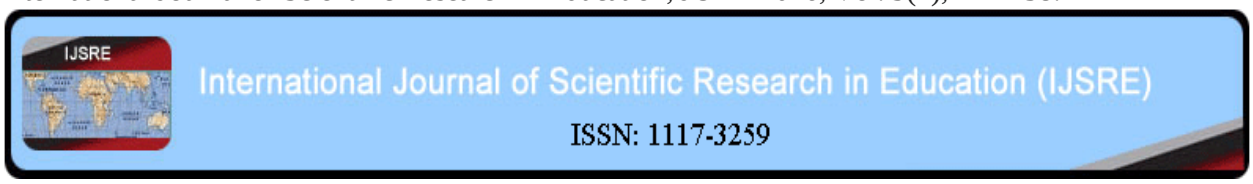
International Journal of Scientific Research in Education, JUNE 2016, Vol. 9(2), 127-138.



The Place of Ecology in Academic Performance as Perceived by Students in Nandi, Kenya.

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Abstract

This study determined the ecological factors, as perceived by students of high and low achieving schools that contribute to the academic achievement in Nandi Central district. We employed causal comparative research design to identity the cause–effect relationship between school ecology of high and low performing secondary schools. Random sampling technique was employed to select the study participants. There were 424 participants. *T*-test, a parametric statistical tool was used to compute the mean of the perceptions of students on the aspects of school ecology in both high and low achieving schools. Secondary schools in Nandi–Central district have a generally favorable ecology, as rated by students. The study concludes that low performing schools have a less favorable ecology compared to the high achieving schools. Thus, school ecology significantly influences academic performance in secondary school.

Keywords: Kenya, Ecology, Learning Environment, Academic Performance, Educational Function, School Administrators.

Reference to this paper should be made as follows:

Yegoh, E., Kiplagat, P., & Tuimur, R. (2016). The Place of Ecology in Academic Performance as Perceived by Students in Nandi, Kenya. *International Journal of Scientific Research in Education, 9*(2), 127-138. Retrieved [DATE] from http://www.ijsre.com

INTRODUCTION

Academic achievement and its predictors have been an important topic of study for educational researchers and policymakers for many decades. It remains a subject of research why students of the same intellectual capacity and potential perform differently under different conditions. These researchers have contend that a number of individual-level and school structural variables are consistently connected to academic performance, and school commitment (Battistich, Solomon, Kim, Watson, & Schaps, 1995), school involvement (Brown & Evans, 2002; McNeal, 1995), school attachment (Crosnoe, Johnson, & Elder, 2004; Johnson, Crosnoe, & Elder, 2001), and school climate (Dupper & Meyer-Adams, 2002; Goldsmith, 2004; Lee & Bryk, 1989). Feuerstein (2000) concluded that although both individual-level and school structural variables affect academic performance, the process by which this effect occurs complicated.

This study sought to find out the ecological (physical aspects of the learning environment) factors, as perceived by students of high and low achieving schools that contribute to the academic performance in Nandi Central district. The school climate – student performance has been well-grounded in the research (Freiberg, Driscoll, & Knights, 1999: Hoy, & Hannum, 1997; Kober, 2001; Loukas, & Robinson, 2004; Norton, 2008; Shindler, et al., 2004). Most school administrators do not take seriously matters of school ecology. Likewise few would endorse neglecting the quality of the ecology at one's school, yet the minority of schools have systematic approaches to promoting or maintaining the quality of their climate. in most instances the underlying reasons for this careless approach to ecology is that it is often misunderstood and/or viewed as ecology is that it is not well understood and/or is viewed as a discrete consideration - unrelated to such things are pedagogical practice, achievement goals, curriculum, and teacher development. When school ecology is defined narrowly, it can appear as a relatively independent factor. However, when the general picture is brought in mind, it becomes clear that it relates to the whole. In their research on urban public schools, Jones et al. (2003) found that all of the various aspects of ecology were correlated to one another at most schools. Where one variable on the physical aspects of the school was found to have an effect, the others had a simultaneous effect as well. For instance, in the event that a variable such as discipline was found to be high, a variable such as student interaction was also simultaneously high. These results and others emphasize ecology as an important element in any schools' effort toward successful achievement.

LITERATURE REVIEW

Sporadic and often inconclusive information exists in the literature concerning regarding the impact of ecology on students. Therefore, the need exists for current data either in support or otherwise the perspective behind this discourse (Tanner & Lackney, 2006). In the twentieth century Alexander and coworkers (1977) and Sommer (1969) made significant contributions to this field, with Sommer focusing on personal and social distance and Alexander addressing design classifications and their relationships to people, towns and regions, and the global environment.

A high-density school influences achievement negatively. The concept of density may be perceived through psychological implications by studying territoriality of place, according to Banghart and Trull (1973). It is a fact that students are dependent on the environment for psychological and sociological clues and always interacting with the physical environment. Since

the school is a social system within the general school climate, social distance as it relates to crowding and density is a function of school design making (Tanner & Lackney, 2006).

According to Castaldi (1994), the architectural design of student circulation space has an obvious influence on the educational function of a school building. Space in a room delivers a silent message to students, where the flow and shift of distance between people is large part of the communication process (Duncanson, 2003; Hall, 1959). Fiske (1995) indicated the need for rethinking all aspects of the structure of schooling, including the design of school buildings and other physical aspects of the learning environment. When students attend a school designed with the needs of the students in mind, they notice it and demonstrate a more natural disposition toward respectful behavior and a willingness to contribute to the classroom community (Herbert, 1998).

The need exists in architectural design for the development of spaces that engage, challenge, and arouse. Brain-compatible learning requires much more interaction with the environment than current facilities allow. Taylor and Vlastors (1975) suggest that educational architecture is a "three-dimensional textbook." This means that the learning environment is a functional art form, a place of beauty and a motivational center for learning. Their research indicates that the architecture of learning environments can kindle or subdue learning, aid creativity or slow mental perception.

The presence of natural light in classroom has received attention from several researchers. An intensive research effort was completed in 1999. In a controlled study of over 21,000 students in California, Washington and Colorado, the Heschong Mahone Group (1999) found that students with the most daylight in their classrooms progressed 20 percent faster on mathematics and 26 percent faster on reading tests over a period of one year than students having less daylight in their classrooms. Similarly, students in classrooms having larger window areas were found to progress 15 percent faster in mathematics and 23 percent faster in reading than students occupying classrooms with well-designed skylights, those diffuse daylight throughout the room and also allow teachers to control the amount of light, also progressed significantly faster than students in classrooms without natural light.

> We also identified another window-related effect, in that students in classrooms where windows could be opened were found to progress 7-8% faster than those with fixed windows. This occurred regardless of whether the classroom also had air conditioning. These effects were all observed with 99% statistical certainty (Heschong Mahone Group, p.3)
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> . . . From this study, we have made a number of important findings: We found a uniformly positive and highly significant correlation between the presence of daylighting and student performance in all three districts. We found that daylighting, provided from skylights, distinct from all the other attributes associated with windows, has a positive effect. (p. 62)

However, not all research favors natural light for learning environments. For example, Romney (1975) studied how windowed and windowless environments affected rote learning tasks, concept learning tasks and perceptual tasks of sixth grade students. No significant relationship was found to exist between the absence and presence of windows on rote learning or perceptual tasks.

Outdoor learning environments have become more popular as curriculum innovation seeks to involve students in the study of ecology and greener environments. Often overlooked considerations for schools include the design and development of green areas, natural quiet areas, and play areas. The developing interest in outdoor learning brings the design of outdoor rooms into focus (Freeman, 1995).

Weinstein (1979) stated that experience has convinced most people that noise can interfere with performance of intellectual tasks, yet research has produced inclusive and often contradictory results on this topic. Acoustics may be a factor in preventing appropriate sound to travel to students. Since Weinstein offered her commentary, more attention has been given to the acoustical environment and a growing body of performance research confirms that many students cannot hear clearly and comfortably in class. School buildings are filled with many different sounds from many different sources. Classroom acoustics are based on three factors: ambient noise level, reverberation time (RT), and the signal-to-noise ratio (S/N). Ambient noise is background noise. Examples include the hum of the heating system, cars passing by, and other students whispering. Reverberation time (RT) is defined as the interval needed for a sound introduced into an environment to reduce its intensity once the sound is turned off. The association between signal and noise is the S/N ratio (Day, 1999). Schools frequently have hard floors, concrete walls, high ceilings, windows and chalkboards, all of which cause a long reverberation time (Scott, 1999). Other factors at school that cause noise are playgrounds, corridors, ventilation systems, scraping of chairs, doors slamming, people' voices, and passing traffic (Day, 1999).

Signals are what people desire to hear; noise interferes with this desire. The signal should be stronger in intensity than the interference noise. In a classroom with an above-average acoustic design, students with no hearing impairments understood 71 percent of what the teacher said. However, students with hearing impairments only understood 48 percent of what was said by the teacher (Day, 1999). Cohen and Lezak (1977) concluded that human energy and efficiency decline due to unwanted noise.

Thermal environment or climate control is another environmental factor that has been the topic of several studies. The comfort index strongly influences the physiological state of the student. A comfortable temperature of 72 degrees Fahrenheit requires a relative humidity of 60 percent. As the temperature of the air rises, the humidity should decrease to maintain comfort level (Castaldi, 1994). In a survey conducted by McDonald (1964), teachers were asked what effect air conditioning had on their attitudes, work classification and classroom conditions. Of the teachers surveyed, 28 percent reported improved grades, 38 percent reported a willingness to do more work and 85 percent reported that their students showed a greater ability to concentrate when functioning within an air-conditioned environment.

McCardle (1966) conducted a study involving forty matched pairs of sixth graders. His study showed that pupils in a thermally controlled room committed significantly fewer errors on conceptual learning tasks than those in the room with no thermal controls. Curtis and Stuart (1964) showed that the gain of student achievement in climate-controlled facilities was superior to those in non-climate-controlled schools. Chan (1980) found that students in schools that were air-conditioned scored significantly higher, at the 0.05 level on the vocabulary section than students in non-air-conditioned buildings.

METHODOLOGY

This study employed causal comparative research design (ex post facto) to attempt to identity the cause–effect relationship between school ecology of high and low performing provincial secondary schools in Nandi–Central district of Kenya and academic achievement of students at Kenya Certificate of Secondary Examination (K.C.S.E.). In this design, the cause –effect linkage is made logically as the research process proceeds as follows: it focuses on the effect and then asks what might be causing that effect, and lastly, attempts to identify and substantiate a plausible connection between the effect and its cause (Gay, 1996). The design requires an identification of a criterion group, which is composed of people who have been observed, judged, or who describe themselves as possessing a certain characteristic that differentiates them from others, and examination of the possible causes for these differences. Kafui (2005) posits that causal-comparative studies are important in education because several educational variables cannot be manipulated and be used for experimental research. Descriptive research analysis was also employed in this study. Fraenkel and Wallen (1993) posit that descriptive analysis involves asking a large group of people questions about a particular issue and drawing conclusions.

In this study, negative and positive school climate were presumed to have already occurred, therefore, data was collected and analyzed retrospectively to establish their relationships or associations and meanings in relation to academic performance of students at the K.C.S.E. level.

Sample Size and Sampling Techniques

Purposive sampling technique was used to identify both the high and low performing schools based on the KCSE examination results of the selected schools. Out of the eight provincial secondary schools; four were reported to be high performers while the other four were poor performers in national examinations for the last five years. The high performing schools in this study were those whose examination mean scores recorded over the last five years to be above 7.0 with a mean grade of C+ and above, while the low performing schools were those whose mean scores were 6.9 and below, with a mean grade of less than C plain in the same period.

Cluster sampling technique was used to involve all the eight schools. The schools selected were of the same category in the sense that they were all provincial secondary schools. Student respondents were selected randomly from forms three and four classes. The two classes were selected to represent the student population because they were assumed to have stayed in those schools for a relatively longer period than the rest of the students and were deemed better placed to give more reliable information. Simple random sampling technique was employed to select the student participants. Three students were randomly selected from every row in each class. The sample in this study comprised of 424 form three and form four students in four provincial boys' secondary schools, three girls' secondary schools, and one mixed sex secondary school.

Research Instruments

A questionnaire was used in this study. The questionnaire was modeled on the four-point scale numbered 4, 3, 2 and 1. The points represented the following responses: 4-Agree, 3-Tend to Agree, 2-Tend to Disagree and 1-Disagree. These points represented the extent of agreement or disagreement by the respondents on the statements that were listed in the questionnaire. The

respondents were asked to tick in the box that provided the point that corresponded with the description that best suited his or her view. These tools sought information to rate their schools on each of the items regarding to their perception of school ecology prevailing in their respective schools.

Development of the Research Instruments

The researchers designed a questionnaire intended for use in this study. The statements that characterize each dimension of school ecology were patterned after the instrument that Halpin and Croft (1963) constructed called the Organizational Climate Descriptive Questionnaire (OCDQ). It contained sixty-four Likert–type items that were assigned to eight subtests delineated to factor–analytic methods. Four subtests dealt with the characteristics of the group and the other four dealt with the characteristics of the principal as a leader. From the scores of these eight subtests, they then constructed for each school a profile, which determined the relative position of the school on the open to closed intensity scale. In the present study, the questionnaire contained 10 items. It was divided into two sections: section A dealt with demographic profile of the respondents and section B dealt with ecology of the school.

Reliability of the Instrument

To test reliability, a pilot study was conducted in three provincial secondary schools; one girls' secondary school, and two boys' secondary schools in the neighboring Nandi-North district. A reliability analysis was done to test whether each item stated in the questionnaire yielded the desired and consistent outcome (Gay, Mills & Airasian, 2006).

Cronbach's Alpha coefficient was obtained to estimate the internal consistency of items. A reliability coefficient of greater than 0.635 was obtained. The results of the pilot study were used to test the reliability of the questionnaire in order to establish the extent to which it was able to elicit the desired information. The instrument was reliable as the coefficient of reliability was found to be greater than 0.60 in the sub-scale that was being studied namely: ecology. A coefficient of reliability of .60 was considered good enough in this study.

Data-Gathering Procedures

During the pilot study, the researchers administered the research instrument to three leading provincial secondary schools in the neighboring Nandi –North district. Two of these schools were Boys' schools and one Girls' school. In the actual study, all the eight provincial secondary schools in Nandi-central district participated in the study: three Girls' schools, four Boys' schools and one mixed gender secondary school.

Statistical Treatment of Data

The data collected was encoded and analyzed using Statistical Package for Social Sciences (SPSS). Descriptive and inferential statistics were employed. Descriptive statistics delved mainly on the students' perceptions on the school climates prevalent in the provincial secondary schools in Nandi-Central district. Comparisons of school climates of both high and low performing

secondary schools in Nandi Central district were made to establish the influence of school ecology on academic achievement. *T*-test, a parametric statistical tool, was used to compare mean differences of the perceptions of students on the aspects of school ecology under study in both the high and low performing schools. A *t*-test was used to determine whether two means were significantly different at selected probability levels (Gay, Mills, & Airasian, 2006). The level of significance was set at 0.05 in this study.

RESULTS AND DISCUSSION

This study investigated students' perception on school ecology; it also tested the null hypothesis that there was no significant difference between the school ecology of high and low performing provincial secondary schools and academic performance in Nandi-Central district.

The following scale of interpretation was used

3.50-4.00	agree/high rating
2.50-3.49	tend to agree/ average rating
1.50-2.49	tend to disagree/ low rating
1.00-1.49	disagree/ very low rating

Ecology

Students' Perception of Ecology

There were 10 items on the questionnaire for students that addressed the aspect of school ecology. Table 1 shows the mean ratings on ecology as perceived by the students in all the eight provincial secondary schools covered by the study.

Table 1: Students' Mean Rating on Ecology

Statements	Mean	Std. Dev.
In this school there are adequate physical facilities such as classrooms, laboratories and library.	2.9835	1.19780
Repairs and maintenance of school buildings and facilities are undertaken promptly.	2.7311	1.20808
The furniture and other facilities and equipment are adequately provided by the school.	2.9528	1.13930
The school is well planned and appropriately located with adequate room for future expansion.	3.1651	1.17946
Vandalism and graffiti on walls and toilets is not a common feature in our school.	2.8656	1.22748
The school compound is neat, decorated and well organized with beautifully manicured lawns.	3.1392	1.12860
The Lighting system and ventilations are in good working condition.	2.9717	1.27687
The buildings are safe, equipped with fire – fighting equipment with clear exit points in case of an emergency.	3.2600	1.06361
The school is located in a serene environment away from noise or any form of disturbance.	2.6038	1.25047
The school surrounding is conducive for learning	2.7925	1.2848
Ecology (overall mean)	2.9464	0.71679

Students in all the schools studied rated their schools' ecology as favorable, recording an overall mean of 2.9464. Students' rated their school buildings as being generally safe, equipped with fire fighting equipment and with clear exit points in case of emergencies, recording an overall mean of 3.2600. Students also reported that their schools were appropriately located in quiet and serene environments, recording an overall mean rating of 3.1651 and that their school compounds were

well kept, recording an overall mean rating of 3.1392. Students also rated favorably their schools as being well planned and appropriately located with adequate room for future expansion, recording an overall mean rating of 3.1651.

Generally, the ecology in all the eight provincial schools was rated by the students as favorable. The physical infrastructure in all the schools was perceived by the students as being favorable and therefore, ideal for learning. These schools were fairly safe and conducive for learning.

Ecology

Differences in ecology as perceived by the students

Table 2 illustrates test of differences on students' ratings on ecology between high and low performing schools. The test obtained a t-value of 8.923 with *p*-value of 0.000, which is less than the set significance level of 0.05, indicating that there was a significant difference between the ecology of the high and low performing provincial secondary schools in Nandi-Central district as perceived by students.

Table 2: Test of Differences on Ecology Between High and Low Performing Schools (Students' Ratings)

	Performance category			N	Mean	Std. deviation	Std. error mean
Ecology	High performing schools			214	3.2298	.52811	.03610
	Low performing schools			210	2.6576	.76787	.05299

Independent samples test										
		Levene's Test for Equality of variances		t-test for equality of means					95% confidence interval of the difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean difference	Std. Error difference	Lower	Upper
Ecology	Equal variances assumed	44.326	.000	8.953	422	.000	.57213	.06390	.44653	.69774
	Equal variances not assumed			8.923	369.859	.000	.57213	.06412	.44605	.69821

This implied that high performing schools had a better ecology than their counterparts in the low performing schools as indicated in their average overall mean ratings of 3.2298 and 2.6576 for high and low performing schools, respectively.

Table 3 shows comparisons of means of specific items on ecology as rated by the students in the high and low performing schools. Students in high performing schools reported fewer cases of vandalism and graffiti on walls and toilets in their schools, recording a high mean rating of 3.5187 compared to low performing schools who recorded a mean rating of 2.2000. The lighting system and ventilations were also reported to be in good working condition in high performing schools recording a mean rating of 3.4953 as opposed to a mean of 2.4381 recorded in low performing schools. The buildings in high performing schools were also reported to be safe, equipped with fire fighting equipment and had clear exit points in the event of emergencies, recording an average rating of 3.3568 compared to a mean of 3.1619 for low performing schools.

Table 3: Comparison of mean ratings on ecology of high and low performing schools as perceived by the students

Statements	Means	
	High performing	Low performing
In this school there are adequate physical facilities such as classrooms, laboratories and library.	3.0037	2.9619
Repairs and maintenance of school buildings and facilities are undertaken promptly.	2.9299	2.5286
The furniture and other facilities and equipment are adequately provided by the school.	3.1028	2.8000
The school is well planned and appropriately located with adequate room for future expansion.	3.5421	2.7810
Vandalism and graffiti on walls and toilets is not a common feature in our School.	3.5187	2.2000
The school compound is neat, decorated and well organized with beautifully manicured lawns.	3.4766	2.7952
The Lighting system and ventilations are in good working condition.	3.4953	2.4381
The buildings are safe, equipped with fire fighting equipment with clear exit points in case of an emergency.	3.3568	3.1619
The school is located in a serene environment away from noise or any form of disturbance.	2.6916	2.5143
The school surrounding is conducive for learning.	3.1822	2.3952
Ecology (overall mean)	3.2298	2.6576

From these mean ratings, students in high performing schools had a more favorable ecology as perceived by students compared to their counterparts in the low performing schools. These findings concur with studies conducted by Cash (1993) who found that high achievement was associated with schools that were air conditioned, enjoyed less noisy external environments, had less graffiti on walls and classroom, and furniture and students' lockers were in good state of repair. In this study, repairs and maintenance of school buildings and facilities were undertaken promptly in high performing schools recording a mean rating of 2.9299 compared to 2.5286 mean rating recorded by low performing schools.

CONCLUSIONS AND RECOMMENDATIONS

Provincial secondary schools in Nandi–Central district have a generally favorable ecology, as rated by students. The study also reveals that low performing schools have a less favorable ecology compared to the high performing schools. Thus, school ecology significantly influences academic achievement in secondary school. From this study, we conclude that physical characteristics of the learning environment do affect academic achievement and that it is important for educational decision makers, school boards and planners to consider the design classification as discussion in the study.

REFERENCES

Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language*. New York: Oxford University Press.

Banghart, F. W., & Trull, Albert, Jr. (1973). Educational planning. New York: Macmillan.

Battistich, V., Solomon, D., Kim, D., Watson, M., & Schaps, E. (1995). Schools as communities, poverty levels of student populations, and students' attitudes, motives, and performance: A multilevel analysis." *American Educational Research Journal, 32*, 627-658.

Brown, R., & Evans, W. P. (2002). Extracurricular activity and ethnicity: Creating greater school connection among diverse student populations. *Urban Education, 37*(1), 41-58.

Cash, C. S. (1993*). Building condition and student achievement and behaviour* (Unpublished doctoral dissertation). Virginia Polytechnic Institute and State University, Blacksburg, V.A.

Castaldi, B. (1994). *Educational facilities planning; Planning, modernization, and management*. Boston: Allyn & Bacon.

Chan, T. C. (1980). *Physical environment and middle grade achievement*. ERIC Document Reproduction Service, No. ED 198665.

Crosnoe, R., Johnson, M. K., & Elder Jr., G. H. (2004). Intergenerational bonding in school: The behavioral and contextual correlates of student-teacher relationships. *Sociology of Education, 77*, 60-81.

Cohen, S., & Lezak, A. (1977). Noise and inattentiveness to social cues. *Environment and Behavior*.

Curtis, H. A., & Stuart, F. (1964). *A digest of climate controlled and non-climate controlled schools – An evaluative study conducted in Penellas County Florida*. ERIC Document Reproduction Service, No. ED 001128.

Day, C. W. (July, 1999). Sounding off. American school and University. http://www.industryclick.com/magazinearticle.asp?magazineid=33067&siteid=17.

Duncanson, E. (2003). Classroom space: Right for adults but wrong for kids. *Educational Facility Palnner, 38*(1), 24-28.

Dupper, D. R., and Meyer-Adams, N. (2002). Low-level violence: A neglected aspect of school culture. *Urban Education, 37*(3), 350-364.

Feuerstein, A. (2000). School characteristics and parent involvement: Influences on participation in children's schools. *Journal of Educational Research, 94*(1), 29-39.

Freiberg, H. J. (Ed.). (1999). *School climate: Measuring, improving, and sustaining healthy learning environments.* Philadelphia: Falmer Press.

Freiberg, H.J., Driscoll, A., & Knights, S. (1999) *School Climate*. Bloomington, IN: Phi Delta Kappa.

Fiske, E. B. (1995). Systematic school reform: Implications for architecture. In A. Meek (ed.), *Designing places for learning* (pp. 1-10). Alexandria, VA: Association of Supervision and Curriculum Development.

Fraenkel, R. J., & Wallen, E. N. (1993). *How to Design and Evaluate Research* (4th ed.). Illinois: F. E. Peacock Publishers.

Freeman, C. (1995). Planning and play: Creative greener environments. *Children's Environments, 12*, 381-388.

Goldsmith, P. A. (2004). Schools' racial mix, students' optimism, and the Black-White and Latino-White achievement gaps. *Sociology of Education, 77*, 121-147.

Gay, L. R. (1996). *Educational research: Competencies for analysis and application.* Upper Saddle River, NJ: Prentice Hall, Inc.

Gay L. R., Mills, E. G., & Aurasian, P. (2006). *Educational Research: Competencies for analysis and application* (8th ed.). Pearson, Merrill Prentice Hall.

Hall, E. (1959). *The silent language*. New: Anchor Books.

Halpin, A.W., & Croft, D. B. (1963). *The organizational climate of schools.* Chicago: Midwest Administration Centre of the University of Chicago.

Heschong Mahone Group (2000). *Daylighting in schools*. Fair Oaks, CA: Heschong Mahone Group.

Hoy, W., & Hannum, J. (1997) Middle School Climate: An Empirical Assessment of Organizational Health and Student Achievement. *Educational Administration Quarterly, 33(*3), 290-311.

Jones, A., Shindler, J., Cadenas, H., Taylor, C. (2003, January) *Transcending Traditional School Assessment: Examining the efficacy of a participant driven school climate assessment and improvement system*. Presentation at the American Association of the College Teachers of Education. New Orleans, LA. January 25-27.

Kafui, E. (2005). *Causes of low academic performance of primary school pupils in the Shama Sub-Metro of Shama Ahanta East Metropolitan Assembly (SAEMA) in Ghana.* Regional conference on education in West Africa, Dakar, Senegal.

Kober, N. (2001). *It takes more than testing: Closing the achievement gap*. A Report of the Center on Education Policy. Washington D.C: ERIC Reproduction Service Number ED454358.

Lee, V. E., & Bryk, A. S. (1989). A multilevel model of the social distribution of high school achievement. *Sociology of Education, 62*(3), 172-192.

Loukas, A., & Robinson S. (2004) Examining the Moderating Role of Perceived School Climate in Early Adolescent Adjustment. *Journal of Research on Adolescents, 14*(2).

McDonald, E. G. (1964). Effects of school environment on teacher and student performance. *Air Conditioning Heating and Ventilating*, 57, 78-79.

McCardle, R. W. (1966). *Thermal Environment and learning*. Unpublished doctoral dissertation, University of Iowa, Des Moines, IA.

McNeal, R. B. (1995). Extracurricular activities and high school dropouts. *Sociology of Education, 68*, 62-81.

Norton, M. S. (2008). *Human Resources Administration for Educational Leaders*. New York: Sage.

Romney, B. M. (1975). *The effects of windowless classrooms on the cognitive and affective behavior of elementary school students*. ERIC Document Reproduction Service, No. ED 008565.

Scott, E. (1999). Sound decisions improve learning. American School and university. http://www.asumag.com/magazine/achieves/1199acoustics.html.

Shindler, J., Jones, A., Taylor, C., & Cadenas, H. (2004) *Does Seeking to Create a Better Classroom Climate lead to Student Success and/or Improved Teaching? Examining the Relationship Between Pedagogical Choices and Classroom Climate in Urban Secondary Schools*. Paper presented at the AERA, San Diego.

Sommer, R. (1969). *Personal space*. Englewood Cliffs, NJ: Prentice Hall.

Tanner, C. K., & Lackney J.A. (2006). Educational facilities planning: Leadership, architecture and management. New York: Pearson Education.

Taylor, A. P., & Vlastos, G. (1975). School Zone: Learning environments for children. New York: Van Nostrand Reinhold.

Weinstein, C. S. (1979). The physical environment of the school: A review of the research. *Review of Educational Research, 49*, 577-610.

Wohlwill, J. F., & van Bliet, W. (1985). *Habitats for children: The impacts of density*. Hillsdale, NJ: Lawrence Erlbaum Associates.

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