SEASONAL AND CLASSROOM ENVIRONMENT INFLUENCES ON STUDENTS' PERCEPTIONS OF TEACHING EFFECTIVENESS

Jill Mosteller, School of Business Administration, Portland State University, PO Box 751, Portland, OR 97207; jillm@sba.pdx.edu

ABSTRACT

The effects of internal classroom lighting and external seasonal daylight shifts were examined with respect to students' evaluations of one instructor's teaching effectiveness in an undergraduate consumer behavior class. The quasi-experimental field study employed a 2 x 2 between subjects design. Results suggest an interaction effect between term and classroom type, with the winter term and poorly lit classrooms yielding the lowest teaching evaluation scores. Given the university's geographic location at the 45th parallel (latitude), the decline of daylight from fall to winter and classroom lighting are suggested as potential environmental influences on students' evaluations of the learning experience through mood effects.

INTRODUCTION

Teaching effectiveness is generally considered multidimensional. Factors that influence students' evaluations of teaching (SET) may include grade expectation, breadth of coverage, group interaction and learning value (Marsh & Roche, 1997). Recently researchers have begun to examine how the physical aspects of the learning environment may influence student performance (Herzog, 2007; Stewart & Hodges, 2003; Zandvliet & Straker, 2001) since "little is known about the influence of physical attributes on the classroom learning environment on student learning" (Herzog, p. 81). This study informs this limited research area by examining how differences in natural light within the physical classroom and in the external seasonal environment may be influencing students' perceptions of teaching effectiveness.

LITERATURE REVIEW

Classroom Environment

The ideal classroom environment is that which is conducive to maximum learning (Byrne, Hattie, & Fraser, 1986). Veltri, Banning, & Davies (2006) qualitative case study of community college students perceptions of their learning environments suggests that visual information needs to be easily and clearly seen. Low lighting conditions are conducive to rest and relaxation, not active learning. Students who perceived their learning environment to be 'dark and gloomy' reported feeling tired, with 'brighter colors' helping to keep them awake (Veltri, Banning, & Davies, 2006). Herzog (2007) examined quantitative data across a wide array of a university's classroom settings and reported that students who took classes in rooms with natural light had higher grade point averages (GPA) compared to those who did not. In sum, this research suggests that visual conditions within the classroom learning environment may be interacting or influencing to some degree with the students' perceptions or ability to learn.

Seasonal Environment

The external seasonal environment influence on students' mental state has also been a topic of research at higher educational institutions in the northern hemisphere (e.g., above the 45th latitude parallel), where the amount of natural light diminishes dramatically during the winter season. Low and Feissner (1998) surveyed college students in northern New England for the prevalence of seasonal affective disorder (SAD), a subcategory of mood disorders in which peoples depressive episodes have clear seasonal patterns (Rosenthal et al., 1984). Results reported overall increases in SAD among college students from November to February. A criterion for seasonal depression is a temporal relationship between the onset of depression and time of year. The photoperiod (the duration of natural light in a period of time) which is determined by latitude and time of the year, appears to be the best predictor of seasonal symptoms, with populations at higher latitudes reporting more cases of seasonal depression (Young et al., 1997; Rosen et al., 1990). Sullivan and Payne (2007) examined the influence of affective disorders on college students' cognitive processes. Twenty-eight percent of a sample of 59 students from a Midwestern college reported SAD, suggesting that SAD is a more substantially present mood disorder than non-seasonal disorders (Sullivan & Payne, 2007). Results suggested significant differences in cognitive impairment between depressed and non depressed students. Research to date suggests that seasonal affective disorders within the student population may be more prevalent at northern universities and that this mental disorder may diminish a student's ability to think or concentrate.

CONCEPTUAL FRAMEWORK

Environmental psychology researchers suggest that the stimulus-organism-response (S-O-R) model provides a strong framework for understanding the affective and behavioral responses to a physical environment (see Turley & Milliman (2000) for a review). The stimulus can be conceptualized as environmental factors (e.g. classroom attributes, teacher attributes, seasonal attributes) that influence the person cognitively and/or affectively (organism's perceptual processes).The person's perceptual processes of the environment are posited to then influence a behavioral response. Behavioral responses within this framework are generally categorized as approach or avoidance behaviors. Approach behaviors reflect positive actions (e.g., class participation, attentiveness, attendance). Avoidance behaviors reflect negative actions (e.g., not social engaging during class, withdraw of attention, not attending class). As Smith and Lammers (2008, p. 61) note, "when students perform teaching evaluations, they evaluate both the instructor and, at some level, their own learning." Students' behaviors influence their own learning, and may in part be influenced by how they perceived their learning environment. Although this framework is sequential in form, the flow of sequences is intended to be highly interactive within a learning environment. For example, the interaction between the stimulus and organism may be conceptualized by how well a student can perceive information on a whiteboard. If a student cannot visually perceive and comprehend the writing on the board clearly, he may experience frustration and discontinue attending to the information presented.

The influence of mood is integrated within the organism section of the framework. People form judgments based upon a constructive process that may be influenced by their current mood and the mood congruency of the events that are used to form the judgment (Bower, 1981). Stated differently, one's current mood may influence how they evaluate one's consumption performance (e.g., the recall of one's learning experience through perceived teaching effectiveness) (Miniard, Bhatla, & Sirdeshmukh, 1992). Research suggests that happy subjects form more favorable impressions about others than sad people (Forgas & Bower, 1987). So the mood of a student, during and at the end of the term, may influence the perception of the learning experience, thus coloring the teaching evaluation.

FIELD STUDY

Participants

Students at a northwestern university enrolled in an undergraduate consumer behavior class evaluated an instructor at the end of one of two terms. Students were enrolled in either the fall term (late September to early December) or the winter term (early January through early March). Students enrolled in each term were either in a class with no windows and poor lighting or in a class with windows and bright lighting. Two class sections each term were taught by the same instructor with the same syllabus, similar exams in terms of difficulty, and similar projects and homework assignments. A total of 133 student evaluations across the four classes comprised the data.

Classroom Environment

During the fall term, the two class sections consisted of a day class that met twice a week (10:00am-11:50am) and an evening class that met once per week (5:40pm-9:20pm). The day class in the fall term was held in a classroom with bright lighting and glass block windows. The evening class was held in a classroom that did not have windows (painted cinder block walls engulfed the room). For the winter term, the evening class had bright lighting and windows that wrapped around two sides of the classroom. The day class was held in a movie theatre with dark drapes surrounding the seating area. Thus the potential influence of different types of students (tradition versus non-traditional) and time of day and the frequency of classes were randomized out between terms. The internal lighting in the 'no windows' classroom conditions were not considered desirable by students, based upon comments made during the term as well as by requests made by several students if the room could be switched for another one.

Measures

Students during the last week of classes filled out an instructor evaluation form. Fall term students evaluated the instructor in early December and winter term students evaluated the instructor in early March. Responses on a five-point Likert scale to the statement "overall, this instructor was highly effective in this class" were used to measure teaching effectiveness. Teaching effectiveness was analyzed as the dependent measure across different terms and classroom types. The mean teaching effectiveness scores across and within each condition are presented in Table 1

TABLE 1
Teaching Evaluation Score Means

Classroom type	Classroom Lighting		
Term	Poor	Good	Total
Fall /more daylight	4.28	4.77	4.55
Winter/ less daylight	3.31	4.62	3.93
Total	3.79	4.71	4.27

Analysis

A 2 x 2 ANOVA was conducted using classroom environment and term, each representing two levels within each independent variable. The overall perceived teaching effectiveness of the instructor was the dependent variable.Overall there were significant differences (F=15.558, p=.00) among groups. Both term and room environment had significant differences (F_{Term}=11.195, p=.001, F_{Room} =28.820, p=.000). More importantly, the interaction between term and classroom environment was also significant ($F_{term*room}$=5.887, p=.017).The adjusted R squared for this model was 0.249.These results suggest that students who evaluated the instructor during the winter term perceived overall lower teaching effectiveness compared to students in the fall term. Students who took the course in a room with windows and bright lighting evaluated the instructor's effectiveness more highly. Students who took the course in the fall and in a good classroom environment evaluated the instructor most highly, as compared to those students in the winter term who took the course in a classroom with no windows, scoring the teaching effectiveness the lowest among all four conditions.

DISCUSSION

This field study presents data that suggest the amount of light, both internal and external of the physical classroom, may indirectly influence students' evaluation of higher education teaching effectiveness through mood effects. Although no direct causal inferences can be made, the environmental conditions across learning environments varied in terms of the internal and external daylight conditions. Further examinations of how the physical classroom environments may hinder or facilitate learning may be worthwhile. Additionally, results suggest that mood may help explain students' perceptions of their learning environment. Given that depressive mood disorders have demonstrated cognitive impairment, future experimental studies employing various lighting treatments and mood altering class activities within the classroom may be worthwhile, particularly for higher education institutions in the northern hemisphere.

LIMITATIONS

There are several limitations to this study that warrant comment. First, students who performed the teaching evaluations, their evaluations of their classroom environment were not directly measured and assessed. Other students' perceptions of two of these classrooms in subsequent terms, however, were captured and significant perceptual differences existed in terms of classroom lighting, natural light, and the outward view from the classroom (windows). Second, students were not evaluated for the presence of seasonal affective disorder or depression. Thus how a student's individual mental state influenced one's evaluation cannot be asserted. Third, no third-party observations were made to assess changes in teaching style or other confounding factors by the instructor across different classes. The decline in teaching effectiveness from fall to winter due to a seasonal affective disorder experienced by the instructor may be one contributing explanation; however no measurements to assess SAD were administered.

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