n$) and local ($r=3$) integrations of both the central and the north campuses. Furthermore, the visual integration of each plaza is generated with the plazas in the center of the visual integration. The boundaries for the visual integration includes the plazas, the buildings around each plaza, the streets around these buildings, and some parts of buildings across the streets both on the central and the north campus. Each square boundary of its plaza is the same size to each other. Because the analysis of the visual integration focuses on the plazas, space for the analysis of the plaza includes the areas that are visually connected to the plazas. Moreover, the analyses of the visual integration are compared with Venturi, Scott Brown, and Associates' survey of the students' movement on each campus from The pattern of the visual integration, as well as the syntactic analysis, can explain the vitality of the movement patterns in both the Diag and the Lurie Bell Tower Plaza.

4. Results

4.1. Results of the analysis of the Axial Map of Car Circulation

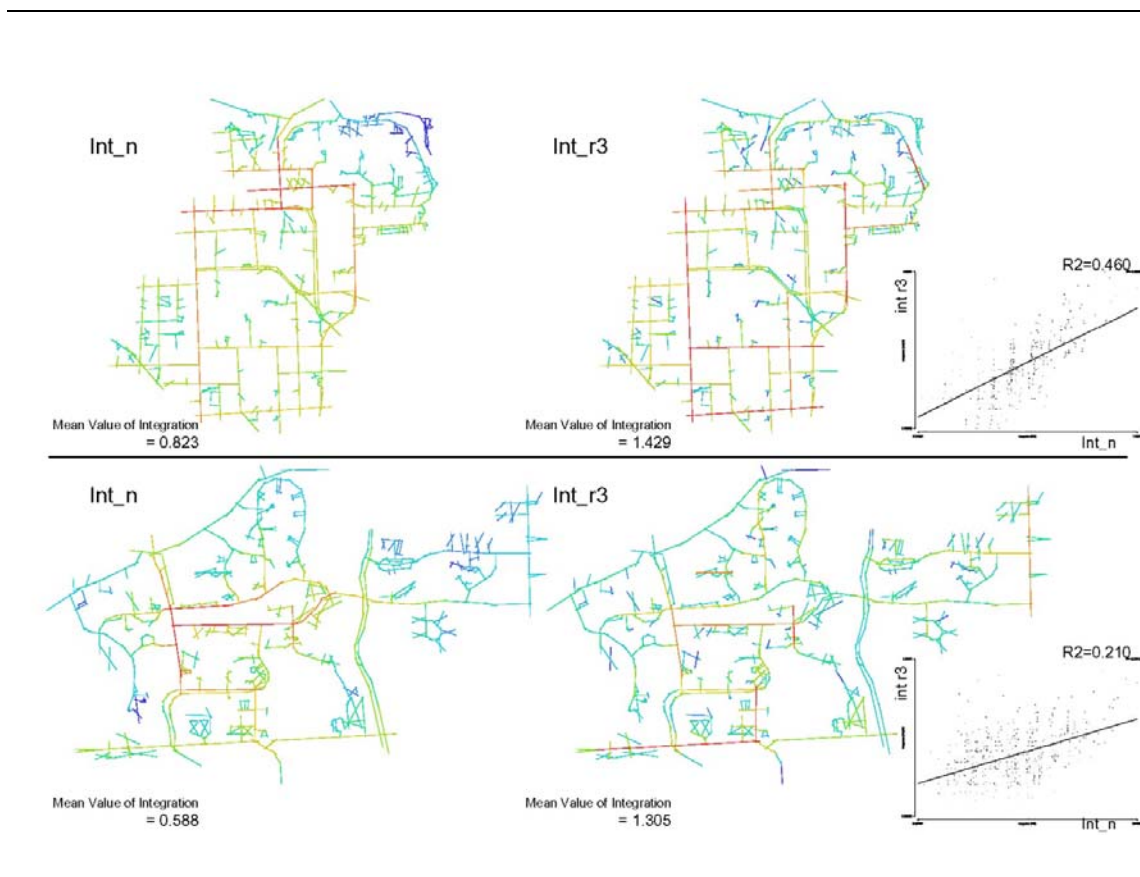


Figure 3

Results Of The Analysis Of The Axial Map Of Car Circulation

The central campus is more integrated in terms of the car circulation than the north campus according to the results of the analysis of axial maps of car circulation. Mean values of integration at the central campus are higher both globally and locally. In the global integration ($r=n$), the high values exist in the streets that connect the outskirts and the center of the central campus. In other words, the highly integrated streets are broadly spread out. However, on the north campus, the

area that the streets with high values of the integration cover is narrower than the area on the central campus. The highest integrated streets on the north campus are located in the areas where research and teaching buildings, family housing, and dormitories are connected.

In addition, the intelligibility of car circulation between the integration of $r=n$ and $r=3$ on the central campus is higher than the intelligibility on the north campus. In other words, the values of the global integration are distributed with weak correlation to the values of the local integration at the north campus.

However, the Diag on the central campus and the Lurie Bell Tower Plaza on the north campus are directly connected to the high integration value of car circulation. The streets with the highest value are located at the edges of the blocks that contain the Diag or the Lurie Bell Tower Plaza.

4.2. Results of the analysis of the Axial Map of Pedestrian Circulation

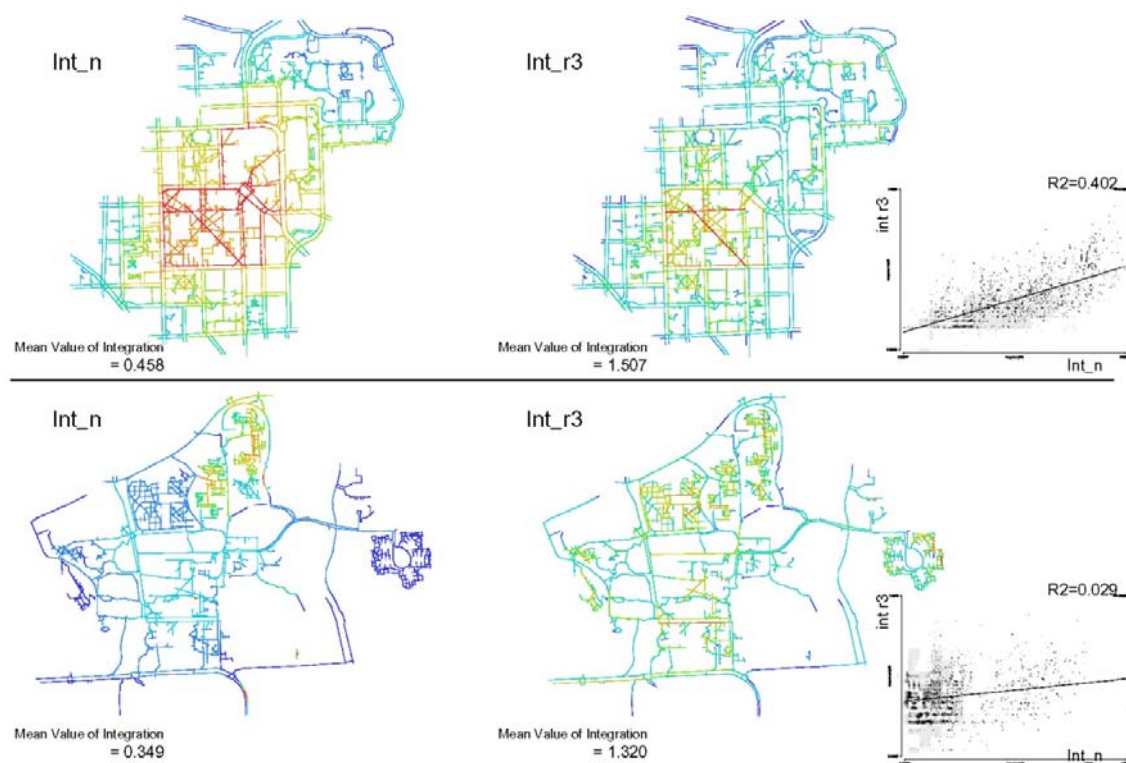


Figure 4
Results Of The Analysis Of The Axial Map Of Pedestrian Circulation

The integration values of pedestrian circulation gradually decrease from the center (high value) to the outskirts (low value). This trend is shown similarly in the integration value of both $r=n$ and $r=3$. Especially, the integration value in the Diag of central campus is the highest in both the global and the local integration. In addition, the diagonal axis in the Diag in the axial map of the integration $r=3$ has a high value of integration.

However, the integration values of pedestrian circulation on the north campus are, overall, low. The place with the highest value of the integration is located in the Northwood IV housing area. The other places have low values (blue) of the integration. In the axial map of the integration $r=3$, the high value of the integration is distributed all around the north campus. Each place has its own highly integrated street of pedestrian circulation.

In addition, the intelligibility between the integration of $r=n$ and $r=3$ of the central campus is higher than that of the north campus. The intelligibility of the north campus is less than 0.03.

4.3. Results of the analysis of the Axial Map of Overlapped Circulation

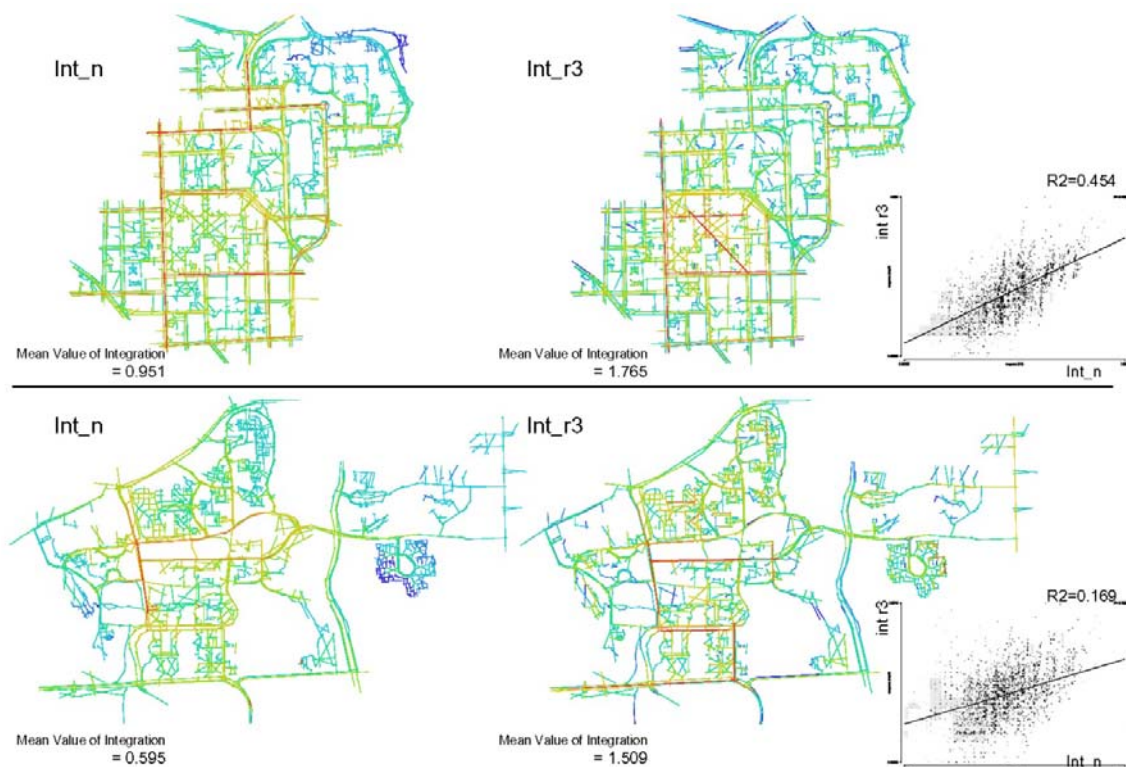


Figure 5

Results Of The Analysis Of The Axial Map Of Overlapped Circulation

Distribution of the high integration values at the global level ($r=n$) in these overlapped circulations follows streets similar to those of car circulation while distribution of the high integration values at the local level ($r=3$) in these overlapped circulations follows axes similar to those of pedestrian circulation. Overall, the distribution of the integration values in the overlapped circulation follows the axes of the integration ($r=n$ and $r=3$) of car circulation. In addition, the mean value of the integration is still higher on the central campus than the mean value on the north campus. The intelligibility between the integrations of $r=n$ and $r=3$ is also higher on the central campus than the north campus.

In addition, the mean values of integration are higher on the central than on the north campus. This situation is the same for car and pedestrian circulation.

4.4. Results of the Visual Integration

In Figure 6, the visual integrations are compared with students' movements in both the Diag and the Lurie Bell Tower Plaza. The visual integration in the Diag of the central campus follows students' movement from the results of the questionnaire in the *Campus Plan* by Venturi, Scott Brown and Associates (1998). These surveys tracked a sample of 1000 freshmen and 2000 seniors from student's residences to their first class on Wednesday. In particular, the seniors' movement is similar to the diagonal space which is highly integrated in the visual integration of the Diag.

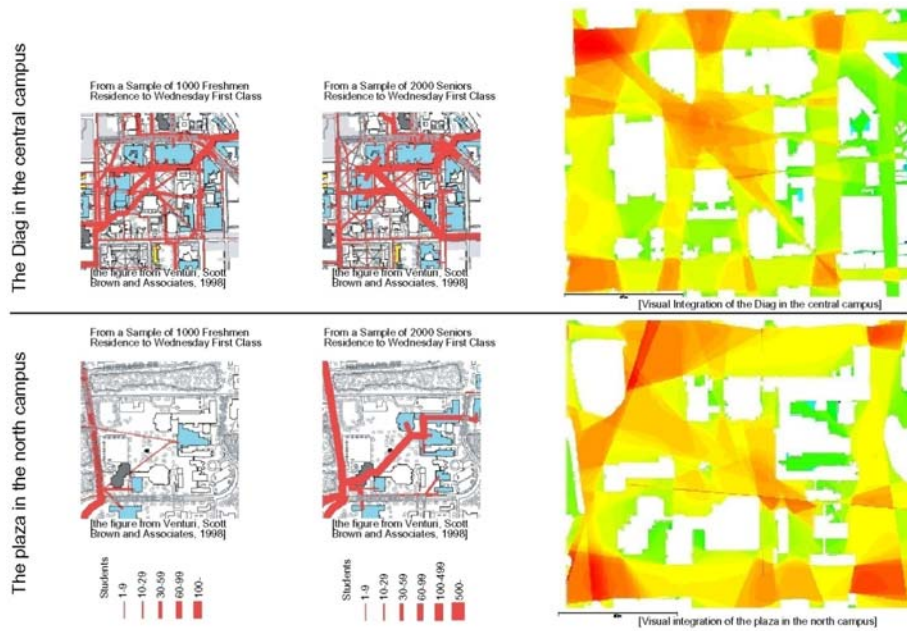


Figure 6
Comparison Between Students' Movement² And Visual Integration

However, in the Lurie Bell Tower Plaza on, the visual integration is different from the students' movement in the *Campus Plan*. Although the places outside the plaza have correlation to the students' movement, the student's movement and the visual integration are differently distributed in the open place of the plaza.

4.5. Results of the spatial analyses

The results of the spatial analyses of the central places on each campus can be summarized with three ways. First, while the higher integration values in the axial map of the central campus are located in the Diag, the lower integration values in the axial map of the north campus exist in the Lurie Bell Tower Plaza (Table 1). The mean value of the integration of all axial lines as well as the mean value of the integration in axial lines of the center plazas is higher on the central campus than on the north campus.

Mean Value of the Integration	Car		Pedestrian		Overlapped	
	n	r3	n	r3	n	r3
the Diag in the central campus	0.96	1.52	0.60	2.19	1.08	2.31
the plaza in the north campus	0.70	1.43	0.35	1.38	0.70	1.65

Table 1
Mean Values Of The Integration

Second, the intelligibility of the central campus between the global and the local integration is higher than the intelligibility of the north campus (Table 2). The intelligibility of the central campus is greater than 0.4 while the intelligibility of the north campus is about 0.2, except for the intelligibility of pedestrian circulation on the north campus which is less than about 0.03.

Third, the movements in the Diag on the central campus follow the result of the spatial analyses of the Diag. However, the seniors' movement in the Lurie Bell Tower Plaza of the north campus is different from the distribution in the visual integration. While these two plazas have a similar size and a similar situation of the place surrounded with buildings, the Diag of the central campus

has more connection with areas outside of the Diag. These connecting places enhance the visual integration of the Diag. Even though some connecting places exist around the plaza on the north campus, the connecting places do not affect the high visual integration in the Lurie Bell Tower Plaza. Instead, high visual integration is located in the space between the library and the Electric Engineering Building.

Intelligibility between the integrations of n and r3	Car R2	Pedestrian R2	Overlapped R2
The central campus	0.460	0.403	0.453
The North campus	0.210	0.029	0.169

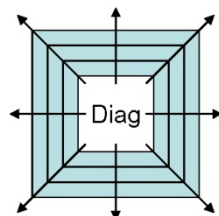
Table 2
Intelligibility Between The Integrations Of $r=n$ And $r=3$

5. Interpretation

Urban places on the central campus are integrated with the Diag, while places on the north campus are less integrated and remain separate, falling into categories such as research, teaching, studying, living with friends, and living with families. According to the development of the central campus in the *Camus Plan* (Venturi, Scott Brown and Associates, 1998), the Diag has occupied the topological center of campus. In addition, according to the axial maps of the central campus the Diag is positioned as the syntactical center of the central campus. However, although the Lurie Bell Tower Plaza on the north campus occupies a central location, surrounded by buildings, its syntactic position is not the center of the north campus. Rather, the highly integrated space on the north campus is located in the streets connecting each area of the north campus, such as Murfin and Hubbard.

In addition, the Diag appropriately attracts natural movement into the place. The Diag has a high integrated axis in the space and the visual integration correlates with the student's movement. In this globally integrated urban space, the physical configuration also correlates with the natural movement. Thus, the students can recognize the Diag broadly and the student's activities can be easily observed from this physical organization. Moreover, since the central campus has the higher intelligibility, the Diag is easily recognized globally and locally by pedestrians who usually walk, stop, and chat in the Diag.

The centralized relationship of the central campus



The matrix relationship of the north campus

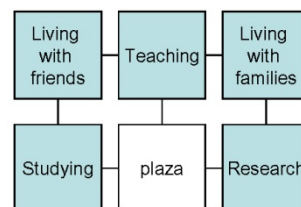


Figure 7
Characteristics Of Organization Of Each Campus

While the organization of the central campus has a centralized relationship between the places in the central campus, the organization of the north campus is a matrix relationship between the places in the north campus (Figure 7). The Diag plays a role of the center space of the central

campus in terms of location and meaning of the urban space. While the Diag is a significant place in the central campus, the Lurie Bell Tower Plaza of the north campus is just one of many urban spaces that are aggregated in the north campus. The Lurie Bell Tower Plaza is one of the cells in a matrix. Each place in the matrix has its own identity based on the functions.

However, the movements in the Lurie Bell Tower Plaza of the north campus are more affected by the inside spaces of the buildings than is the case on the central campus. According to the survey of the students' movement on the plaza on the north campus (Venturi, Scott Brown and Associates, 1998), freshmen and seniors most frequently pass through the Pierpont Commons, one of buildings around the plaza. Because the specific functions of this environment affect the natural movement as a multiplier (Hiller et. al., 1993), the visual integration of the plaza without the consideration of inside space can be different from the actual activity of the students' movement. The diagonal axis on the axial map that includes the axes within the buildings is higher than other axes in the plaza on the north campus. This means that the spatial configuration of crossing the plaza correlates with the natural movement of students within the buildings rather than correlates with other paved areas outside on the plaza.

6. Conclusion

The difference of experienced vitality in the plaza of each campus is derived from the difference in the organization of the spaces. The organization of the central campus is a centralized spatial configuration within the urban space, and the organization of the north campus is organized with areas distributed as a matrix based on the purpose of each space. On the central campus, since the car and the pedestrian circulations are globally integrated, the organization fits both the car and the pedestrian. However, the north campus can be divided with several places of each group for its own functions. Since, on the north campus, each place is likely to be connected from the inside space of buildings, the role of the Lurie Bell Tower Plaza on the north campus is different from the role of the Diag on the central campus. Thus, this different vitality does not mean the Diag is better than the Lurie Bell Tower Plaza. These two plazas have different roles for their campuses.

The Diag on the central campus is appropriate for the outside activities while the Lurie Bell Tower Plaza on the north campus is separated from the activities on the campus. There is more connection from outside areas to the inside area of the Diag. According to the correlation of the students' movement and the visual integration, these connecting places are well organized with the Diag and create the vitality of the Diag in the central campus. However, the connecting places among buildings and places around the Lurie Bell Tower Plaza on the north campus usually exist in the buildings. These enclosed areas are a multiplier of the natural movement in the plaza of the north campus since students movement pass through the buildings. Thus, the fact that there are places inside the buildings that function as connecting spaces greatly affects the vitality of the north campus plaza.

Future development of the north campus should be based on comprehension solid understanding of the unique characteristics of each place while the development in the central campus can follow the urban fabric that already exists. The north campus has a car-oriented organization of place while the central campus is appropriate for both car and pedestrian movement. If the north campus is planned in order to increase the vitality outside, the plan should focus on increasing the global integration of the north campus. The configuration of the streets should be modified with the goal of connecting the plaza with other spaces on the north campus. In addition, any newly constructed building around the plaza should have connecting space. This connecting space will attract and maintain people's movement around the plaza. However, even though the woods between spaces on the north campus could potentially be developed, it would be a better move environmentally speaking for both the university and the city to preserve the woods. In addition, research-oriented facilities around the Lurie Bell Tower Plaza might want to avoid crowded movement on the plaza of the north campus. Crowded people and activities make a noise and disturb quiet circumstance for researches. Thus, the plan of future development should take into consideration the purpose of each place and the existing characteristics of each campus.

7. Discussion and Directions for Future Exploration

Vitality has been addressed as an important element in the urban design. To achieve vitality in the built environment, various strategies have been proposed and adopted. Some of them have been discarded and some are still being investigated. Additionally, some urban design proposals are based on the normative perspective. This normative perspective might work well and effectively vitalize the built environment for residents. However, currently, scientific investigations are increasing and being adopted to verify these concepts. By using spatial configuration, this investigation enhances current normative perspectives of urban design to achieve a scientific status on which to base an appropriate design approach. This study investigating reasons of differently experienced vitality in two plazas located close to each other shows that scientific investigation of spatial structure verifies the spatial characteristics of a university as an academic institute as well as a university town.

Corresponding with an increasing number of facilities and academic activities, a university town continuously expands its boundaries and modifies its spatial structure. This study shows that central and peripheral spatial structures are correlated to different vitality. In addition, university campuses' spatial organization comes from their historical context and in order to achieve some purpose. This study shows that spatial structure of University of Michigan has been incorporated to the production of knowledge in terms of the academic purpose. Thus, a university town has both characteristics of an academic and an urban place. Students, faculty and staffs, and other people live, study, and work there. When planning and developing a university campus, designers and planners should consider that people have to interact with the campus as both as an academic place as well as an urban place.

This study focuses on physical elements in the built environment. Vitality is an observed characteristic as well as an experienced one. While this study being carried out, people's movements and activities in the Diag on the central campus and in the Lurie Bell Tower Plaza on the north campus were observed. The observed patterns were similar to the result of this study. People's movements also happen in the highly integrated area of the visual integration, and also follow the results of the survey of students by Venturi, Scott Brown and Associates (1998). These clues can explain the correlation of the vitality and the integration value in these plazas with more specific elements of these places. However, to address limitations of this study, further observation of people's activity in the places and in-depth interviews about the plazas could be carried out.

Additionally, a future study including both the University and City of Ann Arbor could enhance the understanding of the characteristics of each campus. Although this current study is based on the broad analysis of Ann Arbor, this study lacks a more specific understanding of the city and the direct relationship between the city and the university. In fact, the University of Michigan has been developed over time in terms of a university town. The result of this study mostly focuses on the analysis of the campus, not the university town. Without a full understanding of a university town, it is hard to represent all the characteristics of the plazas at the University. Finally, this study divides the University of Michigan into the central and the north campuses. However, these two campuses are within the boundary of City of Ann Arbor and also connected with other streets that can affect the analysis of the axial maps.

Notes

- 1 The Depthmap is a computer application developed by University College London.
- 2 Student's movements are the result of the questionnaire in the Campus Plan by Venturi, Scott Brown and Associates (1998).

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