SCHOOL MILIEU AND EDUCATION REVENUE: THE EDUCATIONAL ENVIRONMENT AND STUDENT ACHIEVEMENT

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Abstract. This paper appraises an appropriate educational environment at a perfect school. A standard environment equipped with suitable facilities has fundamental effects on better and deeper learning materials and mental conditions of the students and their parents and, eventually, on their mental calmness and social progress. In the present survey, the geographical locations of the schools, good grades and the necessary equipment were discussed as the classroom is a place that has a direct impact on the education process. Then the rest of the school components with indirect but essential influences upon training were considered. In this review, it was also tried to consider the roles of administrative and logistic departments in students' achievement.

Keywords: educational environment, school, students, teacher

Introduction

It is now over 100 years that the concept of education is still a hot topic for discussion at social sectors. Education and, consequently, learning environments are responsible for the most effective role on the mentality and civilization of these societies (e.g., McGowen 2007; Vandiver, 2011). Schools as the major sectors in educational spaces accommodate a longer period of lifetime for human.[1] In this viewpoint, finding a new body for the process of education reform is a step toward the development of accountability, improved efficiency, and achievement of graduates. The failure to create and maintain optimum learning environments can undermine other efforts to reform education.

Improving the quality of school facilities could be expensive being the most single expense and most enduring transaction made by school officials (McGowen, 2007). One of the major concerns for designers of education in recent decades has been the creation of proper conditions for achievement as well as for the acquirement of the main objectives of the educational system by the students. To achieve this, there are many advices. Some projects have successfully been implemented throughout the country in general following pilot implementations, which show positive and vivid effects. Despite all these efforts, educational falls of students are still observed in many learning areas of some countries. Serious concerns, therefore, are raised about education, teacher, and student safety by poor conditions of some schools necessitating educators to understand and find ways to help increase student performance (Vandiver, 2011).

Overview of contents

Educational environment is one factor associated with a reduction or loss of student enthusiasm for learning and research. The purpose of the training space is not classroom only, but includes geographical location, school

yard, classroom, library, gym, study hall, auditorium, laboratories, and health services, clean and good air quality, good light, temperature, and color, all of which can set a good and hearty educational environment or, vice versa, a disgusting and boring complex (Cash, 1993).[2-6]

McGowen (2007) concluded that student achievement, attendance, and completion rate measure were not statistically significant in relation to school facility conditions. Furthermore, teacher turnover rate and discipline or behaviors were significantly related to school facility conditions. Bishop (2009) reported improved student behaviors, enhanced staff and student morale, and a lack of belief that the new buildings more positively impacted student achievement than the old buildings. And Vandiver (2011) found that quality and educational adequacy of educational facilities were significantly associated with student performance and teacher turnover rate in northeast Texas, USA.

Geographical location

Research had shown that there was a relationship between school building condition and student achievement[4] (also, O'Neill, 2000). Where the school is built should be in a green space as far as possible and away from the city noise and the related issues. Many of our urban schools are located in the middle of large markets or adjacent streets, which, in addition to a lot of noise, do not allocate enough space for optimal education. Sometimes the neighbors and residents around the school contest especially at recess times. A good example of such a standard school is shown in Fig. 1.

A more dependable verdict is that persistent noise exposure weakens cognitive utility and several studies reported reading problems related to noise (Haines et al, 2001; Evans & Maxwell, 1997), deficits in pre-reading skills (Maxwell & Evans, 2000) and broader cognitive deficiencies (Lercher et al, 2003). Accordingly, surveys on the effects of the physical surroundings usual-

ly conclude that auditory and sounds are important factors in educational environments.[4,8]

Fig. 1. This school is located in eastern Holland. The building area is 16,000 square meters and 1,300 holds 1300 students aged 12 to 16 years. It is in the form of a compact and contiguous pyramid and has the best sporting facilities. This building received the National Award for the best school in the Netherlands in 2007[7]

School yard

School yard should be proportional to the number of students at that school. When students are queuing in the morning ceremony standing together occupy about two-third of the school yard space (Fig. 2). How much space is needed for each student during recess activities? When there is a small outdoor courtyard it can probably increase physical encounters. Perhaps the time that should be spent for regrouping and preparing for the next class session will be spent on disputation among students.

Classroom

Classroom is one of the basic foundations of education at every school. The following principles can help have a good and ideal class.

Fig. 2. Dense concentration of students in the school yard

Light in the class

In general, 83 % of learning process takes place by means of visual perception.[9] The most frequent objections of unsuitable lighting are headaches, eyestrain, and tiredness. Karpen[10] suggested the use of full spectrum, polarized lighting as it is free of both glare and glimmer to defeat those complaints. In addition, the increased application of computers in schools makes the idea of having glare-free illumination important (Barnitt, 2003). Thus, the adjustment of classroom light will have a significant effect on the students learning.

Classroom is often lightened through the window, and when there is not enough light, yellow or fluorescent lamps are used. A number of experiments have shown that the glass windows bearing area shall be at least one-fifth the size of the room to provide a minimum illumination for reading and writing.[9] In some schools, because the windows overlook the busy streets, opaque glasses are used to make the interior invisible, and in some places the

glasses are stained. It seems the students to suffer dejection in such circumstances and also make them feel suffocated.

Day lighting was argued to offer the most encouraging effect in relation to student achievement[3,11] as organic consequences on the individual's body are produced by daylight (Wurtman, 1975), though, it is not practical or achievable to have only a daylight source in the classroom. It was also suggested that effective daylight lighting must be complemented by artificial lighting that faints against daylight levels.[12] And Barnitt (2003) suggested a mixture of straight and circuitous illumination to achieve appropriate lighting.

Balanced ventilation and temperature

When breathing, if the oxygen is supplied to the body, the brain can organize its activities. It is necessary that excess carbon dioxide be exhausted from the lungs. A class with 30 students all expel carbon dioxide out to the class and will use 21 percent volume of oxygen in the class air. This is where the importance of proper ventilation is indicated. Table 1 shows the approximate amount of air exchanges in a class space.

The purpose of the ventilation is to create favorable conditions for human comfort that comes from the change of air properties. Increasing or decreasing the temperature, humidity and pollution are the duties of a ventilation system. Temperatures over 21 °C decrease mobility and renders lethargy in the students.

Table 1. Approximate amount of air exchanges in a class space

Number of air changes	Volume of space (m^3) per student
6	Less than 5
5	5-5.7
4	5.8-7
3	7.1-8.5
1.5	More than 8.5

Class dimensions

Class dimensions should be proportional to the number of students. In Japan, there is a class area of 108 meters for every 22 people. Planners of new educational spaces should take note that according to the new teaching methods offered such as IT, etc., sitting on the couch (Fig. 3A) does not create the right environment to teach in the classroom. In order for the students to communicate and interact more effectively with each other and also to communicate face to face with a teacher, the benches should be ordered so that this is achieved. Education and grew-up scientists suggest the best way to form a circular or «U» shaped (Fig. 3B) arrangement of chairs, especially in courses that require discussion, group activities and experiments to solve a problem or work on a project. In this case, the interactions will be done properly leading to all the students be involved in the activity and not having passive and fatigue conditions.

To allow for the possibility of group work, primary school children are mostly sat around tables, although McNamara & Waugh (1993) comment that 'group size often seems to be determined by the furniture and its arrangement' rather than by 'educational or pedagogical considerations'. They go on to recommend a 'horseshoe' formation where students can see each other and the teacher. This arrangement is also commended by Comber et al. (1999) and Alexander (1992). Although Martin (2002) argues that it is a very controlling and teacher-dominated approach, Marx et al. (2000) found that more questions are asked by children when seated in this arrangement than when they are in rows.

Class equipment

The interior space of a class should ideally be designed so that all class equipments such as benches, boards, charts, computers etc. to be properly and

effectively used for educational purposes. The blackboard should be chosen with appropriate quality and adequate friction for being pulled over with plaster; its paint is often chosen green or matte black not to reflect the light. The eraser is made from the felt to clean up the boards so that chalk dust does not spread in the class space. The board is located within the sight of students to have a better view and also chalk dust does not cause respiratory problems for them when erasing the board. In an ideal class, a special space is considered for charts and geographical maps. It is better to consider a space for a small library; the students can also bring the books they no longer need them at home. All of these are because the teacher is provided with the equipment needed and not to leave the class for bringing any of the equipment. Some school designers also build a small sink in the classroom so that students and teachers wash their hands as necessary after working with paints, chalking, etc. Students' seating is spacious and comfortable and the desk is also large enough so that items such as books, notebooks and pencils can easily be placed on it for all students. Small tables placed together engage students with each other, and puts learners and the teacher in the wrong space. To implement IT teaching, it is necessary to take into account spaces for placing computers in classrooms as well as a place for storing folders of work and research assignments of students. Such a class might seem crowded, but if the class is provided with all the facilities the teacher can be expected to teach properly and the students to pay more attention.

Library

The need to have children think in libraries will be the heart of learning. In the developed world today, the role of libraries and its relationship to education in terms of technology and sociology have been examined. It has clearly been found that libraries occupying only 5 % of the physical space have a 100 percent influence, which is a great degree of performance. Their

primary goal was to create a model applicable to other schools rather than creating a box, a room or a shelf for the books. Their first step was to move an isolated library and also a marginal reading room to the classrooms (Fig. 4), thus, they emphasized studying and learning as interacting principles.[1]

A)

B)

Fig. 3. A) U -shaped design of a class; B) The old class design in the form of benching

Fig. 4. In this Library, the architects designed the roof as it is a symbol of the sky with its clouds, the simulated lighting and the accessories to flying books instilled a sense of effort and work in space

The gym

The sporting ground of the school was always thought to be the physical space of school yard where students played and sometimes there were volleyball and basketball lines and nets. When the time came to exercise all the students were taken there to play and frolic. So the school yard was an exercise space in the minds of everyone. One of the limitations is that the school yard is not useable when raining. Many times in the academic year with rain, snow and extreme cold with freezing courtyard the students have to spend the exercise time in the class. On the other hand, when the weather is favorable the noise created by the children provides problems for other classrooms. As is evident, the sound is an important factor affecting learning, so if the voices outside the classroom overcome the teacher's, the students will offer their hearing unwantedly to other sounds rather than the teacher's.

Study hall

One of the important items in creating a focus in students is the study place, which should be a safe place, quiet and away from any noise. In some schools, the library hall serves as a study hall. In some school districts such as the one in Kerman (southern Iran), special study halls with a capacity of 100 to 150 people have been constructed in the schools where the teachers attend the day before each exam and answer the students' questions.

Auditorium

Auditorium is a place for intellectual gathering, running meetings, religious celebrations and meetings where audience numbers are high such as family sessions, or PTA meetings attended by parents. Given that because of various social celebrations, religious festivals, and special events held in our schools, a school auditorium to accommodate students, their parents and guests will be required. Students at these venues can display their taught science and arts like theatrical performances and songs as well as implementing speeches and ceremonies conducted in a manner that is not boring for the audience.

Science laboratory and vocational workshop

Laboratory aids and practical training courses are effective for the flourishing of creativity, innovation and the talent of students. An ideal laboratory is preferably located on the ground floor and its floor and walls are washable equipped with hot and cold water plumbing, heating and cooling systems, and gas plumbing systems. In such a laboratory, safety is fully respected, for example, proper ventilation to prevent accumulation of vapors and toxic gases in the lab. Fire extinguisher is installed in a proper place so that it facilitates rapid access of all emergency personnel. There are plenty of cabinets and shelves in the laboratory, which are resistant against chemicals, rust and cor-

rosion. Access to the equipment is possible and the accumulation rate is proportional to their weight toleration.

Like laboratories, vocational workshops have the above sensitivity regarding their safety while these workshops are different according to the boys and girls schools. Proper alignment in the workshop, adequate space for student group work, and the availability of first aid box appear to be necessary.

Spaces for support services

These places are considered for the welfare of students and staff to provide services to other spaces[13] such as health suites, pantry, buffet, installations room, health and first aid rooms, and a multi-purpose hall (cultural activities), some of which are reviewed below.

Toilets: Insufficient numbers of toilets (Fig. 5) and, in some cases, lack of cleaning, prevent students from using them leading to disorders of digestive and excretion systems occasionally with irreparable injuries. Based on the regulations on environmental health in schools, at least one toilet fountain for every 40 people and one sink for every 60 people are considered. Toilet height suits students of different age at variable academic courses (60-75 cm from the ground).

Water tabs are also set out in compliance with health and sanitary conditions with a minimum distance of 15 meters. It is better to be made of washable wall around drinking water (such as tile, ceramic, stone, etc.). Often a water tap for every 45 people is expected.[14]

Health and first aid rooms: Due to the high mobility of students at recess, they are at risk of physical injury. A trained and experienced health educator with the necessary facilities to help students reduces severe damages to them.

Buffet: Buffet is one of the favorite places for kids. Kids often go to schools with inadequate and sometimes without having breakfast, an issue that

requires a separate discussion. That is why students face severe congestion in front of the buffet at recess times. But because kids and primary school students spend their important daytime at school, their feeding at these times should be considered. Buffets located at the entrance of the school hall and traffic places causes traffic congestion and disruption to students due to the large crowds. It is very important to maintain the health of students, hence, it is necessary to place the buffet possibly away from the health service and exposed to the sunlight.

Fig. 5. A view of a sanitary service with good conditions

Official spaces: In these places, the pursuit of education programs as well as school administration and paperwork are done, which are: manager and assistants offices, office staff and copy room, rest room, teachers room to meet with parents of students, counselors, and storage rooms.[13] Obviously, each of these tasks requires its own space. Unfortunately, due to the lack of space in some schools, these issues are addressed in a common room leading to collisions and unpleasant consequences. Office space is, therefore, an inte-

gral part of an ideal school and integrating these spaces with learning environment causes that none of these spaces have desired output for the schools.

Conclusion

Many of classes in the Iranian schools are considered non-standard as they are more than 20 years old. There is not adequate space for the teacher in the classroom and often the number of students exceeds the capacity of the class. Whereas social life during the last 100 years has had a lot of changes, if people from a hundred years ago could come back to life, they should have surprised by our strange life as our classrooms resemble those found 80-90 years ago. Although a competent teacher is able to employ appropriate methods to make the learning environment seem desirable at most difficult physical conditions, a range of physical spaces need to be considered and respected in the construction of new educational facilities in order to protect the health, safety, and appropriate education and training. Based on the relationship between school facility and the learning environment, further research is needed to addresses other indicators of student achievement and the overall success in school. When educators are accountable for student attainment, provisions must be made by lawmakers to guarantee that school leaders, school districts, and schools are making any effort to address the success of all students.

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