

# Improving the Educational Skills for Blind and Partially Blind Children by Creating the Same Opportunity in the Scope of Education

(The comparative study of Shahid Mohebi complex and Anchor center for blind and partially blind children)

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**Abstract**—The educational environments, should be considered as the one of the important architectural bodies. Because, for children, the first environment, where the rules must be respected, are schools. According to psychologists, the environment of schools must be not only simple, but also suitable for children. The understanding of the blind and the partially blind children and establishing a mutual relation between them and our world, is effective for educational attention in understanding of space and considering these senses and the correct use of concepts in architecture for creating proper space are in demand.

Although, there are a vast number of blind children in Iran and a desperate need for their education, the problems of educational spaces have been marginally considered. Also, by creating a suitable framework for the understanding of space for the blinded children, it is possible to give blinded children this opportunity to be in society without any fear and with self-confidence in order to play with their blind partners. It requires an open mind and the correct understanding of space with a minor creativity. Unfortunately, the most educational spaces for the blind children are not compatible with the psychological factors of children. So, the attitude of these blind pupils to education has been reduced and it has led to their separation from society. The methodology of research is based on causative – comparative between two samples of Shahid Mohebi Complex in Tehran and Anchor blind center in Denver. The obtained results from this comparative comparison is analyzed from the technique of SWOT and has been ultimately represented for the design and the creation of the suitable spaces.

**Keywords**— *Blind child, educational space, spaces understanding, improvement of skills in senses, mutual space relation*

## I. INTRODUCTION

The design of architecture is a close relation between the designer of space and the user of the space and this relation requires the understanding of the characteristics of body, psychology, culture and society. In this paper, in the beginning, the blind world and the way of understanding the blind child from the mysterious space, his relation with the contributing factors, will be explained. Also, the needs and the special criteria in the educational space will be analyzed. Finally, with the investigation of the sample projects in Iran and Denver the suitable data will be obtained and finally will be represented as architectural solutions. For the first time in 1785, *Valentin Hauy*, established a school in Paris for blind people. This school was in the beginning without any book and teacher and had 12 pupils. Then, with the help of *Valentin*, three books in Latin with the capital letters were compiled. One of these pupils at these schools was *Luis Brill* who was working to invent a new handwriting for the blinds [2].

The first school for the blind children was established in Tabriz in 1299 and the onset of the second world war in 1319 was for an unknown reason closed and, for many years, there was no special institute for the blind people. Ultimately a new branch of this type of school was established in Esfahan with the name of Nooraieen. This school was run for 24 hours and it was allocated for the blind girls [6]. The first tries for education of blinds in Iran comes back to 1299. In this year, the process of education for the blind pupils was started in one school in Tabriz by attracting five pupils and it was developed by *Pastor Ernest Christofel* [5]. In 1352, *Gon Goster*, an English woman, established a school for the blind girls in Esfahan and its name was Nooraieen [9]. The infrastructure of the people's mind is formed by collecting experience in mind of children. So, the more collected information and knowledge in the mind of children will lead to more intelligent children. In addition, their self-confidence in the near future in their interaction to society will not disappear due to the visual problems and they can more easily discover their environment and they never feel separated from

society. So, this paper has opened a new view and attitude towards the world of architect and the result of this study will lead to this fact that the designer of space will consider the all different aspects of feeling and comprehension of environment and the act of the blind child with it. Moreover, with the analysis of the child behavior, his reactions with his environment and the visual events in space such as, color, voice and tools will be recognized the process of understanding a child from the space will be unfolded. The reality is that an architect, by designing a space, can make contribution to the education of children and their identity. This contribution is more transparent for the children. The design of space should satisfy the educational and amusing needs along with their spirit of adventure and curiosity. It will lead to the balance in this field. The amusing and researching activities during the game, can reduce the monotonous of space and it can trigger the internal motivation in children and provide an open space for them to show their creativity. Also they can have new explores in this type of space.

Furthermore, providing the most suitable space for the growth of the blind children, security in the free motion and the possibility of the social and constructive interactions in an attractive space without separating them from their non-blind children along, with the suitable use of architecture, are the major goals of this paper.

## II. RESEARCH METHODOLOGY

The research methodology in this paper is causative-comparative. Research is from the type of post-event, because the researcher does not interfere in the parameters and these parameters are available. The researcher only investigates the present relation among them and evaluates them. This is a kind of causative, because the educational spaces are one of the most effective in paying attention of pupils or their indifference to the space of education. By analyzing the external samples and obtaining their advantages in the design of educational spaces and comparison with the internal sample can lead to represent some solutions for the improvement of educational skills of the blind children.

## III. RESEARCH HYPOTHESIS

In the design of space, not only should we consider the all emotional and sensational aspects of the visitor, but also, we should pay attention to other concepts such as seeing, touching and comprehension. Consequently, the created spaces can carry a powerful effect on the senses and comprehension of people. Thus, this space can enable children of talk, to refresh and even to play the music and it can ultimately create various emotional and sensational conditions for people. In addition, the understanding of the world of blind children and the analysis of their weak points in the educational spaces in Iran, without paying attention to the suitable standards of the blind children, are the topics of this research.

## IV. EDUCATIONAL DEFINITION OF THE BLIND CHILDREN:

Based on the educational point of view, a blind child is someone who cannot use the books and the normal plans of education system and we have to provide special methods and tools for them. From the learning angle, the blind people are those that their visual loss is so serious that they can read only by using Braille or with listening methods. On the other hand, the blind pupils are those who have the serious problems and have to try to rely on other senses such as listening and touching in order to do their routine activities.

## V. THE ANALYSIS OF THE PROBLEMS OF THE BLIND AND PARTIALLY BLIND PUPILS IN EDUCATION:

TABLE 1. THE ANALYSIS OF THE PROBLEMS OF THE BLIND AND PARTIALLY BLIND PUPILS IN EDUCATION

Illustration	Row
The listening power should be improved because they are able to use this sense properly [3]	1
The comprehension of space is very necessary for them. They must learn how to understand their body dimension and the distances between body and things	2
Another important source of power for them is to touch properly, they must be taught to touch different objects.	3
A child should walk properly around his space in order to explore his surrounding	4
The body strength of the children should be improved at school	5
They should be get socialized in different groups at school	6
The orientation and movement is very important for the independence of the blind children. In order to achieve this goal different tools such as the white stick, a guiding dig are necessary and they must learn how to use them [10]	7
The differences in class and the individual training is necessary	8
They should be motivated in order to participate in different activities [1]	9
Today , normalization is one of the most effective ways for the education of the blind children. They study with the sighted children in the same environment	10
A culmination method is the other way of teaching the blind children and two methods are used together. In the first part of education, the blind child studies at a normal school and later in the second part he is trained under the special training [4].	11

## VI. STUDIES AND ANALYSES

Understanding the educational spaces of the blind children and the analyses of their problems in order to establish a space with suitable characteristics. In the following, in order to realize the available problems

and to solve them, two samples of complexes for blind children have been analyzed. Due to this fact, by analyzing problems and weak points of these complexes, finally, the architectural solutions will be representing.

**1. SHAHID MOHEBI COMPLEX FOR THE BLIND PEOPLE :**

The reason for selecting this complex is that although it is one of the biggest educational complex of the blind people, the standard space for the blind children have not been properly considered and it has various drawbacks and downsides in many aspect .

**Location and capacity of complex:**

Shahid Mohebi complex is located in Tehran and it can accept 222 male blinds between the ages of 7 and 18. It was established in 1970 in Ayatollah Kashani boulevard. This complex is still far from the city center and it is located in the very far point of west in Tehran. The complex is in the form of rectangle with dimensions of 99.5x 172 with the approximate square of 17114 ms and it includes offices, educational centers, sport complex and dormitory. Direction to this complex whether on foot or by car is through a boulevard with high spaces volume of traffic.

TABLE 2. SHAHID MOHEBI COMPLEX



**Spaces of complex:**

**A. Administration Office**

The ground floor of this building is like a pilot where the personals use for parking and the cars are parked in a very compressed way. The steps to the other floors are in the far east of the building and people have to go through the cars in order to reach other floors.

TABLE 3. THE PLANS OF THE ADMINISTRATION OFFICE

<b>Second floor plan</b> 1-Corridor 2-Fountain 3-Accounting 4-Archive 5-Service 6-Pantry 7-Service 8-Watchman	<b>First floor plan</b> 1-Corridor 2- Fountain 3-Charity 4-Counsaling and psychology 5-Dentistry 6,7-Service 8- Ophthalmology 9-Punch room 10-Pantry 11-Service	<b>Ground floor plan</b> 1-Parking 2- Information

**Source: [7]**

The most obvious problem of the building is the losses of the steps which is shown in Table 4.

TABLE 4. THE CONSIDERATION OF THE PROBLEM OF THE STEPS

The loss of sensors for the blind people n the steps
The high height of the steps (around 25 cm)
The steps for the partially-blinded people are not suitable because they are not able to observe the steps and their problem is not less serious than the blinded people.
The steps do not have suitable handholds and it must be revised in the aspect of form and color.
There is no proper contrast between the walls, doors and the door handles and thus a partially blinded person is not able to recognize the handle of the door.

**B. The Art Faculty**

The building is in the north-west of the site and its distance from the entrance is not far .Its development towards the west-east north-south is almost equal. The total numbers of the floors with a basement is four and each floor performs a special function. The width of the building is so long and because of the sliding door, it is difficult for them to find the handle [8].

TABLE 5. PLANS OF THE ART FACULTY

<b>Second floor plan</b> 1-The entrance hall 2-Free reading section 3-Copy section 4-Book reservoir 5-Copy section 6-WC 7-Emergency steps	<b>First floor plan</b> 1-The entrance hall 2-Hall 3-Family education office 4-Education office 5-Lab 6-reservoir of Lab 7-Emergency steps	<b>Ground floor plan</b> 1-Entrance of tea house 2-The hall of tea house 3- Archive 4-The printing room on the paper 5- The printing room on the zinc 6,7- WC 8-Emergency steps

**Source: [8]**

The weak points of the internal space are represented in Table 6.

TABLE 6. THE WEAK POINTS OF THE ART FACULTY IN THE INTERNAL SPACES

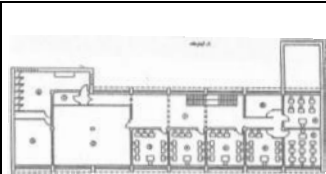
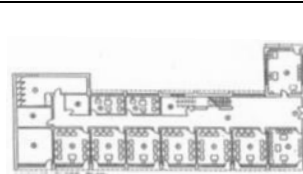
The material of the fixed section is from the glass and by hitting them there is a possibility of falling down
The slim of the width of the hall and labyrinth path to the entrance
No proper place of the north step and the possibility of

encountering with it
The access to the emergency step is difficult and it can lead to some problems
The separation of the library space from the shelves of the books and the possibility of the falling down of the books
A high number of windows that can disturb the concentration of children
The wide area of the windows that can be harmful for the children due to the high amount of light

**C. Primary School**

The plan of this building is like a square and its longitude axis is in the direction of the west to the east and its spaces are on the north and the south. The building has two floors with one sided step. The entrance of the building is in the east.

TABLE 7. PLANS OF THE PRIMARY SCHOOL OF SHAHID MOHEBI

	
<b>The first floor plan</b> 1-Hall 2-Preparation 3-Multiple disabilities 4-Classes 5-Reservoirs 6-Service 7-Reservoir 8-Handwriting education	<b>The ground floor plan</b> 1-Entrance 2-Hall 3-Vice education 4-Classes 5,6-Reservoirs 7-Service 8-Workshops 9-Pantry

Source: [7]

The spaces of Shahid Mohebi complex have not been built based on the proper standards .

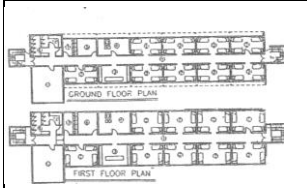
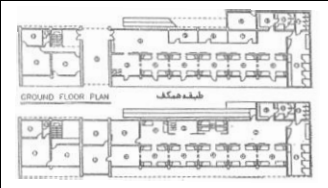
TABLE 8. THE BASIC PROBLEMS OF THE HALL OF SHAHID MOHEBI COMPLEX

This hall has the width of 2 m and the whole spaces are connected through it, The high number of encounters appear in the hall of school
The material is mosaic and there is no sign to warn the situation of classes and therefore it is difficult to have a proper orientation
The area of the walls of the hall are in the same complexion and the doors are placed inside the walls
The steps to the various floors is an obstacle in the hall and pupils can hit with very easily

**D. Dormitory of Primary and Guidance School**

The location of the dormitory is in a suitable condition in relation to the other spaces. But some points should be evaluated. This space is the resting section of the pupils and it has two separate sections. The sharp corners around the building and in the internal spaces can hurt children.

TABLE 9. PLANS OF THE DORMITORIES OF PRIMARY AND GUIDANCE SCHOOL

	
<b>The ground and the first floor plan(dormitory of guidance)</b> 1-Hall 2-Sleeping parts 3-Commodes 4-Tv room 5-The first aid room 6-The hygiene room 7-Study room 8-WC 9-Shower	<b>The ground and the first floor plan (dormitory of primary)</b> 1-Entrance 2-Hall 3-TV room 4-Sleeping section 5-Library 6-Mother room 7-Laundry 8-Reservoir of the materials 9-Dressing room 10-Shower 11-WC 12-The trainer room 13-Praying room

Source: [8]

In the following we will consider the properties of the educational and amazing complex of Anchor in Denver for the blind children

**1. ANCHOR EDUCATIONAL CENTER FOR THE BLIND CHILDREN:**

According to the designer of the building, this school of *Estepleton* has been selected for the new house in Anchor. Because it has suitable pavements and employees can help children to discover their environment and they can socialized in this area.

TABLE 10. GROUND FLOOR PLAN OF ANCHOR CENTER

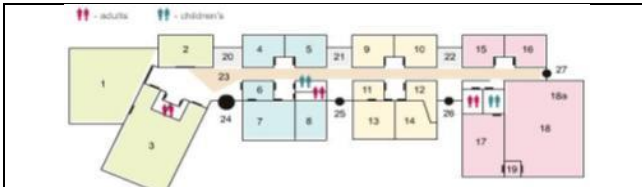

<b>Ground Floor plan of Anchor Center</b> 1-Gathering hall 2- Restingroom 3-Offices 4-Silentroom 5-Children skills room 6- Attention room to brother and sister 7-Dining room 8-Kitchen 9-Show room 10-Class 11-Light room 12-Eye examination room 13-Workroom 14-Brill room 15-Office Brill 16-Sense room with acoustic 17-Sport halls 18-Movement skills room 19-Trees house 20-Transportation place 21,22-Official hall 23-Mail hall 24 to 27-Entrance

TABLE 11. LOCATION OF ANCHOR CENTER



Source: [12]

This building is designed in a way that is used for learning lightening, acoustic and they are combined in a new design. The main idea of designing is based on the playing with lightening. The issue of light and how to enter a space is very important. Because the world of these children are not totally dark. Many of these are able to sense the light and colors. In addition, the acoustic system of the building has been designed in a very efficient way that can meet the needs of pupils in the listening aspects. The view of the building designed with its absorbent light in colors of yellow, blue and red [Table 12].

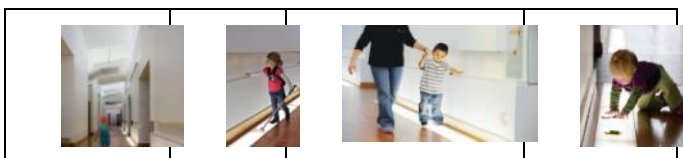
TABLE 12. THE VIEW OF THE ANCHOR CENTER



Source: [16]

The short walls with colorful complexion will lead to stop children get lost. For this purpose, an orientation path in the wall with the height of each child and a bright light have been designed for children [Table 13].

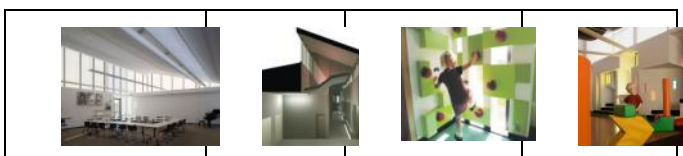
TABLE 13. THE INTERNAL ORIENTATION OF THE ANCHOR CENTER



Source: [16]

Three layers of plaster in the wall are used to protect children from the external voices. The angles of this ceiling, specially walls are well designed to reflect the voice inside the space. By reducing the height of the ceiling, the proper voice reflection can help children to find their location. These ideas have been based on the minds of children [Table 14].

TABLE 14. THE ANGLES OF THE CEILING AND THE WALLS IN ANCHOR CENTER



Source: [15]

Five materials have been used on the ground floor of the school in order to determine every section of

the building. Ceramic tiles and the wood are on the halls and rubber with sensor are used for the sport stadium. Epoxy is used for bathroom, WC and kitchen. The cement paths to the entrance of school are used as controllers for children and they become smaller as children get closer to the doors [Table 15].

TABLE 15. THE INTERNAL SPACES OF THE BUILDING BY USING DIFFERENT COLORS



Source: [14]

When the sun shines to the external part of the building a game is created on the view of the building from the light and shadow which can remind Braille handwriting [Table 15]. Also the pavements of the southern part of the school is based on Braille handwriting. Close to the complex, there are a garden, waterfall and a game area and all of them have sensors. This complex can be so secured for the children [Table 16].

TABLE 16. THE EXTERNAL SPACES AND THE GARDEN OF ANCHOR CENTER



Source: [11]

By above explanation, the results have been represented in [Table 17].

TABLE 17. THE STRONG POINTS OF ANCHOR CENTER

- Orientation by using factors such as voice, color and the form of walls
- Using the main colors in the form and the absorbent light
- The orientation by using the walls with the size of children in height
- A bright path on the ground floor
- Walls with three layers to stop the external voices
- Various angles of the ceiling to reflect the internal voice to help children to find their location
- Differences in the height of ceiling in the different locations for orientation
- Various materials used for every space as a sign
- The design of the view of the building from the idea of Braille
- A garden and a game area with sensors

**VII. THE OUTCOMES OF THE RESEARCH**

TABLE 18. THE LOCATION OF SHAHID MOHEBI COMPLEX



	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Its location to the main part of boulevard</li> <li>• Far from the city center</li> <li>• High amount of traffic</li> </ul>
	<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• The present of the problematic children office near to the complex</li> <li>• Access to the pavement and cars</li> </ul>

TABLE 19. THE LOCATION OF ANCHOR CENTER


	<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Close access to the green area</li> <li>• Distance from the main street</li> </ul>
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TABLE 20. THE ACCESSES OF SHAHID MOHEBI COMPLEX



	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• No special sign for the blind children</li> <li>• No sign for entrance</li> <li>• Access of the cars and walkers from the main street</li> <li>• A distance of the bridge of pavement from the complex</li> </ul>
	<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• A high bridge for the children in the main street (An aslant of the bridge which is not suitable for children)</li> </ul>

TABLE 21. THE DESIGN AND VIEW OF SHAHID MOHEBI COMPLEX



	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Divisions of users in the separated sections</li> <li>• A normal view of the building</li> </ul>
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TABLE 22. THE DESIGN AND THE VIEW OF ANCHOR CENTER

	<p><b>Weakness</b></p> <ul style="list-style-type: none"> <li>• The same combination of the external walls which is not suitable for finding the entrance</li> </ul>
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	<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• The use of Braille in the design of the view of</li> <li>• Use of shadow and light in elevation</li> <li>• The use of the colorful glasses for the partially blind children</li> </ul>
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TABLE 23. THE CEILING AND THE WALLS OF MOHEBI COMPLEX


	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Walls without any special sign</li> <li>• The homogeneous walls and ceiling</li> </ul>
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TABLE 24. THE WALLS AND CEILING OF ANCHOR CENTER


	<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• A light bar on the entrance for partially blinded children</li> <li>• Various heights and different angles of ceiling</li> <li>• The various complexion of the walls and ceiling</li> <li>• The short walls used for the orientation by children</li> </ul>
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TABLE 25. THE INTERIORS IN SHAHID MOHEBI COMPLEX




	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• No special sign for the blinded people on pavement</li> <li>• No sign for the class entrance and spaces</li> <li>• Use of steps with unsuitable materials</li> <li>• No sign between entrance and the main street</li> </ul>
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TABLE 26. THE LOCATION OF THE USERS IN SHAHID MOHEBI COMPLEX


	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Division of users</li> <li>• Ambivalence in finding different places</li> <li>• Location of the medical service in the high floors and difficulty of access to them</li> <li>• High number of floors</li> </ul>
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**Strengths**

- Complex of the administration offices in one building and easy access to them
- Location of the dormitory in the silent part of building
- Limited green spaces


TABLE 27. LOCATION OF THE USERS IN ANCHOR CENTER



**Strengths**

- Formation of the spaces in one path
- Determining one space with its own special material
- The availability of the whole complex in one floor
- Different educational spaces


TABLE 28. THE MATERIALS USED IN SHAHID MOHEBI COMPLEX



**Weaknesses**

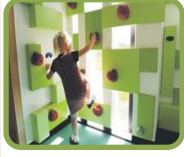
- Wide area of the windows in the classes of the school
- No suitable material of the ground of the steps
- No suitable material of the steps and the handle
- Use of mosaic in the classes
- No signs in entrance of the classes
- No suitable material inside the doors for heat and voice protection
- Homogeneous area of the walls of halls

TABLE 29. A WIDER OF MATERIALS IN ANCHOR CENTER



**Weakness**

- Homogeneous materials of the ground floor of the bathrooms and kitchen, working room and other parts



**Strengths**

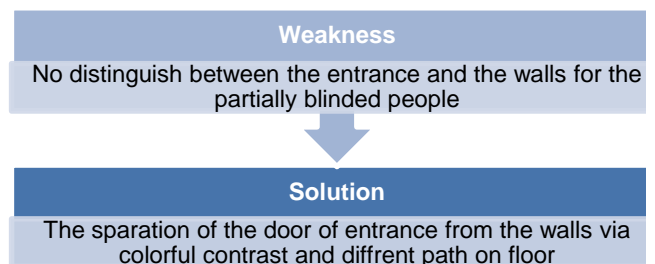
- Three layers of the walls to protect against the noise
- No use of the wide area of the windows
- Use of five suitable materials on the ground floor of the building:
  - 1-Rubber ground with sensors in stadium
  - 2-The wood floor in the room of children refreshing skills
  - 3-opaxee material for the floor of WC, bathroom and kitchen
  - 4-Cement path on the entrance
  - 5-seramic tiles and the wood floor in the hall
- The use of the light and color combination for the partially blinded children

TABLE 30. REPRESENTATION OF THE SAME OPPORTUNITIES

- Located close to the green space
- Orientation through the walls as height as the children
- Light orientation on the hall ground
- Three layers of walls in the class to protect from the noises
- Different angles of a ceiling for the voice reflection to help children for their orientation
- Different height of the ceiling in different place for the help of orientation
- Use of different materials in different places as a sign
- A garden and a game area with sensors

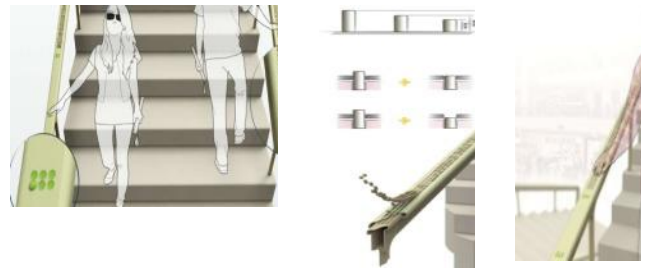
### VIII. DESIGNING SOLUTIONS

After the analysis of the problems concerning with the blinded and partially blinded children these solution are represented:



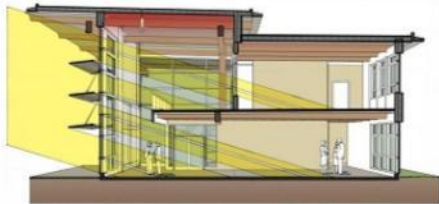
**Weakness**  
 No sign for reaching the steps

**Solution**  
 Designing suitable ground carpet and use of colorful steps



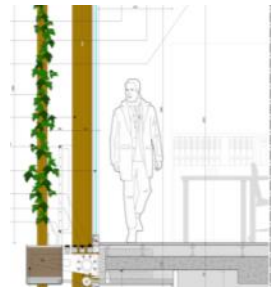
**Weakness**  
 A high amount of windows area is an obstacle for studying the partially blinded people

**Solution**  
 The use of light refraction and create a shadow place



**Weakness**  
 No green space around the building

**Solution**  
 The design of the green spaces and green walls around the building as a sign



**Weakness**  
 The wrong location of the steps

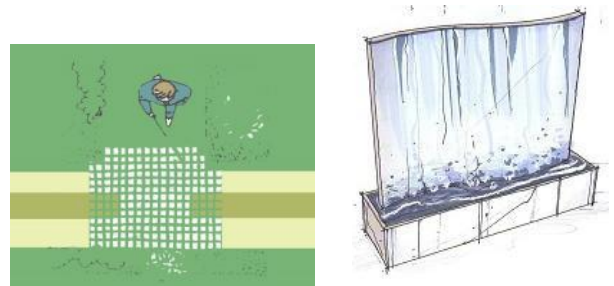
**Solution**  
 The location of the steps near to the entrance with a guiding tool and sensors



**Weakness**  
 No sign for orientation

**Solution**

- A different floor construction for shifting the paths
- Use of water panels for creating voice and signs
- Use of green walls as a sign



**Weakness**  
 No signs in the steps

**Solution**  
 The use of the Brill sign in the steps for warning of arrival

### IX. CONCLUSION

By analyzing the studies of the blinded and partially blinded children in relation to the educational spaces and the analysis of the today's problems, the special results were obtained. In the following , in final tables, the comparative analyses were represented in order to establish the same opportunity for the education of the children in the educational spaces. On the other hand, by considering the positive aspects of the blinded pupils abroad, and clearing the



negative sides of the educational spaces, the summary of them are represented below:

- The non-separation of these pupils from the normal children which leads to more simplification of them in society and the same use of using the facility like the normal people.
- The comprehension of the blinded people from the large space, is a series of the small spaces which are in order.
- The comprehension of the blinded people are linear.
- The comprehension of the blinded people from the space is divided into secants.
- The special characteristics of each space is required for the comprehension of the blinded people.

In order to create a suitable space for the blinded people, all the senses should be improved rather than only one sense.

It is hoped to improve and satisfy the needs of these people by providing proper solutions and analyzing the educational spaces of these blinded people.

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