“Design an educational complex for the deaf with an emphasis on the role of building design on learning behavioral improvement”

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Abstract
With respect to great number of deaf people in Iran, as we refer to the community we may notice that no appropriate school has been provided for the deaf people in which their requirements to be known and anticipated and these schools are usually the same as existing ordinary schools or sometimes with lower quality. Whereas these children suffer from some learning disorders and they are not similar to normal children thus it is necessary for us to notice these schools in terms of architecture. While this defective point exists in our society and no educational complex has been specifically devoted to the deaf children. Therefore we decided to work in this regard. In this trend, we need to know whether these children are required for special standards. Then the requirements for deaf children should be identified and by these requirements it should be tried to enhance physical and mental talents in deaf children. It can be implied this paper is based on this fact that human is assumed as the subject matter in architecture. Comparing healthy people with deaf ones and analysis and difference in way of perception between these two groups about space and recognition of social, psychological, cultural, and training differences among them have been indicated in some of these studies. The question which may be raised here that is there any relationship among formative qualities of educational complexes with enhancement of talents in deaf children?

Keywords: Form- Educational environment- Improvement- Learning- deaf children

1. Introduction
According to attitude of thinkers, architecture, which is dated back the same as history of human, plays essential role as important part of culture in formation and evolution of human being. Inter alia, architecture that includes educational spaces within relatively long period of time in life of humans possesses great share in this trend. This is because the environmental features affected by both topics of architecture and education such as light and color etc., especially effect of educational space on quality of education and behavior of students and teachers, have led to very interdependent relationship among architecture and education. According to the given statistics, about three to five percent of national population suffers from hearing disorders at medium to deep level. Hearing disorders are assumed as most prevalent congenital defect at birth and 0.5% of hearing disorders at birth are due to genetic diseases. After mental retardation, deafness has devoted the second rank of disabilities in this country. [1] Learning of reading is directly related to progress of community. Among types of special learning disorders, that group which is related to poor reading may be more subject to risk of quitting education. [2] These deaf persons are such children.
One of the basic and very important subjects that may lead to creating a new phenomenon is to identify criterion or application of that phenomenon. This issue has been either totally ignored in most of academic
architectural projects or dealt with partially and apathetically. This point may be the reason for this fact that our modern architecture is not consistent with requirements and expectations of community. If we intend to develop this point further we should discuss about subject of architectural projects i.e. consumers of these projects namely human! At first glance, it may seem rather satirical type but considering human as totality of subject in the project may refer us to very attractive and new guidelines in age of architecture. The reason for lesser importance of human as subject may be attributed to laziness and belief in little dynamism of accumulated information about daily life. In other words, whereas architect knows basic needs for human include foods and place for resting and the needed space etc. and s/he perceives intuitively of living form of surrounding people and at the same time construction industry may give him/ her information and details about a building with its ambivert standards within books and journals etc. as a result perceptual and impressive potentials overlook reality of human being with his/ her body proportions. Namely, it leaves reality of growing architecture and is immersed into abyss of normal points. This is the greatest calamity of thinking for contemporary architects in this land. However selection of topics like subject of this thesis is the warning for better recognition of human as subject of architecture. [3]

As Serge Chermayef and Christopher Alexander wrote, people are assumed as the most basic factor in architecture. Therefore, concept of any architectural work depends on this principle that to what extent this architectural work can provide comfort for people and it is efficient to meet their requirements. [4]

All locations the human uses it to provide his/ her want in learning is called school and these places are not only utilized for learning and training beliefs and theories but for perception of the existing reasons for anything and bilateral occasions and relations among human and nature as well. [5]

Walter Gropius implies in this regard that if the educational environment is intended to act as fruitful background for the next generation. Its setting and buildings should be creative not imitative ones. A dynamic environment to release thought and creative expression is important as method of teaching. [6]

The learning disorders have been influences by several fields like medicine, psychology, and training and education. Reading is deemed very important in terms of various dimensions such as academic and occupational achievement and mental health. [7]

About 40% of adolescents with learning disability will most likely quit education. At adulthood, there is remarkably lesser chance for this group in employment and social adjustment compared to normal members of society. [8]

What the human being is and does practically depends on his perception of space. Human’s perception of space is the product of several sensual data including visual, auditory, olfactory, tactile and sensory systems. As a result, paying attention the way of perception of senses of space is more important than design of the space per se. In fact, human’s senses are similar to inputs thereby human’s body receives information from the surrounding space. This subject becomes important when one of this information inputs of body is blocked (here auditory sense). With respect to the exerted change and effect in other senses and by knowing how to convey spatial information to an individual by other senses, the deaf person may receive the needed message from environment with reliance on his/ her visual sense. [9]

Auditory sense is one of the foremost senses God has granted to human. In book of ‘Sacred Geometry: Philosophy’, Robert Lawlor writes: “Auditory sense activates mind once and this is a reaction without picture in the wide range and response returns from the center dependent on senses. Today this dependent center is linked to auditory sense with spiritual, sensual, tasting or mental experiences.” This statement denotes this point that in addition to news messages, it also covers emotional and sensual messages. For example, music sound can be followed with different emotions toward type of music. Silence and or existing sound in an environment comprises of different concepts that create automatically logical spirits in individuals.

The deaf person may receive the needed messages from the environment with reliance on his/ her visual sense. [10]
No one can underestimate importance of learning environment. Brains more learns in safe and secure, creative, challenging and adaptive environments. This point should not be forgotten in design of schools that the given environment is an environment for growth of brain and enhancement of learning in students. Any negligence may create irrecoverable hazardous consequences. [11]

**Designing standards for the deaf people**

According to American Disabilities Act (ADA), hotels and motels should provide useful communicative devices for the deaf people or ones with hardness in hearing so that to prepare the same opportunity for them to enjoy the given devices in services and locations.

A written exchange can be useful for a short and relatively easy essay such as searching for cost of rooms and way of their use or question about food menus in restaurant.

Teletype writer (TTY, TDD) are employed for communication of deaf people and hardly hearing more than normal telephones. These devices include a keyboard with visual monitor. Presence of this hone set is necessary in places e.g. hotels, motels, and locations of provisional accommodation to communicate with deaf people. These phone sets should exist in rooms for the guests and on the table before the receptionist and other places.

- The deaf people may need to translator of gesture language or lip-reader and or computer hearing aids for long term or perfect conversations with deaf people.
- Hotels and motels should provide communication devices in rooms for the guests such as visual alarm that is connected to the building alarming system and the visual warning devices to make hearing disable person aware of phone ring and bell ring and knocking door of room and using special socket for textual phone in rooms. [12]
- To warn the deaf people for risk in buildings, the alarming system can be used with visual indicator (glittering- sparkling light).
- Alarming system is used in textual form as other method in buildings and it can appear on monitors of deaf people or visual systems in buildings and thereby warn deaf person of risk.
- The other alarming method for deaf people is to send message by vibrating pager in buildings. [13]
- The vibrating pad system can be utilized to warn the risk to the deaf person upon sleeping where this system is placed under pad or pillow and it is activated upon warning risk (e.g. warning for smoke) along with other visual alarming system (glittering- sparkling light) and visual alarming system should operate in all floors. [14]
- The deaf signing panels should be installed beside motorway streets near to centers of deaf people and especially in places where they come across the road so that drivers act cautiously.
- Writing signs and warnings on the ground so that deaf person can observe it [15]
- It should be avoided from using materials with high brightness in buildings that may cause temporary blackening of eyes.
- Most of problems the hardly-hearing people encounter take place in halls for lectures e.g. theatres or churches and it is due to destructive auditory effects in the hall. The deaf people may be exposed to problems within the distance the sound moves to reach to audiences and crowds and contradictory sounds may also cause problems for them. Here 2 electronic systems are installed in these buildings to help these persons and for solving this problem: a) Induction loops, and b) Infrared systems. These systems operate in such a way that to change soundtrack among source of sound and audience and thereby they are not affected by other sounds and when these signals reach to receiver of deaf person they are converted into sound. These systems may be utilized in cinemas, churches, meeting rooms in conference halls and lecture rooms and theatres.

Of course, size of lecture room can be efficient in way of selection of these systems and also these systems can be utilized for announcement and warning in airports, stations, and shops as well.
● The buildings deaf people use them should have phones with visual bell ring indicator and it is better to use text phone. [16]

**Pavement of specific spaces for deaf people**

a) Useful and efficient music training for deaf people should include suitable physical and spatial conditions. An example of this kind is the space with wooden floor as well as good acoustic property. [17]

To create suitable space for training music to deaf people, the extra sounds should be removed inside and outside the classes so that the hearing impaired people can use the rest of their hearing potential. It should be avoided from using neon lamps, electrical heaters, and air-conditioners because of their noise. The given space for training music to deaf people should be acoustically insulated by means of curtain on windows and or pavement of floor consequently thereby neither sounds inside this space to exit nor the extra sounds enter inside this space.

The platform of orchestra conductor should not be directly placed at the front of window or toward lighting sources.

The lighting sources (e.g. window) should not be placed subsequently since they create shade on face of deaf person and thereby make impossible visual communication approximately (This point should be observed in all classes for deaf persons). [18]

The position of deaf person or hardly hearing individual is very important in orchestra and in the best condition it is better for these persons to sit at the first or second row adjacent to teacher and the appropriate distance for lip-reading is approximately 6 feet.

In grouping classes, deaf students should be arranged in circular or semicircular positions so that they can see faces and hands of each other (this point should be observed in all classes for the deaf people).

b) The multisensory sound lab

The multisensory sound lab is a special sound system that improves sounds by amplifiers and converts these sounds into vibration and it can be connected to the body by special floor pavement.

The first multisensory sound lab was the result of a question asked by a teacher for deaf people: How can I train the student what the sound is while they may not hear them? Although this lab was devoted to training of acoustics to deaf students at the beginning, this function was developed and it included training functions for hearing, speech therapy, physical treatment, training and showing of dance and sedative activity to the hearing and deaf people and it acts in this way that it conducts electronic sound signals from microphones, musical instruments, recorders or other sound sources to the amplifiers that have been placed downward on the special floor. This floor includes interlocked panels which have been placed in floating form 2 inches higher than the main floor of the class on separated fiberglass blocks. The deaf persons sit on it or stands and perceived sound as vibration and low-tone sounds are perceived as slow vibrations and high-tone sounds with fast vibrations and sound information, pitch and rhythm can be also perceived from the floor. [19]

The light shows voice of the person as a seven-foot column which has been inscribed semi-transparent and including 3 sources of colored light sensitive to different frequencies with various sound pitches. The instruments and accessories of this lab comprise of laser system which displays permanently rhythm of sounds as variable figures placed on the roof or wall. Recorder and CD-player are some other devices and visual memory games and including auxiliary hearing system and inductive loops that can transfer teacher’s voice to children by hearing aid devices.

The floor should be placed as interlocked panels in floating form on foams of concepts and amplifier downward on the floor.

In fact, deaf people and hearing- impaired persons may experience all features of sound including dong, sound pitch, tone, and rhythm by touching and observation. [20]
In this lab, sound which may not be really heard by deaf persons can be converted into very accurate vibrational and visual forms. [21]

The deaf people are entirely dependent on visual sense.

**Designing ideas**

- One can create motion in deaf-specific architecture e.g. motion in form, view, and plan etc. or creation of motion as plasma system TVs instead of walls.
- Creation of visual diversity of space by moving deaf people in space
- Deaf spatial should be designed so that to prevent from placement of deaf person in the same line.
- One can convert the end of volumes (end of corridors) to suitable deaf space such ad open and transparent space to create further visual diversification and rising visual depth.

- Using large monitors on the wall to give textual- visual information to deaf person

- Application of architectural elements to express deaf culture
- Using a plenty of lighting system in spaces but without high luminescence
- Holding of exhibitions to present Deaf Art inside building and in outdoor space

- Creating transparent roof in some parts to increase deaf vision to sky (inclusion of sky inside the space)
● Making short-term recreational-social spaces e.g. restaurant, café shop, and benches in the complex for communication between persons

● Creating hierarchy for access from public to private spaces

● Contrast among background and object i.e. any visual element is better to be placed in opposite background to be more quickly and better perceived by the deaf person e.g. contrast in color of building with the surroundings.

● The symbolic, schematic or distinct architecture and or all three can be used for creation of space for the deaf people since these 3 subjects are the characteristics of visual language for the deaf people. For example, using of special elements that is the symbol of particular subject etc. (i.e. using deaf recognition language in deaf architecture) namely architecture can serve as gesture for the deaf person.

● For the ease of communication between individuals inside and outside the given space with transparency of architectural volumes
● Using aesthetic principles of deaf architecture presented by Gallaudet University
● Creating architectural spaces for communication between deaf persons with ordinary people
● One can employ color tonalities as symbolic visual gesture to deaf for communication in various parts of building e.g. yellow walls that show music training unit etc.
● The materials with various texture can be also utilized to identify specific spaces since the textured materials activate both visual and tactile senses in deaf person (As it implied in previous issues, according to phenomenon of Cross Model Plasticity, the level of visual and tactile sensing is greater in deaf persons than in normal people). Using elements in deaf spaces may be as symbolic or schematic visual gestures denote the related subjects to the deaf people.

● Deaf architecture is introvert architecture.
● Walls and blocks in building may be Deaf Time Lin namely they can be as relief, painting and text about deafness, date of deaf people, and gesture language etc. to inform the individuals.
● Inversion of images e.g. using water or mirror through which the image of some part of building is reversed in them that can be assumed as potential for rotation of mental image (inversion of picture) in deaf person.
Conclusion

Deaf person is not incapable in comparison with the normal people but s/he is a different human therefore needs to specific design and architecture.

We can find by using above-said contents that the formative qualities of educational complexes are closely related to enhancement of talents in deaf children and these are architects who can very efficiently act in education of these children by observation of these effects but this important point is ignored in many countries including our country i.e. Iran.

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