An Assessment of Perceptions of the Impact of Indoor Environmental Quality on Student Academic Performance at Texas Charter Schools

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Abstract
The physical learning environment of educational facilities is suggested to be of dynamic influence to the 56 million occupants including students and educational staff that spend the majority of their days within an educational facility (Environmental Protection Agency, 2002, p.5). One aspect of the physical learning environment which has elicited a wide array of empirical research is that of indoor environmental quality. Several studies reported significant correlations between positive aspects of indoor environmental quality (e.g., daylighting, acoustical performance, indoor air quality, and temperature) and student academic performance (Bosch, 2004; Lin et al., 2010; Lanham, 1999). This study will investigate the relationship between perceptions of the impact of indoor environmental quality and student academic performance at Texas open-enrollment charter schools in reading, science, mathematics, and social studies, as measured by the 2010-11 Texas Assessment of Knowledge and Skills (TAKS) scores. Open-enrollment charter school campuses will be recruited using a stratified random sampling method of 3rd, 5th, 8th, and 10th grade charter schools across the State of Texas. Campus participants will include the charter school principal and two campus educators to complete the Perceptions of Indoor Environmental Quality Scale. The Perceptions of Indoor Environmental Quality Scale is a semantic differential survey created by the researcher to measure perceptions of indoor environmental quality. The researcher will offer hypotheses of open-enrollment charter school campus perceptions of the impact of indoor environmental quality on student academic performance.

Purpose of Study
Earthman (2004) stated, “There is sufficient research to state without equivocation that the building in which students spends a good deal of their time learning does in fact influence how well they learn” (p. 18). Researchers have evaluated single-criterion aspects of educational facilities (e.g., daylighting, acoustics, indoor air quality, temperature) suggesting a significant correlation between poor individual conditions of educational facilities and its impact on student performance (Heschone Mahone Group, 1999; Plympton, et al., 2000; Shaughnessy et al., 2006). In contrast, recent studies have investigated multiple-criterion aspects of educational facilities (e.g., building conditions), yet lacked definitive focus on the interaction effects of multiple aspects of indoor environmental quality and its impact on student academic performance. Furthermore, in the last three decades of educational facilities research, and its impact on student achievement, there is a lack of research which has specifically focused on charter school facilities. Therefore, the purpose of this study is to investigate perceptions of the impact of indoor environmental quality and student academic performance at Texas open-enrollment charter schools.

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Conceptual Framework

Physical Aspects of Learning Environment for Educational Facilities

Facility Design
Facility Furniture
Facility Technology Incorporation
Facility Age
Indoor Environmental Quality (IEQ)*

Hypotheses
1. There is a relationship between principals’ perceptions of the impact of indoor environmental quality and student academic performance.
2. There is a relationship between educators’ perceptions of the impact of indoor environmental quality and student academic performance.
3. There will be a difference between principals’ and educators’ perceptions of the impact of indoor environmental quality.

Research Question
1. What is the relationship between perceptions of indoor environmental quality and student academic performance at Texas open-enrollment charter schools?

Methodology
• Open-enrollment charter school campuses will be recruited using a stratified random sampling method of 3rd, 5th, 8th, and 10th grade schools in Texas.
• Campus participants will include the principal and two educators to complete the Perceptions of Indoor Environmental Quality Scale (PIEQS).
• PIEQS is a semantic differential scale (SDS) outlined as an assessment of individual’s attitudinal response to 20 pairs of bipolar adjectives used to describe sensory experiences.

* Based on prior SDS research, adjectives were selected from 3 general dimensions: Evaluation, Potency, and Activity (EPA). Each adjective pair will be rated on a 7-point scale (Osgood, et al., 1967).

EX: Indoor Air Quality
(x) Fresh ______________ (y) Stale ________
(1) (2) (3) (4) (5) (6) (7)

The location of a concept in the semantic space defined by a set of factors is equated with the evocation by the concept of a set of component mediating reactions, direction in space being equated to what mediators are evoked (Osgood, et al., 1967, pp. 29-30).

Expected Contribution to Knowledge
The researcher expects to build upon an existing body of knowledge of educational facilities research and its relationship to student academic performance. Furthermore, the researcher intends to contribute the findings of this study to the current dialogue between Texas open-enrollment charter schools and Texas Legislators in regard to educational facilities funding.

Proposed Timeline of Research Study
The researcher proposes a pilot study of the PIEQS survey in January 2013 to measure the adequacy of the research instrument. In April, data collection will begin, and conclude data analysis and findings in August. The researcher proposes write-up and discussion by October 2013.