

## Evaluation of the vitality of Lahijan's institute for the intellectual development of children and young adults using space syntax

Fataneh Fakouri Moridani <sup>1</sup>, Hossein Safari\* <sup>2</sup>

<sup>1</sup> MSc student, Department of Architecture, Islamic Azad University, Lahijan Branch, Gilan, Iran.

<sup>2</sup> Assistant Professor, Department of Architecture, Islamic Azad University of Rasht Branch, Gilan, Iran.

\* Corresponding Author, Email: hossein.safari110@gmail.com

### ABSTRACT

Institute for the intellectual development of children and young adults has been established to focus on this group. In spite of its proximity to the city center, this institute has not been paid attention well by citizens. This research is intended to evaluate wayfinding and visual relationship in order to create sociability and vitality of the institute environment. To achieve this goal, a combination of quantitative and qualitative methods has been used. On the one hand, the effective foundations of research were gathered in library. On the other hand, space configuration has been analyzed using space syntax method which is a quantitative method and computer simulation and Depth map software was also used. In order to measure the status quo (present situation) and survey operations, observation was used in the gate, directional splits, and people following. The findings indicate that given that motor potential and access are based on the simulation to reach the convenient center, but gate observation showed that traffic and traffic levels of pedestrians were very low in this path. The evaluation of the dynamic and static behavior of humans within space showed that the trend reaching the institute spaces was inappropriate. Due to the high traffic of pedestrians around the space and the problem of their orientation because of motor obstacles and cutting its movement paths by various factors, and on the other hand, desirable visual inaccessibility to other spaces, changing movement path is proposed. The axial and visual analysis of the present and proposed position showed that changes can be made in the movement trend and the replacement of micro-spaces in the Institute space. Improving access and visual space can be effective in the vitality and social sustainability of the center space.

**Keywords:** *Institute for the intellectual development of children and young adults, vitality, Lahijan, social sustainability, space syntax*

### Introduction

Since the sustainable development initiative in 1987 (Dumreicher and Kolb, 2007) and generalized by the United Nations and the World Commission on the Environment (Brutland Commission), many scholars

believed that the development is as such that future generation needs must be considered (Davoudi and Fallah, 2013). A look at sustainable development is based on three areas of economic, environmental and

social (Dumreicher and Kolb, 2007). What is less considered while with more relation to the realm of architecture is its social image. The social relations of humans can be judged according to their age. The young population of Iran specifies the need for particular attention to this stratum (Afkhami and Zarouni, 2011: 15) which are effective for the sustainability of social relations. Research has shown that architectural space can influence on the behavior of the child (Noghrehkar et al., 2009: 42; Toufighianfar, 2012: 23). It thus becomes clear that neglecting children to advance goals will be problematic for social sustainability.

Institute for the intellectual development of children and young adults is one of the organizations and institutions that is established to pay special attention to this group. What is seen today at these centers is the neglect of this institution and the consequent neglect of the next generation. In spite of its proximity to the city's national garden and its proximity to the center of Lahijan, Lahijan's intellectual development institute faces a diminutive presence of citizens. Perhaps, inappropriate wayfinding and inappropriate visual communication may cause to not attend to this institute (Emo et al., 2012), because external and visual information and factors are effective on human decision making in the environment (Conroy, 2001). Evidence and research suggest that the shortcomings in wayfinding will be effective in the lack of socialization and vitality of the environment (Suzuki et al., 1998; Asselena et al., 2005).

As can be seen in contemporary times, a suitable living space can be effective in its sustainability. The suitability of a space can be considered as realization of adequacies. Factors such as the vitality and sociability of space can make a space convenient. The feasibility of these factors depends on the application of the type of architectural spaces and their relationship with space. Attention to vitality in architectural spaces has been placed on the vision and this encourages the presence of humans in space and emphasizing on their

vitality in the environment (Pakzad, 2009: 10). Due to the importance of morphology in architecture (Gospodini, 2001: 930), the role of wayfinding and accessibility and, on the other hand, visibility is considered as effective factors in social interactions. Considering an effective theory in architecture (Hillier et al., 1996, 1987), this study attempts to find an appropriate solution for the reconstruction of the institute for the intellectual development of children and young adults and the periphery, with emphasis on how to realize vitality in the institute space.

According to what has been mentioned, one of the factors contributing to the realization of social sustainability is to pay attention on children. This institute can be a good response to this problem. In Lahijan, there are very few spaces for the development of children, and space such as the intellectual center is not much paid attention. This neglect, on the one hand, is due to the lack of awareness of the citizens about the educational and training potentials of this institution, and on the other hand, which is also more relevant in this study, is the changes in the physical body of the space and its periphery, which has made in the last decade. This institute is located in the central area of Lahijan on the edge of the national garden; this space was established in the past a good relation with the citizens, but in the last decade, based on the changes in access and adding the uses, motor-visual relation of this space with citizens did not exist. Thus, this study intends to analyze the present situation of space so that a suitable solution can be suggested in order to establish social interactions and creating vitality in this institute in the direction of realizing social sustainability.

### **Background research**

In recent decades, the theory of space syntax has been widely welcomed by the world's researchers in urban and architectural studies (Safari, 2017; Karimi, 2012). On the one hand, this theory has been considered in how wayfinding can be done in the urban space (Edwards and Griffin, 2013; Chebat et al., 2005;

Hölscher et al., 2005; Ishikawa and Montello, 2006; Mallot and Basten, 2009; Vilar et al. 2013; Wiener et al., 2009) and the effect of landmarks on wayfinding (Caduff and Timpf, 2008; Zakzanis et al., 2009), and on the other hand, in architectural space (Lam et al., 2003). In Iran, more research has been carried out in urban field (Abbaszadegan, 1381; Abbaszadegan et al., 2012; Sarbandi Farahani et al., 1393; Soltanifard et al., 1393). Although few studies have been done using space syntax techniques on architectural spaces (Tahersima et al., 1394; Hamadani Golshan, 1394), different analytical capabilities in this method have not been used. In this method, one can find scientific tools using a quantitative simulation that provide prediction and suggestion of improving space from the point of view of social behavior. After suggesting theory, the method of analysis by Camillo Sitte (Sitte, 1945; Collins et al., 2006) and Patrick Geddes (Geddes and Library, 2008; Welter and Whyte, 2003) has been proposed in the second half of the twentieth century, the method of analysis was popular in the space design and research. Researchers and designers sought to use quantitative methods for thinking about space. There was a wide range of approaches to such methods, such as Conzen (Conzen, 2004) and Kevin Lynch, who worked analytic designers based on how to perceive the basic elements of space (path, edge, district, node and landmark) (Lynch, 1981). Christopher Alexander was the one who analyzed urban network (Alexander, 1968). In this way, a systematic approach and theory were formed about designing space and urban design. In 1960, a systematic and structured method was discussed, followed by the 1970 theories such as Rittel (Rittel, 1972). Shortly afterwards, Mike Batty discussed mathematics and fractal geometry in relation to a kind of space analysis (Batty and Longley, 1994). Most of the analytical methods proposed have strengths and weaknesses, for example, these methods are a part of the complex process of research and design, and the findings do not provide reliable evaluation methodology. Most basic principles of the theory of public and urban space require the physical

body location whose performance, social relations and behavioral perspective of humans must also be considered (Hillier, 2008; Penn, 2008). But this weakness exists in the mentioned theories and this is a scientific gap between the methods of analyzing space and the effective design is based on the fact that the social behavior of people is ignored. In addition, in the methods of analysis and design stage, two distinct processes are considered, and there is no specific method for conducting the research and design process simultaneously (Karimi, 2012). The proposed methods are rarely interdisciplinary, and are not related to other disciplines. For example, for analytical methods in the city, traffic, engineering, or a range of different local or global scales, districts, regions, neighborhoods, or public scale of space are not neglected (Weber and Landis, 2012). So the methods mentioned above have some shortcomings from social point of view. Taking analytical methods into account, all the components are effective and distinctly different (Blakey, 1850). However, in space syntax method, analysis is not the only consideration in the process, and in particular its usefulness is determined when it should be noted that research, design and evaluation process will be simultaneously taken into account with the consideration of the local and global scale (Karimi, 2012). To use this method, some of the variables used in this research must be introduced, as will be explained briefly below.

### **Methodology**

In this study, the method is applied in terms of objective and descriptive-evaluative in terms of approach. At first, qualitative method and library studies have been used. Following, the space syntax method has been used. The space syntax method is initially a quantitative research in the form of computer simulation with Depth Map software. In the research work, presences in space and local observations have been used, which are described separately.

### **The variables used in the space syntax method in this study**

The variables used in this research include connectivity and integration. The spatial connectivity refers to the number of spaces and in urban space to the number of streets connected to a specified space or a certain street (Karimi, 2012). Integration is an important concept in space syntax theory. Calculating the degree of integration of each space is the reciprocal of the average number of spatial depth of space that one person traverses from origin to destination, in other words, it is the average number of changing directions that can be reached from origin to all destinations in an architectural space or urban space. Integration in the space syntax method has a relation-movement concept and not a concept based on the degree of distance (Abbaszadegan, 2012: 60).

### **Methodology of conducting simulation in research**

In this study, using Depth Map software, the urban spaces related to the site and the interior space of the institute for the intellectual development of children and young adults were analyzed by simulation method and expressed graphically and by numerical taxonomy. Space Syntax is a method that deals with visual and behavioral analysis of urban and architectural spaces (Hillier, 2003).

Axial analysis is used to analyze accessibility and predict human behavior in terms of movement in the architectural and urban space. In this method, using Depth Map software, the quantity and how people move in the spaces are evaluated as a linear graph, and, of course, the numerical value is defined for each access, which is characterized by the ability to compare methods for sensing motion differences and similarities in movement paths (Penn et al., 2003). It should be noted that this analysis should be compared with observational methods to give a more accurate analysis of human behavior (Safari, 2016: 85). Convex space analysis and human visual behavior in space that analyzes other types of social interactions.

### **Observational research of static and dynamic activity of visitors in real space**

As previously stated, the simulation method of space syntax will not be credible and observational research associated with this method must be used to validate (Safari, 2016: 85). Observational studies in this study are based on local information and on-site observations concerning the behavior of humans that include static and dynamic activities (Fewings, 2001). Observations include gate, people following, and the directional splits. This kind of research can observe exactly and quantitatively evaluate the relation of visitors to the real space (Giddings et al., 2011).

### **Gate observation method:**

This method is used to record observations of human movements. Gate technique is a space observation technique in real space that provides information on the amount of traffic and the volume of moving human beings. This method must be presented graphically and statistically in separate modes. The number of space spots must be selected due to their use and function (Major, 1997-98; Safari, 2016: 86).

### **People following:**

This is a technique that takes into account the dynamical movement of humans. It is important for three reasons: the recognition of the human movement setting in the studied space, the relation between the other paths and the study area, and obtaining the average distance people walk. To do this, plan of the study area is required. Dynamic movement of human beings is considered from the point of entry into the study area to the stage of departure or reaching destination. The movement trace of those you followed them must be specified in the plan. The important thing is to be careful, when one is chased and his movement trace is specified in the plan, the person does not understand, because in the case of a person's awareness, it is possible to feel uncomfortable and influence on the natural behavior. To do this, you must try to stay away from them. In order for your

observation to be generalized, it is best to select about 50 people for a single stage, which it must be noted that selecting people was made in terms of gender, age and other identifiable characteristics. The observational approach to human movement trace is a useful way of understanding the type of human movement and understanding how to use space in terms of movement. If this method is integrated with the method of human division direction into motor intersections, a better understanding of the dynamical behavior of human in space is achieved (Major, 1997-98 Safari, 2016: 87).

**Method for the observation of directional splits:**

This method is useful and suitable for recording human motion observations in decisions that are made at each intersection. It is used for both urban research fields and within architectural spaces. This method is used to record motion at intersections, in a way that determines flow at intersections (as numerical and percentage). In the direction of human division at motor intersection, a plan of the intersection must be provided to ensure that all possible motor potentials exist. It was necessary to

select people randomly and make sure that which route they select. You must carefully list the number of people who chose each path. The total number of people to be observed must be 100 (Major, 1997-98 Safari, 2016: 87).

**Theoretical fundamentals. Vitality: An element of the social sustainability realization factors.** The type of influencing and efficacy that results from the relationship among humans can be called social interaction (Behzadfar and Tahmasbi, 2013: 21; Daneshpour and Charkhchian, 2007: 22). Man is a social being and this makes him connect with other people and the formation of society. Public spaces are formed in responding to this inherent human need. Social interactions are the primary form of human communities. One of the important issues of the present age is the attention to social sustainability (Gheibi and Pourzaman, 2016). Different factors can influence social sustainability and vitality, which in this study, the foundations and theory are considered based on some of these elements (Figure 1).

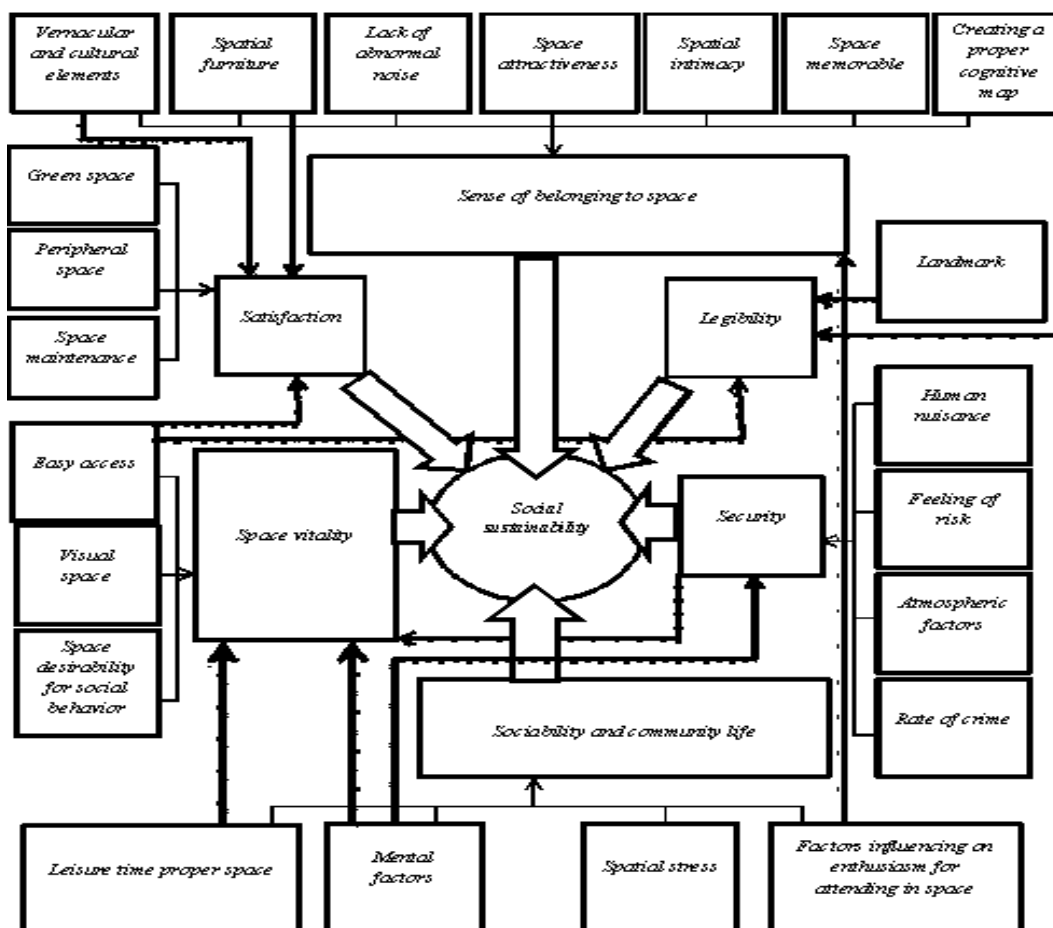


Figure 1. Conceptual framework of research, factors influencing social sustainability (Source: Authors, 2018)

Various definitions have been expressed about vitality (liveability and liveliness) from the sixties to the present (Habibi, 2000). In Dehkhoda Persian dictionary, the term vitality means being joyful. The desirability of the physical body and the creation of diverse activities in a place where the security and mental comfort and the right to make more choices for the users of space and the realization of social and cultural interactions are possible. Vitality is a concept dominant in the public space, which can be defined in two levels: micro and macro. The vitality in the micro level is divided into two parts of physical and non-physical parts, and at macro level it includes spatial, cultural, economic and social elements (Pakzad, 2006), which, on micro scale and in the physical part, its realization in the architectural space can be socially considered.

As it has been mentioned previously, vitality has been suggested in the urban landscape by Jane Jacobs

and Kevin Lynch. Jacobs found the conditions for creating vitality in dominant short buildings, the combination of buildings with age and different conditions, high human density of all ages and spatial functions more than two, but Lynch, in the book a theory of good city form, considers factors of meaning, proportionality, easy accessibility, space monitoring, space efficiency and the observance of spatial justice as an effective feature on vitality. From Lynch's views, it is evident that biological and ecological factors are effective on vitality.

Spatial vitality can be considered from the economic, environmental, social, and cultural aspects (Landrys, 2000), but this study emphasizes its social aspect. From social point of view, vitality is considered space liveability in terms of social interactions. Namely, social cohesion and dynamic relations exist among various layers of society and a kind of coordinated relationship between different classes of

people (Landrys, 2000). Different meanings have been expressed about vitality, but their common feature is to create a kind of social interaction and the dynamism of human beings to bring together, the presence of a diverse range of human beings, a space for the sake of hesitation, meeting and the ability to entertain in space (Jacobs, 1961; Lynch, 1981; Lange, 2004).

Lange (1987) considers human behavior in the general environment dependent on the nature of their behavior in the microspaces, thus expressing emphasis on the impact of architecture space and behavior on the public and urban space. In the following, suitability of space in these occasions depends on that how humans behave in proper light, convenient motor and sitting space and create a place for social relations between humans, which may be the emphasis on Jacobs and Appleyard (1987) which consider vitality in creating the possibility of a comfortable life (Pakzad, 2006). On the other hand, vitality can create identity, the existence of social life, happiness, and the advancement of society and individuals and ecological sustainability (Fry, 2002). *The interpretation and explanation of the formation of social life and the development of individuals may be sought in the theory of Henry Lennard (1997). He considers vitality in the creation of an atmosphere of visual space and, of course, audiovisual space, and an appropriate context for informal social interactions of people, and in particular the emphasis on the sociability opportunity of children and adolescents and young people (Fry, 2002), which emphasizes the relation of institute for the intellectual development of children and young adults within the public arena and urban space. According to what has been stated, in order to analyze the social sustainability of the center space, which is considered as space vitality, the physical body of space must be considered from the aspects of access, visual space (Jacobs, 2009; Pakzad, 2006) and desirability of space in social terms.*

### **Institute for the Intellectual Development of Children and Young Adults**

Due to the limited resources and reports on the institute, this section has been prepared from Wikipedia sources and the book "a starting point and valuable base for all activities" written by Leili Amirarjmand in the Quarterly. The first year, 3th and 4th (winter 1975) and Institute for the Intellectual Development of Children and Young Adults: Persian to English. Tehran: Institute for the Intellectual Development of Children and Young Adults, 1973; 3) and Institute for the Intellectual Development of Children and Young Adults. Institute at a glance. Tehran: Institute for the Intellectual Development of Children and Young Adults. 2001-2005; 4) and "Annual Reports of Institute for the Intellectual Development of Children and Young Adults". Tehran: Institute for the Intellectual Development of Children and Young Adults, 1969-1989; and websites: "Kanoon Parvaresh Fekri, IIDCYA" and <http://www.Kanoonparvaresh.com>.

Institute for the Intellectual Development of Children and Young Adults is a nonprofit organization. It was originally designed to give children a specialist look and pay more attention to books and achievements for children and adolescents. The organization began its work in January 1965 under the excellent chairmanship of Farah Pahlavi and the management of Amirarjmand. It is evident that the presidency was merely a ceremonial aspect, and it did not form a government-oriented corps, and as it was stated, it was intended to give special attention to children and adolescents.

The institute, as seen, is one of the most popular publishers especially for children and adolescents. Of course, his task is not limited to this, and his other works are to produce films and other cultural achievements for children and adolescents. After the Islamic Revolution (1978), it continued to function as a state-owned educational company. Its activities are not limited to Iran, but it can also have extensive cooperation with other international organizations. All

this is done in the center under the supervision of the board of directors and managing director elected by the general assembly. The Assembly convenes every four years and its members include the Minister of Education, the Ministry of Science, Technology and Research, Economics and Finance, as well as the head of the Voice and Vision Organization of Iran.

**Findings**

**Spatial syntax analysis, Accessibility of Institute for the Intellectual Development of Children and Young Adults relation to the city.**

Development of Children and Young Adults relation to the city in this section, regarding the results of observing and comparing it with simulation, space syntax method will be considered. In simulation of the axial map, we must consider at least 3 km to the study area (Jacobs, 1993; Syed Mahdzar, 2013). In this study, almost the whole city of Lahijan was located with emphasize on the center area (Figure. 2).



Figure 2: Analysis of the site's access to the Lahijan city using space syntax

**Findings of the Gate Observation Method in the Institute Area and Compare it With Simulation Analysis**

The calculation of the density of pedestrian in the range of the institute, in two weekend and weekday intervals was considered in isolation and in total (Table

1) and then the density of human traffic was compared with the simulation of the range.



Figure 3: gate location for detecting traffic density of pedestrians in the range of study area



Figure 4: Global integration analysis (HH) from the institute area

Counting at the mentioned gates (Figure 3) has taken place in the area of the intellectual development



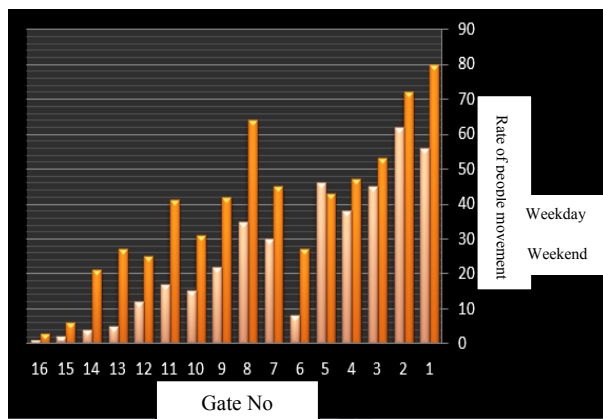
institute between the weekday and the weekend. The traffic count of people per gate was measured at 3 minutes in time interval 4-6 in the evening. In addition, based on strategic study around the institute 16 gates were considered for this phase of the study. These gates are selected due to the accuracy of the area covered by the study. Based on the average number of people that were calculated, the most traffic was at Gate 1 and 2 located in Imam Khomeini Street, which leads to the Shohada square. The connection to the main square of the city and the location of commercial, administrative and service centers in this direction may be due to the high traffic volume. Gates 14, 15 and 16 are located on paths that are located as a subway and on the edge of the national garden. Gate 14, due to the location of administrative and service centers such as the city council has more traffic (Figure 5); but Gates 15 and 16, despite being in the same direction and ending with the intellectual development institute for children and adolescents, has the lowest traffic in relation to the total gate considered in this study, which

indicates the weakness of this access in sociability and accessibility.

The highest rate of pedestrians was at the gates 1 and 2, located on the main street of the city (68 and 67, respectively), and the lowest rate of pedestrians in the gates 15 and 16 (4 and 2 respectively) (Table 1). According to the observations, the path leading to the intellectual institute due to the lack of visual space and the use of space as a parking lot, despite presence in the neighbourhood of the National Garden and the proximity to the city centre has less traffic and this indicates lack of attention of the visitors to the institute that is seen as a separated and unrelated space. This suggests that only families that are familiar with the site close to this area to fill their children's leisure time, and do not any motivation. It must be noted that a native village house was rebuilt next to the institute which had a significant impact on being the institute out of sight. The village house did not welcome by the visitors and only had an impact on the creation of a cozy corner that not only did not have a positive effect, but also increased the amount of crime in this area.



Figure 5: how to access to the Lahijan’s institute for the intellectual development of children and young adults



**Figure 6: Comparison of traffic level of humans in the surrounding areas of the intellectual development institute between the weekday and the weekend**

Based on the simulation data and the axial analysis (Figures 2 and 4) and (Table 1), the northern side of the national garden's access to the intellectual development institute has a good integration (0.96) as compared to the other accesses. These reports indicate

that this route has necessary potential for proper access to the site, but, according to observations, factors such as considering the route for riding access would disappoint people from this route.

**Table 1: Comparison gate observation method and accessibility position from simulation point of view using space syntax method**

Gate No.	Traffic level	Traffic level	Integration	Integration	Integration	Connectivity
	Weekend	Weekday	HH (RN)	HH (R2)	HH (R3)	
1	56	80	1.08	3.88	2.70	10
2	62	72	1.08	3.88	2.70	10
3	45	53	0.98	3.88	2.18	5
4	38	47	1.08	3.88	2.70	10
5	46	43	1.08	3.88	2.70	10
6	8	27	1.08	3.88	2.70	10
7	30	45	0.97	2.48	2.02	4
8	35	64	0.98	2.81	2.18	5
9	22	42	0.98	2.81	2.18	5
10	15	31	0.98	2.81	2.18	5
11	17	41	0.88	1.38	1.40	2
12	12	25	0.98	2.81	2.18	5
13	5	27	0.88	1.48	1.49	2
14	4	21	0.88	1.38	1.38	2
15	2	6	0.86	1.06	1.04	2
16	1	3	0.96	1.82	1.75	2

**Findings of the method of observing the people following in the interior of the intellectual development institute**

In this stage of the research, the behavior of the visitors was observed from the entrance to their destination. The field of walking was taken into consideration in order to determine the effect of their movement trace

on the map (Fig. 7). In order to make an impartial observation, individuals were randomly selected at different ages (36 children and 24 adults) and gender (26 men and 34 women) to identify the human's dynamic behavior in the environment. It must be noted that adult persons include employees and children's parents.

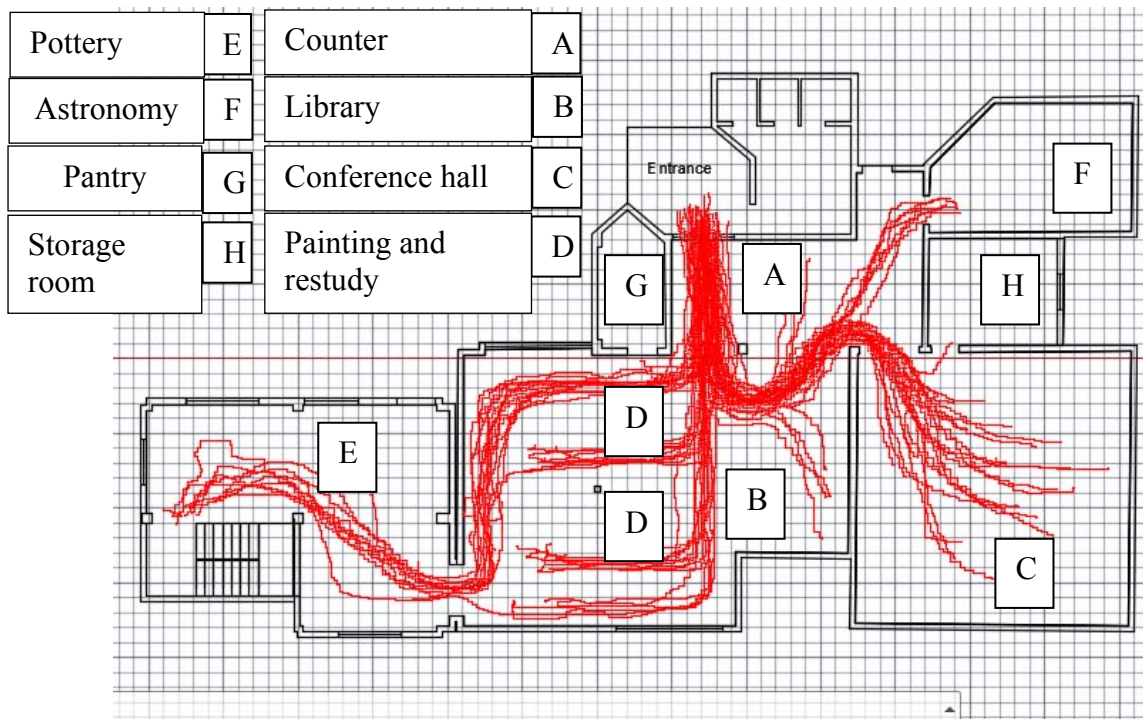


Figure 7: Simulation of pedestrian movement in the interior of the children's intellectual development institute

The observations showed that the most traffic is in the front area of the counter (area A). Visitors, based on the type of space syntax to reach the space of the Conference hall and the astronomy (C and F), must have difficulty accessing the spaces from the front of the counter, and this will influence the proper routing. Perhaps since the entrance filter of the counter is correct, but this access is not optimal in terms of accessibility and space delightful.

**Directional Splits findings in the spaces of dividing interiors**

This method is intended to record separately (accurate recording of the number and percentage of individuals' orientation) in their movement in division spaces. Possible destinations are considered from division space and then the observation is done carefully. Division spaces in front of the counter and connecting the spaces were observed (Figure 8) (Table 2).

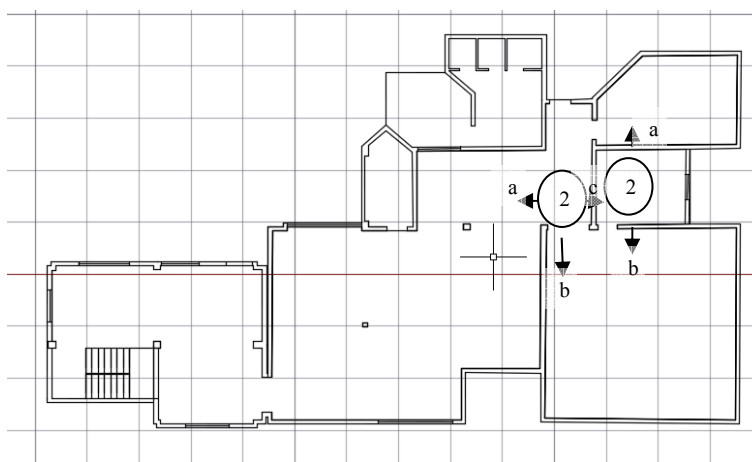


Figure 8: Observation position for identify visitor's orientation

**Table 2: Total traffic density of visitors in division space**

Position	Traffic density in step 1			Traffic density in step 2		
	a	b	c	A	b	C
1	۲	۳	۵	۴	۱۱	۲۱
2	۳	۷	-	۸	۱۸	-

Evidence suggests that a greater percentage of people in the institute select C direction after the previewer (position 1). This indicates that the counter is situated in the traffic area. In position 2, there is also the most traffic to the communities' space, which may also indicate that after the entry, there is a need for a division space without movement problem such as a counter to the gathering hall (Table 2).

**Analysis of Simulating Interior Space of the Institute by Space Syntax Method**

As stated previously, space syntax theory is based on the consideration of social interactions in motor-visual terms of view. The results of simulation using space syntax method, which depict how the spatial situation is from a morphological point of view, express factors relating to the social logic of space (Hillier and Hanson, 1984). In this method, the simulation is determined of how humans move in space and how space is accessed (Hillier et al., 1987). Considering the fact that space syntax is a method for measuring the position of space, this section focuses on the axial and visual analysis of institute space.

**Table 3: Measuring the position of institute space based on axial map and VGA**

		Name of space							
		Counter	Library	Confrence of hall	Painting and restudy	Pottery	Astronomy	Pantry	Storage room
<b>Axial space</b>	Integration	<b>11.78</b>	<b>5.89</b>	<b>4.42</b>	<b>11.79</b>	<b>1.61</b>	<b>11.79</b>	<b>1.52</b>	<b>1.41</b>
	Connectivity	<b>15</b>	<b>14</b>	<b>11</b>	<b>14</b>	<b>1</b>	<b>15</b>	<b>1</b>	<b>1</b>
<b>VGA</b>	Integration	<b>13.52</b>	<b>13.66</b>	<b>9.62</b>	<b>12.98</b>	<b>4.43</b>	<b>7.48</b>	<b>5.51</b>	<b>5.21</b>
	Connectivity	<b>1291</b>	<b>1434</b>	<b>1034</b>	<b>1278</b>	<b>250</b>	<b>353</b>	<b>494</b>	<b>193</b>
	Area of visibility	<b>109.85</b>	<b>132.50</b>	<b>93.35</b>	<b>119.97</b>	<b>23.70</b>	<b>31.84</b>	<b>37.95</b>	<b>20.67</b>

Based on the axial analysis, it was found that the greatest integration was obtained in the counter space, restudy space painting and astronomy (11.79). With regard to the counter space, if it becomes a division space, this integration limit is appropriate because it provides easier access to other spaces. But in terms of study space and astronomy, this limit of integration and the degree of accessibility are not required (Figure 7).

followed by counter, study and painting (13.52 and 12.98 respectively). This analysis also emphasizes upon changing library to the counter use. On the other hand, visual connectivity and visual area of the library have also the highest rate (1434 and 132.5, respectively) (Figure 9) (Table 3).

Visual analysis showed that the most visual integration was found in the library space (13.66),

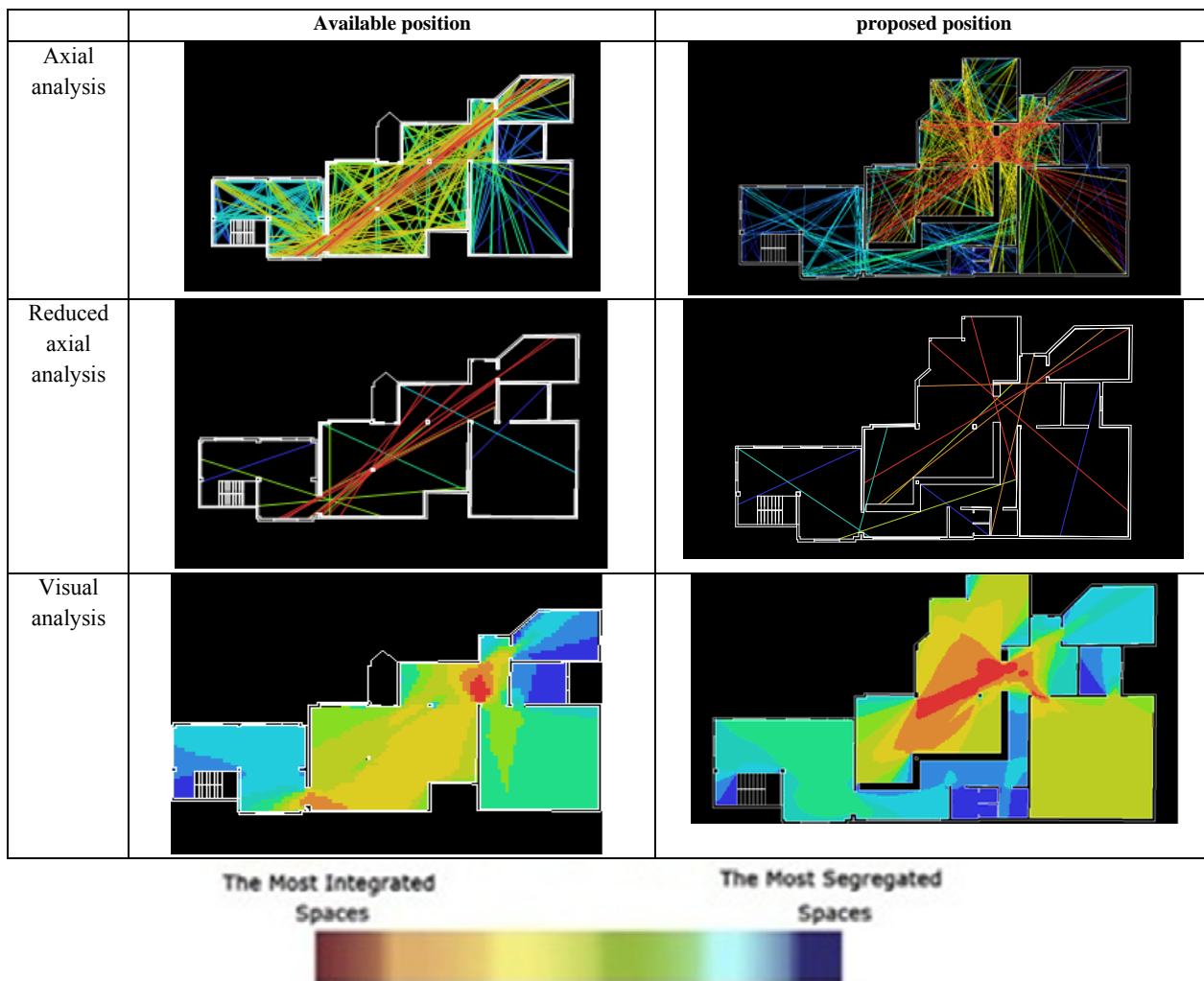


Figure 9: analysis of axial and visual simulation from available and proposed position

Studies point to the importance of accessibility sustainability in terms of motor and visual feature to create vitality as a component of space social sustainability (Allen, 1999; Golledge, 1999; Syed Mahdzar, 2013; 2008; Karimi, 2012). Accordingly, in this research, a proposed position is provided to improve the motor-visual relations of visitors for the realization of social sustainability, in which attention to the proper relationship between spaces that can contribute to social sustainability can be assisted.

**Conclusion.**

As stated, one of the major issues that researchers are addressing today is the realization of social sustainability in society. Creating a platform for social interactions and a sense of vitality in citizens is one of

the factors that can be effective in this regard. All citizens, especially children and young adults- the future of society is for them- must be regarded in the establishment of effective factors on social sustainability.

The institute of the intellectual development of children and adolescents in Lahijan has been neglected in the last decade and is not well received by the citizens. On the other hand, in this study, we tried to analyze the physical condition of space and the type of existing social interactions of space, in order to provide solutions for creating a sense of vitality in space.

The findings indicate that, given the proximity of the intellectual development institute to the city center and the connection to high-integration streets, gate observations showed that pedestrian traffic is very

low from its proximity. The main reasons for this reluctance to the presence of a walking man on this route are the following: 1) creating a riding ring in the vicinity of the institute 2) building a rural home in the visual center of the institute, so that the space of the institute is out of sight 3) The rural home has created a cozy corner that has reduced space security.

In addition to changes in the outer spaces of the institute, the lack of optimal improvement within the institute complex also influences the weakness of vitality in this space. Behavioral observations of humans within the institute (human movement trace and directional splits) have shown that the type of spatial syntax and reconstruction performed have not been consistent with the optimal social behavior of the pedestrian in space. Therefore, the motor and visual potential of the human condition in space has been analyzed and suggestions have been made to improve motor and visual behavior that provide the basis for creating optimal social interactions. This could be beneficial to spatial vitality and, consequently, social sustainability.

This research specifies for architects and urban planners that vitality is an effective factor in social sustainability, which can be analyzed and measured properly by simulation using space syntax method. On-site observations from the environment are effective in understanding human behavior in the environment and will affect the decision to improve space.

## References

Abbaszadegan, M. (2002). Urban Design: Space Syntax Method in City Design Process with a Look at Yazd City, *Urban Management*, 3 (1), 64-75.

Abbaszadegan, M. & Azari, A. (2012). Measurement of effective measures on the creation of pedestrian lines using the GIS and the space syntax, architecture and urbanization of Iran, 4 (1), 55-68.

Abbaszadegan, M. Mokhtarzadeh, S. & Bidram, R. (2012). Analysis of the Relationship between Spatial Structure and Development of Urban Neighborhoods by Space Syntax (Case Study: Mashhad City). *Urban and Regional Studies and Research*. 4 (2), 43-62.

Afkhami Aghda, R. & Zarouni, M. S. (2011). Investigating the elements of the story in the collection secrets of the world and their teaching for children, critique of contemporary Arabic literature, 9 (2), 1-32.

Alexander, C. (1968). *Notes on the Synthesis*. Cambridge, MA: Harvard University Press.

Allen, G. (1999). *Spatial Abilities, Cognitive map, and Wayfinding: Based for Individual Differences in Spatial Cognition and Behavior*. Baltimore, MD: The Johns Hopkins University press.

Asselena, M. V., Kesselsa, R. P. C., Kappelleb, L. J., Neggessa, S. F. W., Frijnsb, C. J. M. & Postmaa, A. (2005). Neural Correlates of Human Wayfinding in Stroke Patients. *Brain research*, 1067, 229 – 238.

Batty, M. & Longley, P. (1994). *Fractal Cities: A Geometry of Form and Function*, 1st edn. New York: Academic Press.

Behzadfar, M. & Tahmasbi, A. (2013). Identification and Evaluation of Effective Components on Social Interactions, *Bagh-e Nazar*, 10 (25), 17-28.

Blakey, R. (1850). *History of the Philosophy of Mind*. London: Longman, Brown, Green and Longmans.

Caduff, D. & Timpf, S. (2008). On the assessment of land marks alliance for human navigation, *Cogn, Process*, 9, 249–267.

Chebat, J. C., Gelinas-Chebat, C. & Therrien, K. (2005). Lostina mall, the effects of gender, familiarity with the shopping mall and the shopping values on shoppers' wayfinding processes. *J. Bus. Res*, 58, 1590–1598.

- Collins, C. C., Collins, G. R. & Sitte, C. (2006). *Camillo Sitte: The Birth of Modern City Planning: With a Translation of the 1889 Austrian Edition of His City Planning According to Artistic Principles*. New York: Dover Publications.
- Conroy, R. (2001). *Spatial Navigation in Immersive Virtual Environments*. Faculty of Built Environment. University of London, London, 249.
- Conzen, M. R. G. & Conzen, M. P. (2004). *Thinking about Urban Form: Papers on Urban Morphology*. Oxford, New York: Peter Lang.
- Daneshpour, S. A. & Charkhchian, M. (2007). Public spaces and factors affecting collective life, *Bagh-e-Nazar*, 4 (7), 19-28.
- Dumreicher, H. & Kolb, B. (2007). Place as a social space. Filed of encounter relating to the local sustainability process. *Journal of environmental management*.
- Edwards, D. & Griffin, T. (2013). Understanding tourists' spatial behaviour: GPS tracking as an aid to sustainable destination management. *J. Sustain. Tour. Manag*, 1–16.
- Emo, B., Hölscher, C., Wiener, J. M. & Dalton, R. C. (2012). Wayfinding and Spatial Configuration: Evidence from Street Corners. Paper Presented at the Proceedings of the 8th Space Syntax Symposium, Pontificia Universidad.
- Fewings, R. (2001). Wayfinding and Airport Terminal Design. *Journal of Navigation*, 54 (2).
- Fry, H. (2002). *Building a more sustainable urban form*. Tehran: University of Tehran.
- Geddes, P. (2008). *Civics: As Applied Sociology*. Teddington: Echo.
- Gheibi, D. & Pourzman, M. (2016), Investigating the Role of Space and Activities in the University Space to Create Social Interactions between Students (Case Study: Payam-e Noor University, Shiraz), International Conference on Architectural Engineering and Urban Development.
- Giddings, B., Charlton, J. & Horne, M. (2011). Public Squares in European City Centres. *URBAN DESIGN International*, 16(3), 202–212.
- Golledge, R. (1999). *Human Cognitive Maps and Wayfinding*. Baltimore: Johns Hopkins University Press.
- Gospodini, A. (2001). Urban design, urban space morphology, urban tourism: an emerging new paradigm concerning their relationship. *European Planning Studies* 9(7), 925-934.
- Habibi, S. M. (2000). Civil Society and Urban Life. *Fine Arts* 7(12), 21-33.
- Hamadani Golshan, H. (2014). Rethinking the Space Syntax Theory, An Approach in Architecture and Urban Design; Case Study: Borujerdi Houses, Kashan, *Fine Arts Journal*, 20 (2), 85-92.
- Hillier, B. (1996). *Space Is the Machine: A Configurational Theory of Architecture*. Cambridge, MA: Cambridge University Press.
- Hillier, B. & Hanson, J. (1984). *The Social Logic of Space*, Reprint. Cambridge, UK: Cambridge University Press.
- Hillier, B. (2003). The Architectures of Seeing and Going: or, Are Cities Shaped by Bodies or Minds? and Is There a Syntax of Spatial Cognition? Paper Presented at the 4th International Space Syntax Symposium, London.
- Hillier, B. (2008). Space and Spatiality: What the Built Environment Needs from Social Theory. *Building Research & Information*, 36(3), 36216–36230.
- Hölscher, C., Meilinger, T., Vrachliotis, G., Brösamle, M. & Knauff, M. (2005). Finding the WayInside: Linking Architectural Design Analysis and Cognitive Processes. 1–23.
- Ishikawa, T. & Montello, D. R. (2006). Spatial knowledge acquisition from direct experience in the environment: individual differences in the development of metric knowledge and the

- integration of separately learned places, *Cogn. Psychol*, 52(2), 93–129.
- Jacobs, A. & Appleyard, D. (1987). Towards an urban design manifesto: A prologue. *Journal of American Planning Association*, 53, 112-120.
- Jacobs, A. B. (1993). *Great Streets*. Cambridge, Massachusetts: MIT Press.
- Jacobs, L.R. (2009). Building Reliable Theories of the Presidency. *Presidential Studies Quarterly*, 39(4), 771-780.
- Karimi, K. (2012). A Configurational Approach to Analytical Urban Design: Space Syntax Methodology. *Urban Design International*, 17(4), 297-318.
- Lam, W. H. K., Tam, M. L., Wong, S. C. & Wirasinghe, S. C. (2003). Way finding in the passenger terminal of Hong Kong International Airport, *J. Air Transp, Manag*, 9 (2), 73–81.
- Landry, C. (2000). *Urban Vitality: A New Source of Urban Competitiveness*, Prince CL aus Fund.
- Lynch, K. (1981). *A Theory of Good City Form*. MIT Press. Translated by Seyed Hossein Bahreini, Tehran. Tehran University Press.
- Major, M. D. (1997-98). *MSc Built Environment: Advanced Architectural studies*. London: The Bartlett School of Graduate Studies, University College London.
- Mallot, H.A. & Basten, K. (2009). Embodied spatial cognition: biological and artificial systems. *Image Vision. Comput*, 27(11), 1658–1670.
- Noghrehkar, A., Mozaffar, F., Saleh, B. & Shafaei, M. (2009). Designing a kindergarten space based on the relationship between creativity and architectural ideas, *educational innovation*, 8 (4), 39-59.
- Pakzad, J. & Saki, A. (2006). The Aesthetic Experience of the Environment, *The Journal of Fine Arts*, 19 (3), 5-14.
- Penn, A. (2003). Space Syntax and Spatial Cognition: Or, Why the Axial Line? *Environment and Behavior*, 35, 30-65.
- Penn, A. (2008). *Architectural Research. Advanced Research Methods in the Built Environment and Behavior*. Oxford: Wiley-Blackwell.
- Rittel, H. (1972). Systems Analysis of the 'First and Second Generations'. *Bedriftsokomen*, 8, 390–396.
- Safari, H. (2016) *regular geometry towards effective visitors wayfinding: a case study Kulalampur city center*, PHD thesis, UTM.
- Safari, H. & Fakouri Moridani F. (2017). Syntactical Analysis of the Accessibility and Sociability of a Square in the Kuala Lumpur City Center, *Frontiers of Architectural Research*, 6(4), 456-468.
- Sarbandi Farahani, M., Behzadfar M., Abbasazdegan, M. & Alvandipour, N. (2014). Effective Environmental Qualities on Behavioral Institute in Green and Open Spaces; *Urban Planning Studies*, 2 (1), 101-116.
- Sitte, C. (1945). *The Art of Building Cities: City Building According to Its Artistic Fundamentals*. New York: Hyperion Press.
- Soltanifard, H., Hataminejad, H. Abbaszadegan, M. & Pourahmad, A. (2014). Analysis of Metamorphism of Historical Context of Sabzevar City Using Space Syntax Theory (1906-2006). *Quarterly Journal of Geographic Space*, Islamic Azad University, Ahar Branch, 14 (4), 163-179.
- Suzuki, K., Yamadori, A., Hayakawa, Y. & Fujii, T. (1998). Pure Topographical Disorientation Related to Dysfunction of the Viewpoint Dependent Visual System. *Cortex*, 34, 589–599.
- Syed Mahdzar, S. S. B. (2008). *Sociability Vs Accessibility Urban Street Life*. Ph.D, University College London, London.
- Syed Mahdzar, S. S. B. (2013). *Streets for People: Sustaining Accessible and Sociable Streets in Pasir Gudang City Centre*. Paper Presented at the the Ninth International Space Syntax Symposium Seoul.



- Taher Sima, S., Irani Behbahani, E. & Bazrafkan, K. (2015). Explaining the Role of Outdoor Education in Schools in Iran with Comparative Study of Traditional to Contemporary Schools (Case Studies: Chaharbagh School, Dar Al-Fonoun and Alborz). *Quarterly journal of Islamic architecture research*, 3 (1), 55-70.
- Tofighianfar, A. (2012). Investigation of Social Alienation of Youth and Their Related Social factors, *Journal of Sociological Studies of Youth*, 8.
- Vilar, E., Rebelo, F., Noriega, P., Teles, J. & Mayhorn, C. (2013). The influence of environmental feature on route selection in an emergency situation, *Appl, Ergon*, 1–10.
- Weber, R. & Landis, J. (2012). *Modelling Urban Systems*, the Oxford Handbook of Urban Planning. Oxford, UK: Oxford University Press.
- Welter, V. M., and Whyte, I. B. (2003). *Biopolis: Patrick Geddes and the City of Life*. Cambridge, MA: MIT Press.
- Wiener, J. M., Büchner, S. & Hölscher, C. (2009). Taxonomy of human way finding: a knowledge based approach, *Spat. Cogn. Comput*, 9(2), 152–165.
- Zakzanis, K., Quintin, G., Graham, S. & Mraz, R. (2009). Age and dementia related differences in spatial navigation within an immersive virtual environment, *Med. Sci. Monit*, 15, 140–150.