REMODELING A SCHOOL FOR THE BLIND AND VISUALLY IMPAIRED IN OMAN

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It is not impairment that restrains a person, but the way in which society deals with the person. This paper aims at highlighting some key issues in providing an efficient school design setup to current standards which responds to one category of students - the blind and visually impaired. At the beginning, this study will discuss the different policies in educating disabled children; special school, integration education & inclusive school. After that, a set of key issues in designing special schools for blind and visually impaired, depending on revising the previous related literature will be deduced. Then other design criteria will be inspired from the results of a field study in a school for blind and visually impaired in Oman. Finally, on the basis of the comparative study between the existing situation and one of the graduation projects of a SCD student, supervised by the author, conclusion and recommendations will be drawn.

Keywords: Disabled children, SEN schools, School for the Blind and the Visually Impaired, Remodeling, Special schools.

Introduction

The Universal Declaration of Human Rights in 1943 and The World Conference on Education for All in 1990 reassert the right to education for every individual regardless of individual differences (UNESCO, 1994). “Disabled students” refer to a specific group of students who have physical, sensory or intellectual impairment (UNESCO, 2001). Even though, disabled children undergo obvious educational and societal marginalization, they account for one third of all out-of-school children (www.unesco.org/education). In 1970, US schools educated one in five children with disabilities. In addition, many states in the US had laws that exclude children with major disabilities such as deafness, blindness, and mental retardation (www.learningrx.com). It’s a real challenge to consider that about 150 million children worldwide live with disabilities and around four in five children with disabilities are living in developing countries (Jouval, Fédérique, 2010).

Responding to the recent call to all societies to fulfill their duties in providing disabled children with an environment which minimizes the feeling of their impairment and helps them to achieve their full potential, the graduation project; DES432 of Interior Design Department, Scientific College of Design, Oman, was initiated in Fall 2012-13. This project was supervised by the author and named “Re-designing a School for the Disabled”. The objective of the project was to remodel an existing school for students with SEN (special educational needs) according to the recent design criteria. A literature review was conducted by the author to reveal the required key issues and approaches of designing an accessible and
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attractive school for students with SEN. The students analyzed the actual situation through field studies and face-to-face interviews in SEN schools in the Sultanate.

A set of design criteria was deduced by the author depending on the literature review and the field study. The students were asked to apply the mentioned design criteria in their project. One of the projects was remodeling Omar bin Al-Khabat Institution for the Blind, done by a student Ruua Omar. This project is selected as a case study in this research.

This paper will begin by discussing the main approaches of special educational needs through history. Definition, advantages and disadvantages of each approach will be revealed (Lloyd, Christine, 2002), (www.learninggrx.com), (UNESCO and Ministry of Education and Science in Spain, 1994), (Cutinha, (Fr.),R.1989), (Dyson, A.1997).

A field study was conducted by the author and the student, Ruua Omar where an in-depth questionnaire was distributed. A convenient non-probability sample included experienced head teachers, school directors, students, parents and local authorities. The collected data was analyzed, categorized and a set of problems were indentified. A comparison between the existing design criteria and current design standards of the SEN school was done through the above mentioned Interior Design graduation project.

The final design of the students’ projects provided an innovative, accessible, attractive and stimulating learning environment which supports and motivates children to achieve their potential and capabilities. Furthermore, the society will be able to reap benefits from these students’ abilities and talents.

Literature Review

A brief literature review for designing a school for disabled students is laid out in the following paragraph. However, due to the limited space, this review is not able to address all the concerned literature or the range of theories that underpin this literature.

Most of the previous literature that dealt with design issue provided guidelines concerning transfer of mainstream schools to accessible school for students with SEN at the level of planning and facilities (Department for Education& skills, 2002), (Horton, J. Kirk, 1988), (Imaginative Minds, 2008), (Naish, L. etal, 2004), (Leo Care, Bureau, 2012), (Cutinha, (FR).R. 1979), (UNESCO, 2010), (Leo Care Bureau, 2012), (Habibi, M and Mirfa Temoh, F, 1991), & (British Standards Institution, 2012). Some other literature gave guidelines to provide access for disabled people in all buildings including schools (Government of Ireland, 2004), (Habib, Mohsen & Mirfatah, Fatemeh, 1997). (CABE, 2007), (Jones, D. & Bonnett, D., 2003), Communities & Local Government Publications, 2006), & (The National Register of Access Consultants, 2010). The publication by the Department for Children, schools and families in 2008 has played the most effective role. It is a comprehensive design guide, which goes through the design process and takes the important domains in consideration. This literature provides some logic suggestions of area guidelines. All spatial requirements were included (Department for children, schools & families, 2008).

Main Approaches of Special Educational Needs (SEN)

The use of the term special education needs (SEN) is fairly recent. It was firstly issued in Warnock Report (DES 1978) which was a significant pillar in the development of educating children with SEN in the UK (Stakes, R & Hornby, G, 2000).

SEN definition has been included in many editions, Bernardino, Vitaliano provided one of the most comprehensive and appropriate definition of SEN;
“The education of the pupils who deviate so from the relatively homogenous group of so-call “normal” pupils that the standard curriculum needs, involves modification of the standard curriculum in content, method of instruction, and expected rate of progress to provide optimum educational opportunities for such people” (Cutinha, (Fr.) R., 1979).

A historical glance at the approaches of educating SEN children/the visually impaired will be clarified as follows: In 1784, Mr. Valentin Huay established the first exclusive school for the visually impaired in Paris. Later on, a student of this school, Mr. Louis Braille invented Braille, the embossed six dot system for reading & writing. Other early examples were in both United States (US) & India. In 1832, groups of visually impaired children were first taught in a residential (exclusive or special) school. First opening of public school (integrated education) was in 1900 in the US. In India, Miss Annie Sharp, a missionary, founded the first school for the visually impaired in 1887 (Cutinha, (Fr.) R., 1979).

In such initial examples, education for children with SEN took form of separate, special school with the emphasis of deficit rather than potential. The children were given medically diagnosed categories. Early psychologists such as Cyril Burt, also confirmed this type of approach to disability and difference. In 1944, important reforms to SEN education especially at mainstream level and the provision of free education for all included the children with special needs. However, the act still emphasized on a medical model of disability. Special schools were still seen as the most appropriate way of catering to “handicapped” children.

Recognition was given to the provision of education in mainstream schools. In the 1960s and 1970s a new approach for educating children with SEN was adopted. Such an approach was favored by behaviorist psychologists. The medical model was rejected and an approach which stressed the responsibility of that modification was placed on the teacher. In addition, one of the milestone acts of educating children with SEN was Warnock Report, which was issued in 1978. The report made 225 recommendations mostly about the necessity of revising the techniques of providing education services for children with mental and physical disabilities.

The Warnock report advocated a continuum of special needs rather than discrete categories. Furthermore, legislation gradually started responding to such recommendations. The Warnock report formed the basis of the 191 Education Act’s policies (enforced in 1983) on SEN. The Act stressed on the approach that was in favor of inclusion & integration rather than separation and isolation. This approach advocated providing the needed resources to each child with SEN in the mainstream school; for instance the child should have a learning support teacher with him in the classroom rather than being taken out of the class (www.garysturt.co.uk).

The recent educational approach & reform was depending on the Educational Act of 1993 & the Salamanca Statement, 1994. In 1994, more than 300 participants representing 92 governments and 25 international organizations met in Salamanca, Spain to promote the approach of inclusive education or “school for all”. The several United Nations declarations culminating in the 1993 United Nations Standard rules on the Equalization of Opportunities for persons with Disabilities, urged all countries to ensure that the education of persons with SEN is an integrated part of the education system. They set the requirements needed to have institutions include everybody, particularly those with SEN, celebrate differences, support learning and respond to individual needs. (UNESCO & Spanish Ministry of Education and Science, 1994)In United Kingdom, for example, there are now legal requirements that oblige schools to provide all the requirements to educate children with SEN. (www.garysturt.co.uk).

Evaluation of Different Approaches of SEN Education

The different approaches for Educating children with SEN can be included as models in the following diagram:
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The definition, advantages and disadvantages of each approach are going to be discussed as follows:

**Exclusive (special) Approach**

The school under such approach is organized specifically for children with a specific type of SEN. (Department for children, schools and families, 2008). Generally, this system provides accommodation, meals and clothes, besides attending special school. Most of these schools teach the regular academic curriculum. In addition, the students have training in various crafts, orientation & mobility and daily life activities. (Cutinha, (Fr.) R., 1979)

The advantages of the above mentioned system can be concluded as the availability of specialized trained teachers with adequate emphasis on plus curriculum. For instance, Braille system, access to a wide range of special equipments and facilities for other skills like music, weaving, wooden-works etc. In addition, a limited class size of 10 students which help to provide individual attention to each student. Finally, this approach is an excellent system for the poor children as boarding and lodging is generally free. Many people, groups, institutions & societies give donations to support such a system.

However, the residential school has obvious limitations; as the most expensive approach. For example, in 1988, a UNESCO report mentioned out of 51 countries which supplied the required information – 34 have less than 1% of their total population enrolled in special education; 0.03% at the lower end of the range. In addition, students coming at the residential schools are unprepared for life difficulties. (Cutinha, (Fr.) R., 1979) Special schools are often at a distance from the family home and separate the children from their peers (UNESCO, 2001)

Recently, an important development of residential system of education took place with the increase of extramural activities to engage the students with SEN into the society, exchange visits with mainstream schools, participate in external events, activities & competitions thus enhancing the further integration of the students in the society.

**Integrated Approach**

Many definitions of integrated education were issued. One such definition was issued by Kristiansen (1989). He defined integrated education as:

“To be integrated means to be transferred from segregated on isolated position to an ordinary environment, with the rights and obligations that are linked to it”. (Cutinha, (Fr.) R., 1979)
Integrated education has a variety of models:

**Co-location model (semi-special school):** Where children with SEN are educated in separate special school facilities with separate staff but on the same site as a mainstream school. Interchange of pupils, resources, staff and dual use of facilities is a common practice (Department for children, schools and families, 2008).

**Resource Center Model:** The children with SEN attend the mainstream school classes, but there usually is also a base or a resource room facility besides a residential accommodation near the mainstream school. The Resource Center has facilities for students with SEN such as, Braille material and many aids and appliances.

**Itinerant Model:** The children with SEN stay with their families. They are enrolled in a mainstream school in their own communities. They are provided services of an Itinerant teacher and educational instructional materials and equipment. The Itinerant teacher travels between schools to provide special instruction and support services. The number of visits depends on the needs of the children. It can vary from one to five visits a week. Teacher-student ratio is from 1:6 to 1:8.

The Integrated education approach is comparatively low cost to exclusive education as there is no investment in buildings, no maintenance of hostels, no duplicating of loud area, playground, music halls etc. Furthermore, the integrated education enhances the social acceptance of the child as he shares the same social environment with his normal peers instead of isolated one. Staying with his/her family & sharing full share of family along with all family members is another important advantage as family support & involvement in educating such a child is provided. (Horton, J, 1988).

However, the integrated education has also limitations such as low enrollment. For example, after 100 years of implementation in the world, integrated education has not succeeded in reaching even one tenth of the population of school age visually impaired children in the developing countries. The integrated school cannot normally provide access to the type of equipments available in special schools besides the quality of equipment and educational materials is restricted. School environment is unsuitable to meet the special needs e.g. lighting level & quality, access materials etc. Finally, the class teacher cannot be expected to have knowledge of a specialist. Similarly the specialist teacher may lack familiarity with the standard school curricula and approaches. (Cutinha, (Fr.) R., 1979)

**Mainstream (Inclusive) schools approach**

Inclusion as a right means full access, participation, planning and policy of high quality education designed to provide excellence for all children, including children with SEN, in one institution, the mainstream schools. (Lloyd, Christine, 2002). Johnson (1994) provides the most comprehensive definition of inclusive education:

“It is a flexible and individualized support system for children and young people with special educational needs (because of a disability or for other reasons). It forms an integral component of the overall education system and it provided in regular schools committed to an appropriate education for all”.

This approach inspired the need to work towards “school for all” institutions which include everybody, celebrate differences, support learning and respond to individual needs. Special needs education has to form part of an overall educational strategy and new social & economic policies. Regular schools with this inclusive orientation are the most effective means of fighting, discriminatory attitudes, creating welcoming communities, building inclusive society and achieving education for all. Moreover, Inclusive schools provide an effective education and improve the efficiency and ultimately the cost-effectiveness of the entire education system. (UNESCO & Spanish Ministry of Education & Science, 1994).
However, in spite of what appears to be a great deal in moving towards the inclusive school, children with SEN still get an inferior education to anyone else. Dyson mentioned that:

“The more difficult special education has found it to transform the mainstream schools into something more responsive and appropriate to the needs of vulnerable children, the more it has fallen back on reproducing itself in a mainstream setting. It has, in other words, colonized rather than transformed the main stream” (Dyson A, 1997) P.153

There is a failure by many to recognize that all pupils have a right to full access to and participate in education, irrespective of ability. In addition, there is also confusion and a lack of agreement about what is meant by and how to identify, a special educational need. Many teachers resist changing and developing their professional practice to meet the demands and challenges of inclusive education, have led to extremely poor practice in the area. These factors led to the integration of pupils with SEN and has served to reinforce segregated practices, placing inevitably, responsibility and blame for any lack of success on the pupil who is seen as being unable to fit in or as taking up too much of the teacher’s time. (Lloyd, Christine, 2002).

The question is: Which approach is better? The educators, professionals, administrators and workers in the field of education of SEN have discussed and debated this question for over more than 100 years. The question has still not been answered. (Horton, J, 1988). All modes of education; residential, integrated and inclusive have the same goal of formal education of a special group. However, they differ in the means of achieving the same. Oliphant (1912) evaluated the above approaches and concluded:

“As to the educational environment for purpose of acquiring knowledge and modes of making livelihood, I think special education has the advantage, for purpose of learning the art of living, I think integrated education has the advantage”.

Both systems of Inclusive and residential education and combinations have stood the test of time and they are bound to stay. Inclusive education goes a step further in promoting education in a completely non-restrictive environment. Some calls have gone to the extent that inclusive education is not an option, but a compulsion. Similarly, a number of residential schools are also fulfilling the role of a resource center, material productions centers and preparatory centers. They also initiate teacher training course for the class and itinerant teachers under inclusive and integration education. All the mentioned approaches are relevant and desirable. All these approaches with their combinations should be promoted. However, the criterion for selection of the appropriate educational approach should be based on the convenience of the child, his parents and his needs (Cutinha, (Fr.) R., 1979).

Key Design Issues of Special Schools for Blind & Visually Impaired Students

An attractive, accessible and good designed school provides children with a rich special experience in which they can continually challenge themselves in a secure and a supportive environment. Nevertheless, such school environment promotes a sense of belonging and self-worth. People with disabilities will have a variety of needs and limitation. Understanding these limitations will allow designers to provide a coherent and useable school.

Some of the most crucial key design issues of special schools for blind and visually impaired children – as the targeted group – are concerning accessibility, school yard, openings, doors, floor coverings, corridors, stairs, ramps, furniture inside the class, lighting, colors, wall finishing, ceiling, acoustics & sanitary spaces (Ghaeon, Gisoo, 1991). The above mentioned design key topics could be clarified as follows:
Accessibility

Starting with main entrance, some children can find it more difficult to negotiate a ramp rather than a stair, so a choice of both should be provided. (Department for children, schools & families, 2008) Technical specifications of sloped/stepped approach of special schools were identified in Document M. Some key issues limited the ramp gradient, width & length. Some specifications concerning the risers, treads & nosing were mentioned. In addition, railing also has some specifications (Figure 1).

![Figure 1. Technical specifications of sloped/stepped approach of special schools.](Government of Ireland, 2004)

Some of key points in case of blind and visually impaired is; adding top & bottom landing with a tactile danger warning about the change in level of the surface must be provided. The first & last steps in each flight should provide a visual contrast with the rest of the steps. (Government of Ireland, 2004). The external door should be easy to operate or automatically operated by sensors or other means.

Navigating across sites independently for blind & visually impaired children requires adding certain ‘clues’. Sensory elements can be added at junctions or in long passageways to indicate directions or positions. There is a variety of mechanisms, audio information, the use of signage and symbols, tactile maps and indicators, tonal contrast, color coding and landmarks (British Standards Institution, 2012) the sense of smell can provide child with useful clues. Flowers and trees can sometimes be smelled from a distance. (Horton, J. 1988) texture, lighting as well as landmark features like settings of fountains can also help children to orientate themselves. Using grab railing with embossed tactile lettering in corporation Braille where required in addition to a different types of tactile from flush mat as a passage where required in addition to a different types of tactile passage along the site will help visually impaired children a lot in finding their way and reduce risk of wet floor surfaces.

Safety

All children need to feel safe, secure and supported in their progress to independence. The level of required security is higher at a special school. The above mentioned passage with grab railing is one of the safety key issues in schools for visually impaired. Another clues are, good sight lines through internal glazed screens for passive supervision, especially where activities & where inappropriate behavior can take place. It is recommended to provide internal doors with vision panels. Safety glazing, like wired glass, can be used in both windows & doors. Avoiding hard edged corners or rough textures is also required. (Department for children, schools and families, 2008)
**Materials**

In terms of quality & texture, a tactile building which responds to the visually impaired children can be provided. (Leo Care, Bureau, www.accessappraisales.co.uk). Surface materials should be fat and even. Different functions should use different materials. For example, bedded gravel within outdoor area allows the experience of a rougher material. (British Standards Institution, 2012)

**Colors**

Contrast color scheme could be seen as essential key issue in a school for visually impaired children. Colors could play a key role to help pupils to orientate themselves whether in the corridor or the playground. A different primary color could accentuate different learning & activities, areas, entrances, window blinds or other architectural features (British Standards Institution, 2012).

In addition, color or tonal contrast can be used to identify objects such as light switches against a wall or tools on works surfaces or possible risk such as step edges. Some guidelines in using colors in a school for visually impaired should be considered, colors should be considered in relation to light level, visibility, maintenance, and psychological effect. For instance, items in vivid colors animate the space. A bright window against a dark background can be glaring and reduce visibility. Bright colors in large areas or busy patterns can construct a strobe effect better to be avoided. Pastel subdued colors can be calming down. However, some people are color blind especially between red & green.

**Lighting**

Daylight is important for all schools. However, as a number of visual impaired children are sensitive to light; there is a conflict of appropriate daylight level. Specialist lighting advice is needed. Design lighting must avoid glare reflections, shadows and any other interference that can cause visual conflicts. Most students with visual impairment are particularly sensitive to glare from direct or reflected sunlight. Using curtains & blinds are very recommend to control sunlight or daylight levels for more comfort & better visibility. They also provide privacy, concealing of external view to reduce distraction, adding color and character to a space, and absorb sound. Blinds should be easy to clean, not collect dust easily, adjustable and resistant to miss-use. Fabric blinds should be dense enough to control light adequately (Department for children, schools and families, 2008). One of the alternatives to daylight access is using skylight and clerestory glazing to control light levels & visual access between inside & outside to avoid distraction. (Leo Care, Bureau. www.accessappraisals.co.uk).

Electric light lamps should be low glare & avoid any flicker and unwanted noise. From that point of view, fluorescent lamp should be avoided & LED lamp which simulate daylight, give homogeneous lighting and have higher efficiency & longer life expectancy is advisable. Electric dimmers can provide better control in lighting level.

**Acoustic System**

All learning and teaching spaces in England should have acoustic system compliance with part F of the Building Regulations. Children with visual impairment rely on hearing sense mainly in their learning process. Providing good room acoustics and sound insulation between rooms and from outside noise improves their access to learning. (Department for children, schools & families, 2008).

Windows are the major noise problem in over 90% of the cases, so using double glazed glass window should provide the required sound reduction. Doors are the second major noise problem. The door should be solid, well fitted to the frame with a seal gasket in case of more than 6mm gap. Using sound-absorbent surfaces in ceiling ensures good sound quality. In addition, slip resistant sheet flooring with acoustic backing - such as linoleum – is hygienic & water resistant. If hard surfaces are used such as woodblock or timber floors, then sound attention on other surfaces must be given.

**Furniture**

Providing appropriate furniture, fittings and equipment helps to ensure full access to learning and social activities. Furniture that is easy to move around or that can be used for more than one purpose can allow
for a diversity of activities & layouts. Considering blind & visually impaired children, furniture surfaces should be smooth with no sharp edges or projections. Furniture should be of appropriate fire resistance and spread of flame and compliant with health and safety standards. Work surface needs to be wide and deep enough to accommodate the necessary learning and communication aids. Room for an assistant to sit next to the child must be available. Appropriate color, without pattern but with visual contrast to the surroundings is both desired. Acoustically reflective materials & shiny surfaces which reflect light and can reduce visibility must be avoided. (Department for children, schools and families, 2008)

Outdoor Area

Experiencing the outdoor play/learning/social environment is an important part of learning and leisure for children with SEN. (Leo Care, Bureau, www.accessappraisales.co.uk) Current teaching and learning approaches tend to involve thematic and cross-curricular work. Access to outdoor learning spaces is crucial for science, physical education, sensory experiences and mobility training (Department for children, schools & families, 2008). Blind children need to learn to orientate their bodies and to move confidently. Physical activities & group games will provide such required experience (UNESCO, 2001)

A variety of spaces should be provided such as outdoor PE areas, a range of cranked canopies & covered external spaces of different scales to accommodate different group sizes. (Leo Care, Bureau, www.accessappraisales.co.uk). Such areas with a combination of hard and soft areas might have play games courts such as multi-games, tennis courts and life skill training areas. Green area can provide a rich resource for learning. Providing planting, ponds & natural trails, with children and teachers involved in their development as part of the curriculum will enhance the school environment and the children’s skills. Children must have direct access to outdoor area to maximize their opportunities for outdoor activities. Minimum areas for team game playing fields is advisable to be 5000 m² for a total number of 1:2000 pupils aged 8 or over. (Department for children, schools and families, 2008).

- Classroom

Classroom space is often divided into small units providing space for individual working and small group spaces. A central classroom space provides significant stimulation for many children as a challenging place to work, negotiate and collaborate with other classmates. (Leo, Care, Bureau, www.accessappraisals.com). They may also work on one-to-one basis with support staff. It is preferable for group size with one teacher to range between 8-15 children with moderate needs 6-8 children with severe needs and 4-6 children with subtle needs the area of a primary class with a size of 8-10 students is 50-65m². (Department for children, school and families, 2008) Providing the class with ICT equipment, one or more network computer workstations, and interaction whiteboard and/or plasma screens will allow students with visual impaired to gain maximum benefit from the learning process. Wall charts and pictures will give an accumulative teaching effect (UNESCO, 2001).

The most important key point concerning reception administration spaces are to be close to the main entrance and furnishings fittings and fixtures of a luxury hotel. (LeoCare, Bureau, www.accessappraisals.co.uk)

Omar Bin ALKhatab Institute for the Blind, Oman – A Field Study

In Oman, the Ministry of Education’s learning difficulties program provides services in Basic Education schools for students with SEN in special integrated classes in mainstream schools. The program began in two schools in 2000-2001, and currently in 2012-2013 it covers 640 schools across the Sultanate (The Committee of preparing the eighth five year plan, 2011).Unfortunately, the above mentioned integrated system was inclusive just for students with hearing difficulties and mental disabilities.

In 1999, one of the business men in Oman took full responsibility in building Omar bin Al-Khattab institute for the blind in Al-Seeb 20 km far from Muscat, the capital city. Mr. Bahwan considered such a
project which occupies 40,000 m² (figure 2) as a contribution in support of the development of Omani society without exclusive. Mr. Bahwan still contributes in the annual budget of the Institute by 30-60% while the rest is state funds. The Ministry of Education takes care of employing & training the staff & supplying the Institute with tools & programs.

![Lawn
School Building
Hostels](image)

**Figure 2.** Omar Bin Alkhatab Institute for the Blind; land usage.

The institute has 137 students in 2012/2013 the ratio between blind and visually impaired is 4:2 the staff number is 85, 9 teachers are blind, with a ratio of one teacher/2 students. The land use of the site is: school building 14.5%, 2 hostels for boys and girls 17%, lawn 18% & free space 50.5% (Chart 2)

![Chart 2. Omar bin Al-khatab Institute; Land Use Percentage.](image)

In 8 days of site visit, interviews were conducted by the researcher and her assistant, a graduate student who designed the case study and was included in this research. A questionnaire was distributed, a controlled sample of 80 participants were involved; 40 students in the age group ranging from 8-22 years; 6 teachers of different specializations (Math, Arabic, Religion, Music, PE activities & KG teacher);
two administrators, the director and the deputy director; three staff- an IT technician, the hostel supervisor & the social worker; two members in the Special Needs Department, Ministry of Education, the Deputy Director of the department and one SEN Specialist; and finally, a random sample of 27 parents was also included.

The overall feeling of students concerning Omar Bin Al Khatab Institution (OBAI) is high satisfaction with 59.5%. The satisfied students were 40.5% and no student in the sample was not satisfied (Chart 3).

According to the sample, the main problems in OBAI are concerning access, lightning, area, study and teachers (Chart 4).

OBAI had a remarkable activity agenda during 2012/2013 which included 46 in campus and out campus activities (Chart5) as an exclusive residential institute, communicating with the society is one of the most critical challenges. One student was ranked first in the musical competition between all high schools in the Sultanate, 5 of them participated in the national football team of the disabled. The author and the staff were amazed with the high cooperative attitude of the students. Students’ response relating to the institution’s advantages was friends, which scored the highest rate of 52.5%.
Chart 5. Students’ activities in & out campus during 2012/2013

Figure 3. The suggested remodelling plan of selected spaces; more accessible & attractive environment.
The graduation project of Interior Design Department, Scientific College of Oman was initiated in fall 2012/2013. The project was supervised by the author and was named “Re-designing a school for disabled in Oman”. The main spaces were defined to be redesigned, the entrance and reception area, a classroom and outdoor area.

With reference to the current design criteria for blind and visually impaired students, the following OBAI comparison were conducted between the existing building and one of the graduation projects.

Table 1. A comparison between the Existing Omar Bin Al Khatab Institute & Suggested Remodelling Design.

<table>
<thead>
<tr>
<th>Point of comparison</th>
<th>Existing Omar Bin Al Khatab Institute</th>
<th>Suggested Remodeling Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Main entrance and Reception area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety elements</td>
<td>• Using 1 ramp with a grab railing between 2 staircases</td>
<td>• Use 2 ramps &amp; 1 staircase.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Add a corduroy tactile danger warning surface at the top &amp; bottom of each ramp.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use wired glass for the main entrance, when cracked pieces remain held together</td>
</tr>
<tr>
<td>Accessibility</td>
<td>• The reception is one hall without information desk or clear sign- ages</td>
<td>• Add a corduroy tactile passage along the school with different patterns to different destination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Add a reception desk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Using fragment devices each destination has a different odor</td>
</tr>
<tr>
<td>Colors</td>
<td>• Two brown hue</td>
<td>• Two hue of orange pastel</td>
</tr>
<tr>
<td></td>
<td>• No vivid colors</td>
<td>• Small items in red, green &amp; yellow adding excitement to the space</td>
</tr>
<tr>
<td>Main theme</td>
<td>• Bleak space</td>
<td>• Luxury as a hotel lobby</td>
</tr>
<tr>
<td>II. Classroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flooring</td>
<td>• Terrazzo tiles</td>
<td>• Marmoleam linoleum as eco-friendly sustainable green flooring, highly durable, non-toxic, anti-microbial &amp; easy to clean with acoustic backing</td>
</tr>
</tbody>
</table>
| Space                 | • 24 m²  
Current standard (8-10 students)  
50-65 m²                                               | • 52 m²                                                                                              |
<p>| Door                  | • Flush door with vision panel                                                                       | • Sound proof door (Solid door) with vision panel.                                                     |
| Windows               | • Sliding one glaze sash                                                                               | • Sound proof windows with double glazing                                                            |
| Teaching approaches   | • One teaching approach and individual work area                                                      | • Multi-teaching approaches                                                                          |
|                       |                                                                                                        | • Individual work area                                                                               |
|                       |                                                                                                        | • Brain storm corner                                                                                 |
|                       |                                                                                                        | • Library corner                                                                                     |</p>
<table>
<thead>
<tr>
<th></th>
<th>Computer station corner (with specific aromatic plants for each student’s location)</th>
<th>Use daylight LES lamps which save energy, give homogenous lighting &amp; more workable source. Use sky light</th>
</tr>
</thead>
</table>
| **Lighting system** | • Using fluorescent lamps with their flickers & undesirable noise  
• Daylight |                                                                                                   |
| **Colours**   | • Using one colour                                                                                   | • Use two pastel colours                                                                         |
| **Furniture**  | • Sharp edges cabinets  
• Using MDF desks                                                   | • All furniture pieces with curved edges  
• Use white Mahogany desks, more durable & luxury material                                          |
| **Hanged items** | • Some hanged items with no tactile presented materials                                               | • Some tactile materials hanged                                                                    |
| **Accessibility** | • No guidance                                                                                       | • Add corduroy tactile passages  
• Add different aromatic plants with different smells in the computer station to guide each student to his seat |

### III. Outdoor area

|            | Sports activities  
• Table Tennis  
• Football  
• Goal ball  
• No social activities  
• No agricultural activities | Sports activities; add to the current activities:  
• Blind Bowling  
• Agricultural activities  
• Social activities |
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<tbody>
<tr>
<td><strong>Activities</strong></td>
<td>• Using one type of carpet flooring</td>
<td>• Use varieties of flooring: soft flooring, grass, flat stone, ceramic tiles</td>
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</table>
| **Flooring**  | • No signage or orientation clues                                                                           | • Corduroy tactile paving passages to orientate the students  
• Plant local aromatic plants & trees to help in outdoor navigation                                  |
| **Accessibility** |                                                                                                             |                                                                                                   |
| **Ceiling**   | • Shaded area with corrugated sheet, semi-dark space                                                         | • Use tinted solar glass to reflect heat & provide filtered daylight with wooden canopies          |

**Conclusion & Recommendations**

1- Remodeling the only school for blind and visually impaired students in the Sultanate means to bring it to the current international standard which will compensate by preparing these students to fully participate in the community and achieve their full potential.

2- Students with different impairments have different requirements. Good and comprehensive design could provide the targeted school environment to overcome their learning difficulties.

3- Designing a school for SEN students must be based on understanding the student’s needs, senior teachers’ experience, parents’ point of view and decision makers.

4- Many issues concerning visually impaired still need more research such as suitable lighting level, distracting colors etc. International cooperation would support the required studies.
5- Exclusive schools need more budget than main stream schools, all the communities, organizations, businessmen, companies and donators are invited to participate and support such a cause.

6- The recent specialist learning schools around the world were upgraded and many drawbacks were overcome.

7- Outdoor areas have a crucial role in supporting the educational process and it enriches the students with SEN skills and experiences, OBAI has an unused vast area.

8- Non-governmental organizations involvement in strengthening the education of SEN students as a societal responsibility is playing an important role in supporting such type of education.

9- Adding vocational training is going to give the blind and visually impaired students. Many countries such as Japan and India have adopted this successful strategy.

References

20. Special Education Need Impaired. Retrieved from www.garysturt.free-online.co.uk


24. The committee of preparing the eighth of the five year plan the Ministry of Education, Sultanate of Oman (2011)

