THE EFFECT OF DEPTH AND DISTANCE IN SPATIAL COGNITION

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Abstract
This study investigates the interrelationship between spatial cognition and configuration, and the effects of turns in path (depth) and metric distance in forming spatial cognition. Studies on cognition of spatial configuration elucidated that depth is a very important factor that determines spatial cognition and human behavior (Hillier et al., 1996). However, they did not explain the influence of depth on spatial cognition and human behavior as they compared depth with that of distance. Other studies explained ‘a change of direction’ as an important element to cognize psychological distance arguing that if there are more crossing points in a path people cognize them to be longer (Sadalla, Staplin, Magel, 1980). However, these studies have not focused on which has more influence on spatial cognition and spatial behavior when depth increases and distance lengthsens.

The study area located in Yonsei University in Seoul was investigated in detail. Structured interview surveys were carried out with local users to elicit aspects of their cognition of the local area and detailed observations were made of their movement patterns within the campus. The findings confirm that there is a strong interrelationship between the syntactic properties and spatial cognition as indicated in the cognitive map. Mainly, both depth and distance have a large influence on spatial cognition. However, a comparison of the influence of depth and that of distance showed that depth has more influence than distance on spatial cognition. When real built environment, spatial users cognize individual central spaces in their brains and then extend the range of the real spatial configuration as they learn more about depth and distance. As the ranges of cognized spatial configuration get extended, overall spatial cognition is influenced more by depth than by distance.

Introduction
The relationship between spatial configuration and spatial cognition is an important issue in understanding the relationship between human beings and built environment. In particular, cognitive distance (human consciousness of distance) used for determining for metric distance is an important element in the process of dealing with spatial configuration existing in a built environment.
Lynch (1960) elucidated that five important elements - paths, nodes, districts, edges and landmarks - affect spatial cognition constituting the municipal image. Following Lynch’s study on municipal images, Appleyard (1970) suggested that paths and nodes, important elements in spatial cognition, are sequential elements used to constitute spatial configuration. It was Downs and Stea (1973) who mentioned cognitive distance based on paths and nodes. They argued that the environmental information people generally need includes location, distance, and direction, which are defined as the environmental properties of spatial configuration. In their argument, distance had a close relationship with environmental cognition, indicating the importance of not only metric distance but also cognitive distance. Sadalla and Staplin (1980) explained ‘a change of direction’ as an important element required to cognize psychological distance. They argued that the more crossing points a path has, people cognize them to be longer. Sadalla and Magel (1980) proved that the number of changes in directions affects cognition of distance. For example, Figure 1 shows that the more changes of direction a path has, the longer it seems to be. In the figure, X axis is the number of changes in direction in a path, and Y axis is an estimated length of path. In other words, depth, a spatial configurational element in human and architectural environment makes people cognize the metric distance to be longer than it actually is.

Figure 1: The rate of spatial cognition according to turn in path

Hillier (1996) explained depth as a denotation of ‘depth of space’ which has the same concept as depth. Depth, for him, is a depth of space having a relative concept, and it identifies changes of direction occurring when moving from one specific space to another space. He argued that the influence of this depth is an important factor that determines spatial utilization of people in spatial configuration. Figure 2 shows the influence of depth. Supposing that people use path A and path B in the Figure, it is shown that path A, which has few depths sustains higher accessibility, spatial cognition, and availability than path B, which has many depths.
Hillier computed Integration of respective spaces based on ‘depth of space’ and argued that this Integration is an important element that determines the configuration of spatial utilization. In fact, in the last 20 years many studies have been conducted analyzing and understanding the properties of spatial configuration based on the argument that Integration is an important element that determines the behavior of spatial utilization.

However, the previous studies are a result of studying the influence of depth (changes of direction) in a restricted environment. For example, first, studies on cognitive distance have seldom been conducted on a role that depth plays in a real built environment. In a real built environment, scales are studied based on distance, but they are seldomly studied on the basis of depth. Second, in the space syntax theory, configurational elements are being invented without sufficient consideration for the cognitive distance that depends on both distance and depth, despite the fact that distance is also an important factor in cognizing spatial configuration.

Therefore, the purpose of this study is to elucidate whether or not the environmental cognition of human beings is based on spatial configuration by examining the existence of an interrelationship between spatial configuration and cognition. After determining that an interrelationship between spatial cognition and configuration does exist, the paper will focus on the effects of the depth and distance of spatial configurational elements play in forming spatial cognition in the same area.

There are several steps used in the study. First, the properties of spatial configuration of a case study area are analyzed using space syntax methodology. Second, users of the area are surveyed for a sketch map, and the spatial behaviors of spatial users are interpreted as properties of the sketch map. Third, the relationship between spatial configuration and spatial cognition is further analyzed. Finally, the influence of depth is compared to that of distance, analyzed in the cognition of the spatial configuration.
Methodology

A Case Study Area

There are two questions considered in selecting a case study area for this research. The first question is related with selecting the center to be used to calculate depth and distance: There should be a center of a real space and a behavior of spatial usage in the area. The second question is how to fix the ranges of this study object: i.e. where an area from the center is fixed and how to examine depth and distance. Namely, an area which has an obvious boundary in spatial configuration and spatial cognition should be selected, but not an area where its range is intentionally restricted or where it has its boundary described in an administrative district. By doing so, respondents would be provided with clear ranges in a spatial cognition study using a sketch map. Considering the two questions above, the Yonsei University campus located in Seoul (Figure 3) was selected as an example for this study.

The campus was chosen for the following reasons. First, Baik-Yang Street is located in the center of campus, which works as the center of spatial utilization. The connecting structure of space has a clear center, in which Baikyang street is connected to each building (Kim 1996). In sketch maps (44 maps in total) used in a study on the spatial cognition of Yonsei University campus, researched in December 2001, the campus also shows spatial configuration in which Baikyang Street clearly works as a center. Second, a boundary restricted the space of campus which is concerned with a question of a study range, and campus users were accurately recognizing the boundary of the campus. Figure 3 shows Baikyang Street and its boundary on campus.

Analysis on Spatial Configuration Utilizing Space Syntax Theory

To analyze the spatial configuration of the area, a 1/1500 map, drawn up in June 2002, was used. Buffer Zone was set to reduce the edge effect by extending the range to the areas 500 meters away from the
boundary to analyze the spatial properties of the campus in its totality. As the next step, axial lines were drawn according to the procedures explained in 'The Social Logic of Space' after total spaces including buffer zone are divided by convex spaces.

**A Survey on Spatial Cognition Using a Cognitive Map**

To examine and analyze spatial cognition for spatial users in the area, a cognitive map drawn by using sketch maps obtained from passers-by was used. The cognitive map was expected to, in principle, be drawn up by interviewees in person, and a structured method providing clues to interviewees was applied to the survey. The interviews were conducted at the library of Yonsei University located geographically in a central space where all the students from each department use. Survey interviewees were asked to draw up all parts of space which they cognize after they were told that the survey was designed to give assistance to people who visit Yonsei University for the first time. The main entrance to campus and the Senate Hall were marked in this survey on white papers (A4 size) to inform them of a reduced scale and a direction. In addition, an attempt was made to minimize the hesitation to draw a sketch by suggesting the order of drawing up the cognitive map.

The order was as follows. First interviewees were asked to draw up all paths by extending the range as starting from Baikyang street. Second, survey interviewees were asked to mark the buildings and write the names of the buildings if they knew them. Third, interviewees were asked to mark an arrow on buildings to identify the direction of the main entrance, which was designed to analyze interviewees' cognition of the main entrance. The cognitive map survey was conducted on December 2002 and eighty four copies were collected out of one hundred. The cognitive maps were used to analyze the properties of spatial cognition, the disposition of paths, and buildings, and the names of buildings. Then, the expressed frequency of

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*Figure 4:*
*The sample of the sketch maps on campus (index-43)*
buildings described was drawn. The main entrance was also distinguished from several other entrances. The sketch maps in figure 4 are the examples of cognitive maps surveyed.

**Analysis of the Distance**

The shortest distance from Baikyang Street to the main entrance of respective buildings was measured. The disposition of all the buildings and the number of all the entrances on the campus were investigated. Then, after determining which direction spatial passers cognize as a main entrance based on the arrow drawn on cognitive maps, the shortest distance by walking from Baikyang Street to the main entrance of each building was measured. A surveyed map of 1/1500 was used and the unit was measured in ‘mm’. The distance part of Table 1 is the data measured in the shortest distance.

**A Quantitative Analysis**

The expressed frequency of described buildings shown in the cognitive map, depth and distance from the center to the building and the data of space syntax AXMAN program (depth, integration, control, and connectivity) were compared and analyzed quantitatively. Computer programs, SPSS11 and Stat View, were used, and a regression analysis was conducted for reviewing independence of variables, homoscedasticity, and normality. In the regression analysis, depth, distance, integration were set as an independent variable, and spatial cognition was set as a dependent variable. A multi-regression analysis was based on a stepwise method, and multicollinearity was examined after identifying variance inflation factor, condition index, and variance proportions.

**Interrelation between Spatial Configuration and Spatial Cognition**

**The Spatial Configuration of the Campus**

This section analyzes the characteristics of spatial configuration by using space syntax theory. Figure 5 presents a result obtained by analyzing global integration of the campus. The integration shows the properties of spatial configuration in view of the whole logical connection considering not only the campus but also the surrounding areas, indicating permeability and integration in the whole ranges of space. The lines showing integration appear to be from red to strong blue (based on rainbow spectrum), and the bigger the Integration a space has, the stronger the red line showing Integration appears to be. In addition, lines displaying less different color between respective spaces indicate the ease of accessing from one space to another.

In Figure 5, the space which has the highest integration is Seong-San Avenue (east and west street in front of campus, 1.148), and the second highest is a crosswalk used to proceed from Shin-chon subway station to the campus. The influence of these Integrations is extended to Baikyang Street in the campus.

The spatial properties of the campus are as follows: An axial space having the highest Integration is Baikyang Street. Spaces that are physically located near Baikyang Street and are capable of being visibly cognized display the second highest Integration. Spaces expressed in a west-directed axial line from the Baikyang Street display less difference in color and show high connectivity. On the other hand, the eastern spaces having blue axial lines display very distinctive difference in color, and the connectivity of spaces is lowering conspicuously. This means that the western spaces have few depths and consist of spaces to ensure visibility. On the other hand, the eastern spaces have paths to be directly accessed despite short
distances, indicating that they have many depths compared to the western spaces. The dormitory and Yonsei Dairy Co., Ltd. located in the northern gate of the campus display as segregated being marked in strong blue. They have not only long distance but also many depths, which indicate low availability and accessibility.

Figure 5: Global integration of spaces around, the campus boundary

The space syntax AXMAN data in Table 1 shows what properties each building has in the total space in a quantitative way. The smaller the depth of space gets from Baikyang Street, the higher its Integration gets. The higher the local integration that considered up to depth 3 is, the higher the control value is. This shows that they are subject to spatial control by local information.
The Spatial Cognition of the Campus

This section analyzes spatial properties found in a cognitive map. The result of analyzing the properties of spatial configuration suggested in a total of eighty-four sketch maps is illustrated below. First, users did not remember the paths but they remembered the location of buildings exactly. The direction of buildings was also expressed exactly. These characteristics show that Baikyang Street is located in the center of the campus and is considered as a center by people who cognize and use spaces. Second, the influence of depth was shown in a cognitive map. For example, paths with a few depths were expressed exactly as visibility is ensured despite short distance. On the other hand, paths with many depths were expressed less frequently. Third, the influence of distance was shown in a cognitive map. Buildings with a longer distance had a less expressed frequency even though they had the same depth from the center.

The next step was to analyze expressed frequencies of buildings based on years when people used the campus. The expressed frequencies of the cognitive map shown in Table 1 are those of all the buildings shown in cognitive map. The expressed frequencies were classified into five categories, from first year users to fifth year users and above, according to how many years people had used the campus and analyzed. As far as the expressed frequency is concerned, the frequencies of the buildings expressed by second year users and above were bigger than those expressed by first year users. Space users, who had been using the campus for less than one year, cognized only the spaces near Baikyang Street, the center of the campus. The properties are a consequence of having been using respective spaces of the campus for more than one year. As it has been shown above, the properties of spatial cognition was analyzed using sketch maps and the interrelationship between all the expressed frequencies of buildings shown in a cognitive map, and the properties of spatial configuration was analyzed in a comparative method.

<table>
<thead>
<tr>
<th>Building</th>
<th>1 year</th>
<th>2 year</th>
<th>3 year</th>
<th>4 year</th>
<th>More than 5 years</th>
<th>Total</th>
<th>Total (%)</th>
<th>Distance (mm)</th>
<th>Space Syntax Data (AXMAN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Hall I</td>
<td>25</td>
<td>18</td>
<td>15</td>
<td>12</td>
<td>6</td>
<td>76</td>
<td>90%</td>
<td>45,447</td>
<td>Depth: 3, Global Integration: 0.3886618, Control: 0.1111111, Local Integration: 1.3750452</td>
</tr>
<tr>
<td>Engineering Research Center</td>
<td>24</td>
<td>16</td>
<td>15</td>
<td>12</td>
<td>6</td>
<td>73</td>
<td>87%</td>
<td>64,876</td>
<td>Depth: 3, Global Integration: 0.887021, Control: 0.25, Local Integration: 0.7640209</td>
</tr>
<tr>
<td>Gymnasium</td>
<td>15</td>
<td>11</td>
<td>10</td>
<td>8</td>
<td>5</td>
<td>49</td>
<td>58%</td>
<td>140,841</td>
<td>Depth: 3, Global Integration: 0.8892193, Control: 0.1111111, Local Integration: 1.3750452</td>
</tr>
<tr>
<td>Centennial Hall</td>
<td>22</td>
<td>15</td>
<td>15</td>
<td>11</td>
<td>6</td>
<td>69</td>
<td>82%</td>
<td>40,889</td>
<td>Depth: 3, Global Integration: 0.8896277, Control: 0.1, Local Integration: 1.4745191</td>
</tr>
<tr>
<td>Severance Hospital</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>26</td>
<td>31%</td>
<td>355,856</td>
<td>Depth: 6, Global Integration: 0.7366199, Control: 0.5, Local Integration: 0.2109273</td>
</tr>
<tr>
<td>Central Library</td>
<td>24</td>
<td>14</td>
<td>15</td>
<td>14</td>
<td>6</td>
<td>73</td>
<td>87%</td>
<td>61,412</td>
<td>Depth: 3, Global Integration: 0.8931867, Control: 0.1, Local Integration: 1.4745191</td>
</tr>
<tr>
<td>Student Center</td>
<td>25</td>
<td>13</td>
<td>15</td>
<td>13</td>
<td>6</td>
<td>72</td>
<td>86%</td>
<td>34,878</td>
<td>Depth: 3, Global Integration: 0.8931687, Control: 0.1, Local Integration: 1.4745191</td>
</tr>
<tr>
<td>Luce Chapel</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>21</td>
<td>25%</td>
<td>91,071</td>
<td>Depth: 5, Global Integration: 0.7434092, Control: 0.3333333, Local Integration: 0.5000312</td>
</tr>
<tr>
<td>Auditorium</td>
<td>20</td>
<td>12</td>
<td>12</td>
<td>9</td>
<td>6</td>
<td>59</td>
<td>70%</td>
<td>45,346</td>
<td>Depth: 3, Global Integration: 0.8924992, Control: 0.2, Local Integration: 0.8725624</td>
</tr>
<tr>
<td>Baikyang Hall</td>
<td>23</td>
<td>14</td>
<td>14</td>
<td>12</td>
<td>6</td>
<td>69</td>
<td>82%</td>
<td>29,926</td>
<td>Depth: 3, Global Integration: 0.8936491, Control: 0.25, Local Integration: 0.7640209</td>
</tr>
<tr>
<td>Yonsei Dairy Co. LTD</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2%</td>
<td>1,029,302</td>
<td>Depth: 12, Global Integration: 0.5305571, Control: 0.3333333, Local Integration: 0.5000312</td>
</tr>
<tr>
<td>Dormitory</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>15</td>
<td>18%</td>
<td>1,152,548</td>
<td>Depth: 12, Global Integration: 0.5219684, Control: 0.3333333, Local Integration: 0.5000312</td>
</tr>
<tr>
<td>Institute of Language</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>16</td>
<td>19%</td>
<td>704,293</td>
<td>Depth: 8, Global Integration: 0.7060657, Control: 0.3333333, Local Integration: 0.5000312</td>
</tr>
<tr>
<td>Research &amp; Education</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>10</td>
<td>10%</td>
<td>726,421</td>
<td>Depth: 9, Global Integration: 0.647384, Control: 0.3333333, Local Integration: 0.5000312</td>
</tr>
<tr>
<td>International House</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>14</td>
<td>17%</td>
<td>566,028</td>
<td>Depth: 8, Global Integration: 0.6851904, Control: 0.25, Local Integration: 0.7640209</td>
</tr>
<tr>
<td>Millennium Hall</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>12</td>
<td>14%</td>
<td>368,675</td>
<td>Depth: 7, Global Integration: 0.6959586, Control: 0.25, Local Integration: 0.7640209</td>
</tr>
<tr>
<td>College of Nursing</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>11</td>
<td>13%</td>
<td>350,799</td>
<td>Depth: 6, Global Integration: 0.7428784, Control: 0.2, Local Integration: 0.8725624</td>
</tr>
</tbody>
</table>

Table 1: Information in Sketch map and real environment (17 of total 39 samples)
Interrelationship between Spatial Configuration and Spatial Cognition

This section analyzes the interrelationship between spatial configuration and spatial cognition of the campus. Figure 6 is a model developed through a rainbow spectrum to analyze all the expressed frequencies shown in the cognitive map with axial lines as a result of space syntax analysis. As far as the total expressed frequencies shown in the cognitive map were concerned, there were ranges of buildings, from the buildings expressed seventy-six times to those expressed one time, which were classified into nineteen stages of different colors (4 multiplied by 19 stages). A Red color indicates the highest expressed frequency (based on rainbow spectrum). To compare with analytical results of the cognitive map in figure 6, figure 7 presents the result of axial lines by adjusting the range of global Integration (Axman Set Range) from the maximum within the campus (1.14) to the minimum (0.49).

Figure 6:
Global integration of spaces around, the campus boundary
These two figures show very similar color distribution in general. For example, Baikyang street, a central space expressed in red, color distribution of eastern and western spaces from Baikyang street and northern spaces (dormitory and Yonsei Milk Ltd.) segregated from the campus display similar color distribution. The color distribution shows that there is interrelationship between spatial properties analyzed by using space syntax and frequencies shown in a cognitive map. In summary, we have proved that Integration obtained after analyzing spatial configuration using space syntax has interrelationship with spatial cognition.

As shown in Figures 6 and 7, a very similar color distribution between configuration and spatial cognition was analyzed in a quantitative way. Table 2 presents the result of a regression analysis of interrelationship between spatial configuration and spatial cognition. The independent variable is Integration, and the dependent variable is cognitive map. There is a positive effect between the two. In addition, it is shown that Integration is highly correlated with a cognitive map. In conclusion, it is proved that global Integration obtained after analyzing spatial configuration using space syntax is interrelated with spatial cognition.

### Table 2:

<table>
<thead>
<tr>
<th>Regression coefficient of cognitive map and space syntax</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>0.802</td>
<td>0.643</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>R square</td>
<td></td>
<td>0.643</td>
<td></td>
</tr>
<tr>
<td>Global Integration - Spatial frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y = -98.574 + 181.8 X (Global Integration)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Effect of Depth and Distance in Spatial Cognition

**Comparative Analysis between Depth and Distance**

This section compares and analyzes the effect of depth and that of distance in spatial cognition according to spatial configuration. Table 3 shows the result of a regression analysis of ‘depth and spatial frequency’ and ‘distance and spatial frequency’. It was analyzed into putting depth and distance as independent variables and putting frequencies shown in cognition map as dependent variables. R square, a regression coefficient, is a numerical value to show interrelationship with spatial cognition prediction. The table 3 shows that depth has a power of spatial cognition prediction of 72% (R square: 0.722) and distance has a power of spatial cognition prediction of 53% (R square: 0.528). The figures indicate that both of the two elements are highly related with spatial cognition. It is especially worth noting that depth has a higher relationship than distance.

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R square</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>depth – spatial cognition</td>
<td>0.850</td>
<td>0.722</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>distance – spatial cognition</td>
<td>0.726</td>
<td>0.528</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Table 3: Regression coefficient of spatial configuration properties and cognition

- \( Y = 24.315 + 1831328.798 \times X(\text{distance}) \)
- \( Y = -9.821 + 234.715 \times X(\text{depth}) \)

**Configurational Elements Affecting Spatial Cognition**

There are significant findings of this study. Figure 8 shows elements affecting spatial cognition obtained through this study. It is shown that depth has the highest influence and global Integration acquired after analyzing spatial configuration by using space syntax has the second highest influence and distance, local Integration and spatial control value respectively affect spatial cognition in the order of their influences.

**Conclusion**

To investigate whether spatial cognition of human beings is based on spatial configuration by examining existence of the interrelationship between them, this thesis focused on the effects of both depth and distance through the use of detailed survey. This study demonstrated the interrelationship between spatial configuration and spatial cognition in a quantitative way. The investigation demonstrated that the effect of spatial arrangement on spatial perception and cognition is statistically significant. Both the frequency of occurrence of elements in sketch maps and global integration of syntactic properties were found to be highly associated with the actual spatial configuration.

High interrelationship was revealed between global integration of spatial configuration and spatial cognition indicated in the cognitive...
A regression analysis demonstrated the existence of a high correlation between spatial configuration and spatial cognition. It is also found a close relationship between frequencies of configurational elements in the cognitive map and the integration of spatial configuration through a regression analysis. The result indicates that integral characteristics of mutual association of spatial configuration have heavy influence on spatial cognition, and that there exists a reciprocally close relationship between spatial configuration inside the cognition of human beings and spatial configuration of reality. Also, the finding of this positive association between internalized representations of spatial configuration allowed for the theoretical and methodological progress in investigating the man-environment relation, providing empirical links between the cognition and behavior in the built environment.

Particularly, in this study, a comparative analysis of the influence of depth and that of distance on the cognition map showed that both are highly correlated with spatial cognition of users. However, depth gives more influence than distance in spatial cognition as indicated by a regression analysis of r-squared value at 0.722 and 0.528 respectively. The significance of this paper lies in the fact that the influence of depth and that of distance were compared and analyzed by surveying everyday users in real environment. The result advances Sadalla et al's research (1980) on the effect of change of direction on perception of distance, which conducted the experiment in a controlled environment. By comparing the effect of depth and distance directly in real world, this research provides concrete evidence that both distance and depth plays an important role in cognitive maps, and depth has more priority than distance on spatial behavior.

In conclusion, the influence of depth and distance was proved to be very important in forming relationships between human beings and a built environment. When human beings cognize a space in a real built environment, they cognize individual central spaces in their brain and then, extend the range of cognized central space of real spatial configuration as they learn more about the built environment. As the ranges of cognized spatial configuration get extended, spatial cognition is influenced more by depth than by distance.

This result may have more serious impact on the definition of accessibility in that it currently regards the most important factor as distance with time. Thus, most architectural and urban planning theories about accessibility are written in terms of distance without considering depth. In this context, we may need to re-instate the concept of accessibility not only for theory but for practice in this field.

References


