

Facility Quality Relation to Learning Efficacy in Mafraq Governorate

Dr. Marie Bani Khalid¹ and Prof. Majd Al-Homoud²

¹ Al Al-Bayt University

Received: 8 December 2012 Accepted: 3 January 2013 Published: 15 January 2013

Abstract

Education facility is the setting where interaction between students and teachers takes place. Facility quality affects learning efficacy. The study was conducted using interviews and surveys to elicit data from 229 administrators located at three directorates of Mafraq Governorate. Subjects were selected using stratified random sampling. Results indicated that learning efficacy was associated with the following entities of facility quality: natural ventilation, classroom arrangement flexibility, attention to furniture and equipment. Further, the following entities of facility quality were positively correlated with directorates of Mafraq Governorate: additional lighting sources, natural ventilation, presence of rest rooms, and school size; and were negatively correlated with indoor sports facility. Finally, the following entities of facility quality were positively correlated to village distance from Mafraq City: natural ventilation, existence of outdoor sports facility, food facility, rest rooms, and number of students in classroom. Administrators should keep in mind that although the education environment is complicated, the different aspects of services are inter-related, and they need to take a holistic view about the facility. Policy makers should realize the importance of facility's physical capacity in influencing students achievements.

Index terms— learning efficacy, facility, quality, physical, built, environment, education, impact, inputs, outputs, market, mafraq, jordan.

1 Introduction

There is evidence that situational (environmental) positions and attitude of students and teachers' towards school affect students' performance (Gump, 1987; Weinstein, 1985; Totusek & Staton-Spicer, 1982; Koneya, 1976; Brooks & Rebata, 1991). Further, interactions between environmental factors and personal characteristics of students do exhibit significant effects on the academic performance of students (Lewin, 1943). No systematic attempts have been made to link the performance of schools to student results, to put in place effective monitoring mechanisms, or to make information about school performance available to parents and students (Galal, 2008). Educational environment is the setting where interaction between students and teachers takes place. Basic physical requirements of the school facility like minimum standards for classroom size, acoustics, lighting, heating and air conditioning, in addition to pedagogical, psychological and social variables act together as a whole in shaping the context within which learning takes place (Lackney, 1999).

Statistics of 2004 show lack of specialized teachers in various majors in Mafraq Governorate of Jordan. In addition, applied science majors are not established in schools at the dispersed human settlements from Mafraq City.

Mafraq Governorate area is about 26435 Square kilometers, which represents about 29.6% out of Jordan's total area, and the second largest governorate after Ma'an. Mafraq Governorate population reached 239,000 and represents about 4.6% of Jordan's total population of 2001, of which 47.6% are females and 52.4% of which are

males; 42% are less than 15 years old compared to Jordan's rate, which is 39%; and 33.1% urbanite and 66.9% town residents. Population density is about 9-11 per one square kilometers compared to the rest of Jordan, which is 58 per square kilometer. The governorate has four regions that include (Department of Statistics, 2001): (1) Mafraq center with 104,000 with 3 districts and 72 settlements of which 25 increases over 1000 people; (2) Northwest Badia and its center is al Al Al-Bayt University and have three districts with 71,000 population and 42 settlements eight of which increases over 1000 people; (3) Northeast Badia have four districts with 51,000 population and 67 settlements with 10 settlements that have more than 1000 population; and (4) Ruwaished with population of 17,000 and twelve settlements, four of which is populated with more than 1000 (Department of Statistics, 2002).

Being the first of its kind, this study emphasizes the role of physical environment of educational facility in providing qualitative and competitive graduates, which impacts socio-economics of the local community. This research is significant by being a model that focuses on development of education facility within economic constraints to sustain resources independently from central governmental support. The researchers are expected to gain more expertise in the management and development of physical educational facility. Goals of the study are to diagnosing the relevance of the physical facility to education output that will make Mafraq Governorate dependent on its own human resources. The study outcomes will provide a set of guidelines towards making educational facility (physically) more efficient.

II.

3 Literature Review and Theory a) Teaching Environment Effect on Learning Efficacy

A study by Tam and Cheng (1995; conceptualized quality of school teaching environment based upon a multi-perspective approach. It measured the internal social environment of the school organization and its relations to the performance of teachers and students. School environment and performance of students had theoretical and practical implications. There were six integrated school environment factors that emerged to reflect the learning/teaching environment: strength of leadership, staff frustration, positive classroom climate, caring and support to students (a combination of three environment variables: esprit, intimacy, and student-centeredness), formalization, and pupil control (pupil control ideology minus organizational ideology) (Cheng, 1993; Ming, 1994; Ming & Cheong, 1995). Leadership behavior of the principal measured by the integration of the five aspects: instructional (educational), structural (hierarchy of authority, hindrance (difficulty and obstruction) as signs of bureaucratization of a school, and participative decision), human resource, political, and cultural (symbolic) (Sergiovanni;1984;Bush, 1986;Bolman & Deal, 1991;Cheng, 1993). Further factors included: school context, which is measured by age and size of the school; personal characteristics of students measured by age and gender; personal characteristics of teachers measured by average teacher teaching experience (teaching age), age of teacher, and gender of teacher. Additionally, teacher performance was measured by efficacy and time-use at the individual level. Students' performance was measured by learning efficacy (efficiency). Students' competition was as a function of affiliation and involvement, better social relationship among students increase the students' engagement in study (Ming, 1994;Ming and Cheong, 1995). b) Facility Quality and Learning Efficacy School facility are of critical importance to teaching and learning environment (Lackney, 1999). Johnson (1990a) indicated that quality of the learning environment affects teacher behavior and teacher attitudes towards teaching continuity. The physical facility is an undeniably integral part of the ecological context for learning, and has a positive influence on the bottom-line indicators of quality in education (Lackney, 1999). Physical conditions of the facility include classroom environments and school environment.

4 i. Classroom Environment

Types of education facility include classrooms, laboratories, lecture halls, and other services. Usually classroom environments have 20-35 students under the control of a single teacher. Classroom environments include class arrangement, size, natural lighting, optimal thermal conditions, and indoor air quality as follows: a. Class Arrangement Several studies indicated that classroom arrangements affect student performance, especially in relation to their distance from the teacher (Griffith, 1921;Snow, 2002); it affects their grades (Becker, Sommer, Bee, and Oxley, 1973; Holliman & Anderson, 1986;Levine, O'Neal, Garwood, & McDonald, 1980), absences (Stires, 1980), participation (Sommer, 1967), and attention (Schwebel & Cherlin, 1972). Further, seating arrangements affect visual and verbal contacts with teacher and, therefore, affect participation but not necessarily overall performance (Adams & Biddle, 1970).

5 b. Class Size

Class size points directly to a social and physical link to achievement (Achilles, 1992; Finn & Achilles, 1990). Children in smaller classes (13-17 per room) outperform those in regular-sized classes (22-25 per room). An increased density can induce stress in children thereby increasing aggressive behavior and distraction in younger children (Loo, 1976). Students take more of the responsibility for their own learning when classes are smaller; learning activities become more frequently individualized (Duke & Perry, 1978).

6 c. Lighting

Natural lighting and windows affect students' performance (Brooks & Rebata, 1991). Students had better achievement and behaviors in classrooms with more light (Rovner, 1982; Kleiber, 1973; Mayron et al., 1974; Dunn & Price, 1985; Ott, 1976).

7 d. Thermal Conditions

Thermal comfort, influence task performance, attention spans and levels of discomfort (McGuffey, 1982). Reading speed and comprehension and mathematical skills operations such as multiplication, addition and factoring were adversely affected by temperatures above 74 F degrees (Harner, 1974). e. Indoor Air Quality Thermal tightening of buildings for energy conservation causes a variety of pathogenic factors in children in so called 'sick' school buildings. These factors may be affecting not only performance but the overall physical health of children, as they exhibit clear signs of sensory irritation, skin rashes, and mental fatigue that potentially decrease the ability of students to perform (Evans, Kliewer, & Martin, 1991).

ii. School Environment a. Noise and Location of Schools Noise may decrease teaching time by forcing teachers to continuously pause or by making it difficult for the student and teacher to hear one another (Crook and Langdon, 1974). Noise negatively influence children's information processing, personal control, and A study by educational building conditions were hampering student performance, and estimated that improved facilities could lead to a 5.5% to 11% improvement on standardized tests (Edwards, 1991; Lackney, 1996). c. Schools Size Small schools benefit students socially and academically, while smaller school buildings consume less energy. The use of school facilities can be shared with a variety of community organizations fostering meaningful partnerships and engagement, as well as, opportunities for children to walk and bike as added health benefit (Lackney, 1999). On average, research indicates that an effective size for an elementary school is in the range of 300-400 students and that 400-800 students is appropriate for a secondary school (7-8) (Cotton, 1996). School size shows effect on the following:

? Quality of the Curriculum and Cost-Effectiveness (Howley 1994 (Howley, 1996; Raze, 1985; Robertson, 1995; Rogers 1987; Rutter, 1988; Walberg, 1992). ? Academic Achievement (Bates, 1993; Burke, 1987 (Burke, 1987; Fowler, 1992; ?ewell, 1989; ?wanson, 1988).

III.

8 Research Methods

The hypotheses of the study were investigated based on field research using interviews and surveys. One leader for two teams of eight assistants conducted the field research. Surveys were conducted by interviewing a sample of schools administrators from the four directorates in Mafraq Governorate (Mafraq center, Northwest Badia, and Northeast Badia) representing the eighteen municipalities that included a target population of all elementary and secondary schools. Interviews took place inside the school building in the municipal office for the whole sample. A secondary, 8 vocational and academic, and two vocational. The proportion is suggested to be about 60%-70% of the schools distributed over the three directorates and covering all the municipalities. So from each municipality only two-thirds of the total available schools were suggested to be interviewed from both female and male elementary and secondary schools. Randomization used the list of schools in each municipality which is alphabetically ordered. Selection was assigned randomly as every other school in the list until the proportion of 60-70% of the schools is achieved from each of the female and male elementary and secondary schools list. ?inal iii. Teaching-Organizational, Personality of the Teacher and the Student, and other Variables a. Teaching-organizational entity includes: (1) In terms of classroom area, it ranged from 4-48 square meters. However, most of the sample (73.7%) has classroom area of 10-29 square meters. In regards to classroom size in terms of students' numbers, the numbers of students ranged from 2 to 50 students, with an average size of about 21 students, see Table 2 and Figure 1.

About half of the sampled schools (52.8%) have classroom size of less than 20 students. In regards to proper classroom size in terms of students number, most of the sample agreed on its appropriateness (71.2%). Classroom shapes were square, rectangular, and irregular. However, the most occurring shape is rectangular (58.5%) and the least is irregular (2.6%). In terms of classroom seats arrangement, most of the sample (85.6%) agreed on its appropriateness. Also, about 54.2% of the sample agreed on flexibility of classroom furniture arrangement. Further, most of the sample (72.5%) considered the attention to furniture and equipment that makes teachers store their tools appropriate. In terms of natural lighting sources, most of the sample agreed on its availability (90.8%). Number of windows in classrooms ranged from 1-8, the most frequent occurrence of number of windows is two (48.5%). In terms of services, about 77.7% of the schools have computer labs, and only 42.4% have science labs, and 13.5% have art studios. On the other side, about half the sample have libraries (50.2%) school library. Further, only 11.8% of the schools have indoor sports facilities, and 27.9% have outdoor sports facilities. In addition, about two-thirds (69%) have food facility, and only 24% have praying facility. About two-thirds (65.5%) have school fencing, and about two-thirds (63.8%) have school gates, see Table 3. Most of the schools (91.7) have rest rooms, see Table 3.

School size measured by students' numbers ranged from schools that have less than 50 students (6.2%) to schools that have 500-757 students (3.2% of the sample). However, 61.1% of the schools have less than 150

students, and the most occurring school size is 150-200 students (40.7%). School area ranged from 54-10000 square meters, with the most occurring area of 200-500 square meters (39.9%). About half the sample (48%) has area of less than 500 square meters, see Table 4. Further, 79% of the sample agreed on the schools being located in a quiet zone and away from noise. About half of the sample (54.6%) agreed that their schools are well maintained. Instructional capacity was assessed with an average of 4 and a tendency of strong agreement; structural agreement was also with an average of 4.1 and a tendency of strong agreement; staff frustration has a tendency of disapproval with an average of 2.6; positive classroom environment has a slight tendency of approval with an average of 3.7; caring and support for students has a slight tendency of approval with an average of 4; formalization has a tendency of strong agreement with an average of 4.2; and students control has a strong agreement with an average of 4.2, see Table 5.

9 Global Journal of Management and Business Research

10 2) Quality of Education at the School Level

Perception of existing pedagogy has a slight tendency of approval with an average of 3.8; directing students to choose the right stream also received slight approval with an average of 3.5; and obstacles by the Ministry of Education concentration has a tendency of agreement with an average of 4.0, see Table 5.

11 3) Other Variables

Included students attitude with a tendency of slight agreement (M=3.8); teachers attitude with a tendency of agreement (M=3.98); available school services has a slight agreement with M=3.4; and perceived students' performance has a tendency of slight agreement M=3.1, see Table 5. Learning efficacy averaged 3.1 with agreement. Meanwhile, perceived students' performance in all subjects were as follows, see Table 6: ? Science ranged from 1-5 with M= 3.2.

12 Global Journal of

? Math ranged from 1-5 with M= 2.9.

? Physics ranged from 1-5 with M= 2.7.

? Chemistry ranged from 1-5 with M= 2.9.

? Biology ranged from 1-5 with M= 3.1.

? Geology ranged from 1-5 with M= 3.2.

? Computer Science ranged from 1-5 with M= 3.4.

? Arabic ranged from 1-5 with M= 3.7.

? English ranged from 1-5 with M= 2.9. Learning efficacy was associated with the following entities of the physical capacity of classroom and school facility and in the order of their strong effect: natural ventilation, rest rooms, science labs, computer labs, school area, indoor sports facility, number of classroom windows, and art studios, which supports Lackney (1999), Snow (2002), Brooks and Rebata (1991), Griffith (1921) Further, the following entities of the capacity of physical classroom and school facility were positively correlated to directorates of Mafrq Governate: additional lighting sources, natural ventilation, presence of rest rooms, and school size; and negative correlated with indoor sports facility, which supports Cotton (1996) ii. Weaknesses Lack of computers; weak physical infrastructure like crowding in some classrooms, rented buildings, and bad quality buildings; dispersed school from residential settings; lack of instruments, tools, and computers in remote schools; insufficient financial and technical capacities of school; two teaching shifts iii. Opportunities Improvement of physical environment, infrastructures, facilities, labs, equipment, buildings, and classrooms; separation of gender and of educational levels. iv. Threats lack of thermal control in extreme weather conditions; and lack of safe playground, school fencing, and other infrastructures. c) Recommendations Some schools suffer from lack of infrastructure and feel upgrading is not made possible, especially for schools who have rented buildings. It is suggested to increasing and enhancing infrastructure and services for students, teachers, and management; distributing services equally among schools; implementing safety measures at the main street in front of the schools.

Major issues that should be considered by education policy makers include: ? Emphasis of joining schools together, as it seems number of students as well as section are vital for output and more so than number of teachers. Many schools are suffering, especially in the Northeast Badia Region of Mafrq Governate, from small number of students in geographically dispersed villages. It is healthier to increase numbers of students to a range of 20-30 per section for completion among students. ? Physical infrastructure that supports students' activity seems vital and affects student's performance positively. Therefore, it is worth to invest in sports and arts facilities, and the like.

¹© 2013 Global Journals Inc. (US) arousal level (Cohen & Weinstein, 1981; Evans, Kliever, & Martin, 1991; Berglund & Lindvall, 1986; Cohen, Evans, Stokols, & Krantz, 1986).

²© 2013 Global Journals Inc. (US)



Figure 1:



Figure 2:

1

Stre-

Figure 3: Table 1 :

2

Variables Classroom Size (Number of Students) Classroom Area Classroom Shape Classroom Number of Wi

Classroom Cooling Control Classroom Natural Ventila-	3	1.74	1.13	1.22	1.58	1.86	1.50	1.88	1.72	1.31	1.7
tion Computer Labs Science Labs Art Studios Library	2										
Indoor Sports Facility Outdoor Sports Facility Food Fa-	2										
cility Praying Facility School Fencing School Gate Rest	2										
Rooms School Size (Students Numbers) School Area In	2										
terms of additional lighting sources, about 229 2 229 1	2										
School Environment 1 1 229 1 1 229 1 1 229 1 1	2										
229 1 1 229 1 1 229 1 1 229 1 1 229 1 1	2										
229 565 10 229 9443 54	2										
	2										
	2										
	2										
	2										
	2										
	575										
	9497										

two-thirds of the sample (79.5%) agreed on its presence. Thermal conditions: only about half the sample agreed on heat availability (47.2%), and about one-quarter (26.2%) agreed on cooling control availability. In regards to air quality and natural ventilation,

[Note: A most of the sample (87.3%) agreed on its availability in classrooms, see Table3.]

Figure 4: Table 2 :

Frequency Valid Percent Cumulative Percent				Rest Rooms Yes 210 91.791.7 No 19 8.3 100.0 Total 229 100.000.0
Classroom Environment				
Classroom Additional Lighting Source				
Yes	182	79.5	79.5	
No	47	20.5	100.0	
Classroom Heat Control				
Yes	108	47.2	47.2	
No	121	52.8	100.0	
Classroom Cooling Control				
Yes	60	26.2	26.2	
No	169	73.8	99.6	
Classroom Natural Ventilation				
Yes	200	87.3	87.3	
No	29	12.7	100.0	
School Environment				
Computer Labs				
Yes	178	77.7	77.7	
No	51	22.3	100.0	
Science Labs				
Yes	97	42.4	42.4	
No	132	57.6	100.0	
Art Studios				
Yes	31	13.5	13.5	
No	198	86.5	100.0	
Library				
Yes	115	50.2	50.2	
No	114	49.8	100.0	
Indoor Sports Facility				
Yes	27	11.8	11.8	
No	202	88.2	100.0	
Outdoor Sports Facility				
Yes	64	27.9	27.9	
No	165	72.1	100.0	
Food Facility				
Yes	158	69.0	69.0	
No	71	31.0	100.0	
Praying Facility				
Yes	55	24.0	24.0	
No	174	76.0	100.0	
School Fencing				
Yes	150	65.5	65.5	
No	79	34.5	100.0	
School Gate				
Yes	146	63.8	63.8	
No	83	36.2	100.0	

Figure 5:⁷Table 3 :

Educational Facility's Physical Entities				b. Human Resources Capacity -distribution across gender, levels of education, number of sections and students, and pass and fail: The distribution of gender across the sampled schools was 41.05% males, 19.65% females, and 39.30% mixed genders. Education level across the sampled schools included 57.64% elementary, 10.48% secondary, and 31.88% both levels.
Variables	Frequency	Percent	Classroom Environment	
			Classroom Area	
Less than 10	8	3.4	3.5	
More than 10 & less than 30	169	73.7	77.3	
30 and more / less than 48	52	22.5	100	c. Teaching-Organizational Entity, Quality of Education at the School Level & Other Variables 1) Teaching-Organizational Entity
Classroom Size (Students Numbers)				
Less than 10	22	9.5	9.6	
11 to 20	99	43.2	52.8	
21 to 30	85	37.2	90	
31 to 40	21	9.1	99.1	
45	1	0.4	99.6	
50	1	0.4	100	
School Environment				
School Size (Students Numbers)				
Less than 50	15	6.2	6.6	
50 to less than 100	31	12.9	20.1	
100 to less than 150	94	40.7	61.1	
150 to less than 200	20	8.3	69.9	
200 to less than 250	20	8.5	78.6	
250 to less than 300	15	6.3	85.2	
300 to less than 400	17	7.1	92.6	
400 to less than 500	9	3.7	96.5	
500-575	8	3.2	100	
School Area				
54 to less than 100	3	1.2	1.3	
100 to less than 200	15	6.5	7.9	
200 to less than 500	92	39.9	48	
500 to less than 1000	22	9.6	57.6	
1000 to less than 2000	30	13	70.7	
2000 to less than 3000	11	4.7	75.5	
3000 to less than 4000	13	5.6	81.2	
4000 to less than 5000	15	6.5	87.8	
5000 to less than 6000	17	7.3	95.2	
6000 to less than 10000	11	4.7	100	
Total	229	100	100	

6

Overall Performance	229				3.1009	.67052	
High Performance in Science	229	4	1	5	3.23	1.023	1.047
High Performance in Math	229	4	1	5	2.85	1.066	1.136
High Performance in Physics	229	4	1	5	2.71	.896	.803
High Performance in Chemistry	229	4	1	5	2.87	.918	.842
High Performance in Biology	229	4	1	5	3.13	.923	.851
High Performance in Geology	229	4	1	5	3.18	.907	.823
High Performance in Computer Science	229	4	1	5	3.39	.854	.730
High Performance in Arabic	229	4	1	5	3.67	.835	.696
High Performance in English	229	4	1	5	2.88	1.077	1.160
b) Relationship Between Physical Entity of the Facility over Learning Efficacy & other Variables							

Figure 7: Table 6 :

5

Education & Other Variables

Figure 8: Table 5 :

7

Figure 9: Table 7

7

Capacity of Physical Facility Variable	Pearson Correlation North Ba-dia Regions
Additional Lighting Source	.172 **
Heat Control	.047
Cooling Control	.005
Natural Ventilation	.134 *
Computer Labs	.101
Science Labs	-.069
Art Studios	-.060
Library	.076
Indoor Sports Facility	-.164 *
Outdoor Sports Facility	-.015
Praying Facility	-.035
Food Facility	.083
School Fencing	.019
School Gate	.047
Rest Rooms	.131 *
Proper Classroom Size	-.127
Classroom Size	-.024
Number of Students in Classroom	.118
Classroom Shape	-.004
Natural Classroom Lighting	.011
Number of Classroom Windows	.070
Seats Arrangement	.030
Classroom Arrangement	-.093
Flexibility	
Attention to Furniture & Equipment	-.003
School Size (Students Numbers)	.288 **
School Area	.210 **
School Quite Location	.102
School Maintenance	-.010

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).
 b. Village Distance

Figure 10: Table 7 :

8

Figure 11: Table 8

8

Variable	Pearson Corre- lation North Badia Regions
Additional Lighting Source	.172 **
Heat Control	.047
Cooling Control	.005
Natural Ventilation Computer Labs	.134 *
	.101
Science Labs Art Studios	-.060
	-.069
Library	.076
Indoor Sports Facility Outdoor Sports Facility Praying Facility	-.164
Food Facility School Fencing School Gate Rest Rooms Proper	* -.015
Classroom Size Classroom Size Number of Students in Classroom	-.035
Classroom Shape	.083
	.019
	.047
	.131 *
	-.127
	-.024
	.118
	-.004
Natural Classroom Lighting Number of Classroom Windows Seats Arrangement Classroom Arrangement Floor	

school facility on learning efficacy using ANOVA Test of Variance. The test indicated significant effect on natural ventilation, existence of computer labs, science labs, art

[Note: A studios, indoor]

Figure 12: Table 8 :

10

Figure 13: Table 10 :

11

Number of Students in Class-room	2632.487 h	29	90.775	1.505	.055
Number of Classroom Windows	74.168 i	29	2.558	1.661	.024
School Area	1.988E8	29	6854857.856	1.810	.010
Heat Control	183.192	1	183.192	774.146	.000
Natural Ventilation	110.562	1	110.562	1163.979	.000
Computer Labs	121.298	1	121.298	789.252	.000
Science Labs	177.698	1	177.698	819.995	.000
Art Studios	263.977	1	263.977	2411.320	.000
Indoor Sports Facility	269.182	1	269.182	2811.274	.000
Rest Rooms	98.761	1	98.761	1462.587	.000
Number of Students in Class-room	39429.236	1	39429.236	653.777	.000
Number of Classroom Windows	599.361	1	599.361	389.227	.000
School Area	3.125E8	1	3.125E8	82.493	.000
Heat Control	592.000	229			
Natural Ventilation	316.000	229			
Computer Labs	382.000	229			
Science Labs	625.000	229			
Art Studios	823.000	229			
Indoor Sports Facility	835.000	229			
Rest Rooms	286.000	229			
Number of Students in Class-room	117522.000	229			
Number of Classroom Windows	2043.000	229			
School Area	1.567E9	229			

V. Conclusions

a) Capacity of Physical Facility over Learning Efficacy
& Geographical Location & Village Distance

Figure 14: Table 11 :

.1 Acknowledgement

Funding for this work was provided by Deanship of Scientific Research, German-Jordanian University, Amman, Jordan, in 2008.

[Griffith ()] *A Comment upon the Psychology of the Audience. Psychological Monographs*, C R Griffith . 1921. 30 p. .

[Snow ()] *A doctor dissertation thesis on: Teachers' Perception and Use of Classroom Space*, S E Snow . 2002. Athens, Georgia. The University of Georgia

[Fowler ()] 'Available from the Office of Educational Research and Improvement'. W J Fowler Jr . *Paper presented to the American Educational Research Association Annual Meeting*, (San Francisco, CA) 1992. National Center for Educational Statistics, U.S. Department of Education (What do We Know about School Size? What should we know?. Washington, D.C)

[Cohen et al. ()] *Behavior, Health, and Environmental Stress*, S Cohen , G W Evans , D Stokols , D S Krantz . 1986. New York: Plenum.

[Smith and Deyoung ()] 'Big School vs. Small School: Conceptual, Empirical, and Political Perspectives on the Re-emerging Debate'. D T Smith , A J Deyoung . *Journal of Rural and Small* 1988. p. .

[Barker and Gump ()] *Big School, Small School: High School Size and Student Behavior*, R Barker , P Gump . 1964. Stanford, CA: Stanford University Press.

[Edwards ()] *Building Conditions, Parental Involvement, and Student Achievement in the D.C. Public School System*, M M Edwards . 1991. Georgetown University, Washington, D.C (Unpublished master's thesis)

[Stockard and Mayberry ()] *Chapter 3 in Effective Educational Environments*, J Stockard , M Mayberry . 1992. Newbury Park, CA: Corwin Press, Inc. p. . (Resources and School and Classroom Size)

[Sommer ()] 'Classroom Ecology'. R Sommer . *Journal of Applied Behavioral Science* 1967. 3 p. .

[Levine et al. ()] 'Classroom Ecology: the Effects of Seating Position on Grades and Participation'. D W Levine , E C Neal , S G Garwood , P J McDonald . *Personality and Social Psychology Bulletin* 1980. 6 p. .

[Stires ()] 'Classroom Seating Location, Student Grades, and Attitudes: Environment or Self-Selection'. L Stires . *Environment and Behavior* 1980. 12 p. .

[Totusek and Staton-Spicer ()] 'Classroom Seating Preferences as a Function of Student personality'. P Totusek , A Staton-Spicer . *Journal of Experimental Education* 1982. 505 p. .

[Becker et al. ()] 'College classroom ecology'. F D Becker , R Sommer , J Bee , B Oxley . *Sociometry* 1973. 36 p. .

[Brooks and Rebata ()] 'College Classroom Ecology: the Relation of Sex of Student to Classroom Performance and Seating Preference'. C I Brooks , J L Rebata . *Environment and Behavior* 1991. 23 (3) p. .

[Summers and Wolfe ()] 'Do Schools Make a Difference?'. A A Summers , B L Wolfe . *American Economic Review* 1977. 67 p. .

[Toenjes ()] 'Dropout Rates in Texas School Districts: Influences of School Size and Ethnic Group'. L A Toenjes . *Texas Center for Educational Research* 1989. 324 p. 783.

[Rutter ()] 'Effects of School as a Community'. R A Rutter . *National Center on Effective Secondary Schools* 1988. 313 p. 470.

[Campbell et al. ()] 'Effects of School Size upon Some Aspects of Personality'. W J Campbell , J L Cotterell , N M Robinson , D R Sadler . *The Journal of Educational Administration* 1981. 19 (2) p. .

[Harner ()] 'Effects of Thermal Environment on Learning Skills'. D P Harner . *CEFP Journal* 1974. 12 p. .

[Kleiber ()] *Environmental Illumination and Human Behavior: The effects of spectrum light Sources on Human Performance in a University Setting*, D Kleiber . 1973. Ithaca, N.Y: Cornell University Press.

[Stolp ()] 'Every School a Community: The Academic Value of Strong Social Bonds Among Staff and Students'. S Stolp . *OSSC Bulletin* 1995. 39 (1) . (entire issue)

[Lewin ()] 'Forces Behind Food Habits and Methods of Change'. K Lewin . *Bulletin* 1943. National Research Council. 108.

[Gump (ed.) ()] *Handbook of Environmental Psychology (pp698-701)*, P Gump . D. Stokols and I. Altman (ed.) 1987. New York: Wiley. (School and Classroom Environments)

[Rovner (1982)] 'Healthtalk: New Light on Depression'. S Rovner . *The Washington Post* 1982. May 21. p. 85.

[Ott ()] 'Influence of Fluorescent Lights on Hyperactivity and Learning Disabilities'. J N Ott . *Journal of Learning Disabilities* 1976. 9 (7) p. .

[Pittman and Haughwout ()] 'Influence of High School Size on Dropout Rate'. R B Pittman , P Haughwout . *Educational Evaluation and Policy Analysis* 1987. 9 (4) p. .

- [Raze ()] 'Instructional Implications for Small Schools: A Review of the Literature'. N Raze . *SMERC Information Center* 1985. San Mateo County Office of Education. p. 347.
- [Rogers ()] 'Is Bigger Better? Fact or Fad Concerning School District Organization'. R G Rogers . *ERS Spectrum* 1987. 5 (4) p. .
- [Sergiovanni (1984)] 'Leadership and Excellence in Schooling'. T Sergiovanni . *Educational Leadership* 1984. February. p. .
- [Bolman and Deal ()] *Leadership and Management Effectiveness: a Multi-Frame, Multi-Sector Analysis. Human Resource Management*, L G Bolman , T E Deal . 1991. 30 p. .
- [Mayron et al. ()] 'Light, radiation and academic behavior'. L W Mayron , J Ott , R Nations , E Mayron . *Academic Therapy* 1974. 40 p. .
- [Howley ()] *Literature Review. In Sizing up Schooling: A West Virginia Analysis and Critique. Unpublished Doctoral Dissertation*, C Howley . 1996. Morgan-town, WV. West Virginia University
- [Koneya ()] *Location and Interaction in the Row and Column Seating Arrangements. Environment and Behavior*, M Koneya . 1976. 8 p. .
- [Burke ()] 'Making a Big School Smaller: The School-Within-a-School Arrangement for Middle Level Schools'. A M Burke . *Orting Middle School* 1987. p. 890.
- [Mcganney et al. ()] M L Mcganney , D M Mei , J Rosenblum . *Ninth Grade Houses: The Program and Its Impact in New York City Public High Schools. Paper presented at the Annual Meeting of the American Educational Research Association*, (San Francisco, CA) 1989. 306 p. 284.
- [Aptekar ()] 'Mexican-American High School Students' Perception of School'. L Aptekar . *Adolescence* 1983. 18 (70) p. .
- [Cohen and Weinstein ()] 'Nonauditory Effects of Noise on Behavior and Health'. S Cohen , N Weinstein . *Journal of Social Issues* 1981. 37 (1) p. .
- [Walberg ()] 'On Local Control: Is Bigger Better?'. H J Walberg . *Source Book on School and District Size, Cost, and Quality. Minneapolis* 1992. Hubert H. Humphrey Institute of Public Affairs. 361 p. 164. MN: Minnesota University ; North Central Regional Educational Laboratory
- [Schwebel and Cherlin ()] 'Physical and Social Distancing in Teacher-Pupil Relationships'. A I Schwebel , D L Cherlin . *Journal of Educational Psychology* 1972. 63 p. .
- [Bates ()] 'Portrait of a Successful Rural Alternative School'. J T Bates . *Rural Educator* 1993. 14 (3) p. .
- [Cheng ()] 'Profiles of Organizational Culture and Effective Schools'. Y C Cheng . *School Effectiveness and School Improvement* 1993. 4 (2) p. .
- [Eichenstein ()] *Project Achieve, Part I: Qualitative Findings 1993-94*, R Eichenstein . 1994. Brooklyn, NY; New York City Board of Education: Office of Educational Research. 379 p. 388.
- [Lackney ()] *Quality in School Environments: A Multiple Case Study of Environmental Quality Assessment in Five Elementary Schools in the Baltimore City Public Schools from an Action Research Perspective. School of Architecture and Urban Planning*, J A Lackney . 1996. University of Wisconsin-Milwaukee (UMI Dissertation Services No. 9717142)
- [Adams and Biddle ()] *Realities of Teaching: Explorations with Video Tape*, R S Adams , B J Biddle . 1970. New York; Holt, Rinehart & Winston.
- [Robertson ()] 'Reinventing the High School: The Coalition Campus School Project'. P Robertson . *Paper presented at the Annual Meeting of the American Educational Research Association*, (New York City; San Francisco, CA) 1995.
- [Cawelti ()] 'Restructuring Large High Schools to Personalize Learning for All'. G Cawelti . *ERS Spectrum* 1993. 11 (3) p. .
- [Fetler ()] 'School Dropout Rates, Academic Performance, Size, and Poverty: Correlates of Educational Reform'. M Fetler . *Educational Evaluation and Policy Analysis* 1989. 11 (2) p. .
- [Ming and Cheong ()] 'School Environment and Student Performance: A Multi-level Analysis'. T W Ming , C Y Cheong . *Educational Research Journal* 1995. 10 (1) p. .
- [Ming ()] *School Environment as Related to Performance of Teachers and Students*, T W Ming . 1994. The Chinese University of Hong Kong Graduate School -Division Of Education (Master of Philosophy in Education Thesis)
- [Gottfredson ()] *School Size and School Disorder*, D C Gottfredson . 1985. Baltimore, MD: Center for Social Organization of Schools. p. . Johns Hopkins University
- [Fowler ()] 'School Size and Student Outcomes'. W J Fowler Jr . *Advances in Educational Productivity* 1995. 5 p. .
- [Grabe ()] 'School Size and the Importance of School Activities'. M Grabe . *Adolescence* 1981. 16 (61) p. .

- [Fowler and Walberg ()] 'School Size, Characteristics, and Outcomes. Educational Evaluation and'. W J Fowler Jr , H J Walberg . *Policy Analysis* 1991. 13 (2) p. .
- [Cotton ()] *School Size, School Climate, and Student Performance. Close-Up #20*, K Cotton . <http://www.nwrel.org/scpd/sirs/10/c020.html> 1996.
- [Weinstein ()] *Seating Arrangements in the Classroom. International Encyclopedia of Education*, C S Weinstein . 1985. New York: Pergamon.
- [Berglund and Lindvall ()] 'Sensory reactions to sick buildings'. B Berglund , T Lindvall . *Environment International* 1986. 12 p. .
- [Berlin and Cienkus ()] 'Size: The Ultimate Educational Issue?'. B M Berlin , R C Cienkus . *Education and Urban Society* 1989. 21 (2) p. .
- [Gregory ()] 'Small Is Too Big: Achieving a Critical Anti-Mass in the High School'. T Gregory . *In Source Book on School and District Size, Cost, and Quality. Minneapolis* 1992. Hubert H. Humphrey Institute of Public Affairs. 361 p. 159. MN: Minnesota University ; North Central Regional Educational Laboratory
- [Haller et al. ()] 'Small Schools and Higher-Order Thinking Skills'. E J Haller , D H Monk , L T Tien . *Journal of Research in Rural Education* 1993. 9 (2) p. .
- [Garbarino ()] 'Some Thoughts on School Size and its Effects on Adolescent Development'. J Garbarino . *Journal of Youth and Adolescence* 1980. 9 p. .
- [Schoggen and Schoggen ()] 'Student Voluntary Participation and High School Size'. P Schoggen , M Schoggen . *Journal of Educational Research* 1988. 81 (5) p. .
- [Johnson ()] *Teachers at Work: Achieving Success in Our Schools*, S M Johnson . 1990b. New York: Basic Books.
- [Johnson ()] *Teachers, power, and school change*, S M Johnson . 1990a. Cambridge, MA: Harvard University Press.
- [Howley ()] 'The Academic Effectiveness of Small-Scale Schooling (An Update). ERIC Digest'. C Howley . *Clearinghouse on Rural Education and Small Schools*, (Charleston, WV) 1994. 372 p. 897.
- [Gregory and Smith ()] 'The Case for Small High Schools'. T B Gregory , G R Smith . *High Schools as Communities: The Small School Reconsidered. Bloomington*, 1987. Phi Delta Kappa. 278 p. 518.
- [Achilles ()] *The Effect of School Size on Student Achievement and the Interaction of Small Classes and School Size on Student Achievement. Unpublished manuscript, Department of Educational Administration*, C M Achilles . 1992. Greensboro, North Carolina. University of North Carolina-Greensboro
- [Eberts et al. ()] *The Effect of School Size on Student Outcomes. Final Report*, R W Eberts , E Kehoe , J A Stone . 1982. Eugene, OR. 245 p. 382. Center for Educational Policy and Management, University of Oregon
- [Crook and Langdon ()] *The Effects of Aircraft Noise in Schools around London Airport. Sound and Vibration*, M A Crook , F J Langdon . 1974. 34 p. .
- [Loo ()] 'The Effects of Spatial Density on Behavior Types of Children'. C Loo . *ERIC* 1976. National Institute of Mental Health
- [Lackney ()] 'The Relationship between Environmental Quality of School Facilities and Student Performance. Congressional Briefing to the U.S. House of Representatives Committee on'. J Lackney . <http://schoolstudio.engr.-wisc.edu/energysmartschools.html> *Science Sponsored by the Environmental Energy Study Institute* 1999.
- [Galal (2008)] *The Road Not Traveled: Education Reform in the Middle East and North Africa*, A Galal . 2008. January 2008. by World Bank. (Published)
- [Evans et al. ()] 'The Role of the Physical Environment in the Health and Well-being of Children'. G W Evans , W Kliever , J Martin . *New Directions in Health Psychology Assessment*, H E Schroeder (ed.) (New York) 1991. Hemisphere. p. .
- [Bush ()] *Theories of Educational Management*, T Bush . 1986. London: Harper and Row.