Re-activating the learning environment research
in environmental psychology*

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Approaches of environmental psychology to assessing the classroom environment can be classified into two major schools; the ecological and the cognitive. Both of them have their origin in Lewin's formula; \( B = f(P, E) \). In early days of the cognitive school, Murray's Need-Press model made a striking contribution to the concept of person-environment fit by furthering the fundamental framework of the corresponding relationship between persons and the environment. Subsequently, Stern and Hunt developed a theory of person-environment fit. Numerous studies have shown that the congruence of students' preferred-actual environment (person-environment fit) at the class level relates to student positive achievement. In early ecological school studies, Barker and Wright found the place specificity of behavior, namely behavior settings. It is defined that effective learning would arise from synomorphy, that is the similarity in shape between standing patterns of behavior and the physical milieu. Finally, for reactivating the learning environment research in environmental psychology, we discuss future studies, such as the instruments for a technology-rich learning environment, learner's individual differences, and the paradigm shift of environment-behavior research from interaction to transaction.

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Research on the Learning Environment

Three distinct methods for assessing classroom environment can be noted in the literature on learning environment research. The first and least common approach is the application of techniques of naturalistic inquiry and case studies. The second and most frequently used method is ecological observation and systematic coding of classroom communication according to a category system. The third approach to studying the classroom environment focuses on student or teacher perceptions of psychological characteristics of the classroom (Fraser & Walberg, 1981).

The three methods can be further classified into two major schools of thought. The first and second methods can be grouped together as ecological school and the third approach is in the cognitive school.

Cognitive Assessment

The following observation by Fraser (1998) can be of little doubt. “Few fields of educational research have such a rich diversity of valid, economical and widely-applicable assessment instruments as does the field of learning environments.” These assessment instruments, which have been widely applied and are of practical use in education and management, however, they have their origin in psychological traditions. McAndrew (1993) recognized that environmental psychology as an interdisciplinary field has its beginnings in the writings of contemporary influential psychologists. In fact, leading psychologists such as Kurt Koffka (1886-1941), Kurt Lewin (1890-1947), Edward C. Tolman (1866-1959), Egon Brunswik (1903-1955), Henry A. Murray (1893-1988), Roger G. Barker (1903-1990), James J. Gibson (1904-1979), and Urie Bronfenbrenner (1917-2005) are frequently reviewed in environmental psychology textbooks (e.g., Gifford, 2002). Thus the third approach, the cognitive school of learning environment research, is of no small concern to scholars and students not only in education but also in environment-behavior research. Let us briefly revisit the background of the assessment instruments in this field.

Person-Environment Fit Theory

Lewin (1935, 1936) is generally considered as the pioneer in person-environment fit research with his familiar formula, $B = f(P, E)$. This formula for understanding and predicting human behavior means that “behavior (B) is determined by the person and the environment ($f(P, E)$) and not by the person or the environment alone (Lewin, 1951).” Lewin’s seminal work says the person and environment are one and indivisible. The principle of this formula has had a powerful impact on contemporary social and ecological psychology and has inspired broad studies and theoretical sophistication, sometimes even criticism (e.g., Edwards, 2008).

Murray (1938) explored personality and proposed a need-press model. Thus, Murray described two types of classification of the environmental stimulus that impacts upon an organism. The former is based on whether the stimuli promotes or inhibits the fulfillment of the organism’s needs. The latter is classified into alpha press and beta press (see Figure 1). Murray defined alpha press as the actual environment and beta press as the environment perceived by the persons within the environ-

![Figure 1. Murray’s Need-Press Model: A Diagram](image-url)
ment. The various types of needs were also organized into a broad category of lists of human motivations, and their combination of a particular press with its corresponding need composes a theme. Needs and presses are in parallel, and their combination determines human behavior. Thus, it is possible to argue that the needs-press theory can be similar to the drive reduction theory. Obviously, Murray made a striking contribution to the person-environment fit by proposing the fundamental framework of the corresponding relationship between a person and his/her environment. Building on Murray’s work, psychologists, for example, Stern (1970), Mitchell (1969), and Hunt (1971), further developed the person-environment fit theory. Today, the theory of person-environment fit has been broadly supported in social sciences, such as education and industry.

Moos’s Schema of the Social Environment

Moos (1974) made a major contribution to the study of people and their environments by describing a schema for classifying sociopsychological human environments. In the schema Moos delineates three basic types of dimensions: Relationship, Personal Growth or Goal Orientation, and System Maintenance and System Change (see Table 1). For the last few decades, classroom environment studies have used Moos’s scheme, particularly in the development of well-established questionnaires. This has occurred in many countries (such as the USA, Australia, New Zealand, the Netherlands, Belgium, Finland, Singapore, Indonesia, China, Korea, Taiwan, and Japan), various learning environment scales have been developed based on Moos’s three dimensions; Ito & Matsui (2001) developed the original Japanese version of the climate scale from classroom observations and interviews. They also made reference to equivalent of theoretical frameworks and items from the Classroom Environment Scale, the Learning Environment Inventory, and the Class Atmosphere Scale (Silbergeld, Koeing & Manderscheid, 1975; 1976). They have achieved remarkable results in school

<table>
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consultations with the practical use of the original version of their classroom climate scale. Hirata & Sako (1998) reported some characteristics of non-attendant and juvenile delinquent students’ perception of their classroom by utilizing an original version of the classroom environment scale.

**The Modification of Sub-scales or Items**

The Correctional Institution Environment Scale (CIES) is one social environment scale developed by Moos (1974). In the application of the CIES in Japan (Asai & Hirata, 1997; Hirata & Asai, 1997) the CIES was administered to residents in Japanese correctional institutions, and their findings suggested the cultural differences between Japan and the United States on some sub-scales such as Expressiveness and Personal Problem Orientation. These results described some characteristics of Japanese students, for example, they preferred nonverbal communications to discussion. Some would consider an active discussion as a mutual understanding process, others from other cultures in contrast might feel it to be a stressful situation. Therefore, it can be said that the necessity to revise sub-scales or items in practical use of these cognitive scales describe some characteristics of a society.

**The Actual and Preferred Environment**

Whereas most prior classroom environment research has restricted its attention to student perceptions of the actual environment (Fraser, 1982), many studies nowadays support the vital merit of using both the actual and the preferred forms of classroom environment in learning environments research.

Fraser & Fisher (1983) emphasized the importance and practical implication of the actual-preferred congruence (person-environment fit) at the class level. Their broad research data showed precisely that classes achieve affective and cognitive outcomes better when the actual classroom environment matches that preferred by the class.

Hirata & Oura (2009) found a disparity between the perceptions of actual and preferred classroom environments among Japanese juvenile delinquents. The actual and preferred forms of the original classroom environment scale were administered to both the students from secondary schools and correctional institution residents. Figure 2 shows that juvenile delinquents reported that they are asking about a closer relationship with a teacher more than non-delinquents. Hirata & Oura (2009) also reported that the delinquent students felt stronger pressure for Achievement Responsibility.

These findings lead to the conclusion that it is beneficial to attempt to make the actual classroom environment congruent to that preferred by the delinquent students to deter them from school maladjustment. Fraser (1982) pointed out that another major merit of having the actual and preferred form of the classroom environment is to enable the confluence of the two previously distinct research traditions, namely, person-environment fit research and classroom learning environment research.

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Ecological Studies

In the early 1940s, Roger G. Barker and Herbert F. Wright established the Midwest Psychological Field station in Oskaloosa, Kansas, to undertake a new research area with an ecological viewpoint. Though Lewin placed value on the physical milieu as a psychological mediator, Barker and Wright (1949) investigated the place specificity of behavior, namely, behavior settings. They published "One Boy's Day", a record of their observational research, and emphasized that obviously analyzing the specimen record of behavior is more effective to predict human behavior than exploring each personality.

In the late 1970s, Rutter, Maughan, Mortimore, Ouston, and Smith (1979) and Rutter (1983) reviewed the numerous research findings of school results, such as academic outcome (examination results), delinquency, behavior in class, attendance rates, attitudes toward learning, rate of going on to a higher stage of education, employment of school leavers, social skills, etc. They argued that the broad school characteristics, such as school scale and class size, classroom organization, academic emphasis, financial resources of schools, rule clarity, rewards and punishments, ethnic origin, pupils' participation in responsibilities, parents' occupation status, and ethos of a school, are effective predictors of school results.

Barker and Gump (1964) wrote “Big School, Small School”, a landmark book of the ecological learning environment research that defined the effect of school size upon the behavior and experiences of students. Carrying on the ecological work on psychology, Gump (1980) systematically classified the school environment into three components, the physical milieu, human components, and standing patterns of behavior (see Figure 3). He also examined the effects of different school environments, such as open school, on pupils.

Physical Milieu: Open School

According to Gump (1987), the basic qualities of openness are (1) space, undivided by walls, which is uncommitted and flexible; (2) corridors are not required, and space usually consumed by corridors becomes available; (3) without walls and doors, school inhabitants travel directly between activity regions; and (4) stimuli also travel freely between adjacent activity regions. Therefore, the possibility of visual and auditory distraction is the trouble for open school inhabitants. Similarly, it was reported that pupils in open schools developed a less positive reaction to peers than did pupils in conventional schools. Also in Japan, Furukawa (1988) examined the characteristics of each type of elementary school, and found less cognition of pupils on the unity of class in open schools than in traditional ones. The burden of the data available on achievement test re-
sults for open space versus traditional schools seems to support the conclusion; that certain kinds of students appear to be especially unsuited to the open atmosphere.

Soma, Takahashi, Sako, & Nojima (1993) commented on the shift in elementary school architecture in the USA, the U.K., and Japan, from traditional to open schools and examined the functional flexibility of open spaces and their educational meaning. They emphasized that open school does not mean a specific style of architecture but a philosophy of education, therefore open spaces would be merely spacious areas unless the educator envisions a clear plan and purpose.

Moore (1983) found that modified open plan school children did contact more places and were more self-directed, engaged, and exploratory than children in either the fully open or the closed center type. Gump (1987) found that the problem facing staff moving from a traditional program in an egg-carton school (see Figure 4) to an open space school could be seen as one of dissonance between a continuing traditional program and a new physical milieu. He explained the dissonance via the term of ecological psychology, that the old program and the new milieu are not synomorphic (i.e. similar in shape). The search for synomorphy between standing patterns of behavior and physical milieu, namely, the person-environment fit or optimization, could be called a permanent proposition of the environment-behavior research.

From the 1970s to the 1980s, Barker and his colleagues developed and established the theories and methods of ecological psychology, and produced many studies under grant-in-aid (Price, 1976). Barker (1987) later noted that after they discovered behavior settings and began to understand their importance for human behavior and for evaluating environments, they had dreamed that the behavior setting survey would become the standard

**Figure 4.** Traditional “egg-carton” and open space schools.

“instrument” for assessing the attributes of human environment on a par with tests of the traits of persons, however it had not happened. It was an era of behaviorism and experimental psychology, when Barker and Wright started their ecological psychology studies. Most of the journals that reviewed their publications were concerned primarily with the behavior of individual persons; they found the methods and theories of behavior setting difficult to incorporate into their procedure and ways of thinking. The argument of the sample quantity, both old and new, is seen as inevitable for every empirical research.

**Methodological Arguments**

According to reviews of Chavez (1984) from the late twenties through the early sixties, the use of high-inference measures to study classroom climate (learning environment) was not prevalent in the literature in those days, whereas the study of classroom climate using low-inference measures was well established by the early sixties. Most cognitive assessments originated from a need-press model (such as the LEI, MCI, CES, etc..) and belong to the high-inference measures. Rosenshine and Furst (1971) defined a high-inference measure as a rating system that requires an
observer to make an inference from a series of classroom events using specific constructs, such as satisfaction, cohesiveness, etc. They also define a low-inference measure as a rating system that classifies specific, denotative, relative objective classroom behavior and is recorded as frequency counts by an observer. The nature of high-inference seems to be the limitations of cognitive assessment methods, while Fraser (1982) reviewed the previous arguments (e.g., Fielder, 1975; Rosenshine, 1969) showing an advantage of the cognitive approach as follows.

1. Paper-and-pencil perceptual measures are more economical than classroom interaction techniques, which involve the expense of trained observers and extensive coding.
2. Perceptual measures are based on experiences over many lessons, while interaction data usually are restricted to a very small number of lessons.
3. Perceptual measures usually involve the pooled judgment of all students in a class, whereas interaction techniques typically involve only a single observer.
4. Students perceptions, because they are the determinants of student behavior more so than the veridical situation, can be more important than observed behaviors.
5. Perceptual measures of classroom environment have been found to account for considerably more variance in students' learning outcomes than have interaction variables.

Tracing the person-environment fit back to its origin, Lewin’s work sheds light on the relationship between a person and his/her surroundings, and Murray followed the standpoint of exploring personality. A need-press model supposed that human needs and the environmental press correspond. Consequently, measuring the environmental press could be synonymous when measuring his/her need.

Future Studies

Technology-rich Learning Environments

One of the dramatic innovations in education today has been being brought about by the introduction of information and communication technologies (ICT). Khine (2003) described the application of the new technologies in delivering a teacher education module of classroom management and argued for the conditions to create a technology-rich constructivist learning environment. Under the technology-rich learning environment, such as web-based or on-line learning, and computer-mediated communication (e.g., on-line discussions), both teachers and learners would be required to develop new literacy and roles for effective participation. Therefore, new learning environment instruments for technology-rich classrooms have been developed, and numerous studies reported about the validity and application of these instruments, such as the WEBLEI: Web-based Learning Environment Instrument (Tobin, 1998, Chang & Fisher, 2003), and the TRO-PLEI: Technology-Rich Outcomes-Focused Learning Environment Inventory (Aldridge, 2003). These cognitive assessment methods will continue to be developed more and more with the advances of ICT in the learning environment.

Research devices in field research are also making progress, so traditional methods can be improved upon by combining them with new materials. Ito, Nagasawa, & Yamashita
(1996) surveyed children’s recognition and viewing in elementary school, using projective methods with photos taken by a pupil. The analysis of eight pupils’ photos and interviews showed that the same grade pupils shared a same view, and lead to the conclusion that their understanding of their school environment depends on whether the pupil can access a view or not. The new observation devices, such as photography, wearable video cameras, mobile GPS, might be able to solve the economic problems in ecological studies.

Learners’ Individual Differences

For classifying the human-environment transaction, the four basic modes suggested by Stokols (1978) are well known: (1) interpretive; (2) evaluative; (3) operative; and (4) responsive. Iwata (1988) argued that environmental psychology has aimed principally at human action and reaction and the social-physical surroundings which provide them, so it seems that little attention has been paid to the examination of individual differences. He examined, for example, the internal-external locus of control as the person-environment parameter, and introduced the nature-human locus of control to predict human behavior. These traditional psychological interests should not be overlooked especially in the research field of child maladjustments or learning environment.

The Shift from Interaction to Transaction

Finally, though environmental psychology has been concerned about the person-environment system, namely, transactional research from the beginning, each of these studies seem to fall into the categories of interaction. Minami (2006) attempted to categorize the levels of transaction depth and explored person-environment mutuality via descriptions of the social and cultural phenomena in Japan. Actually, environment-behavior researchers engaged in transactional perspective are still few.

However, Mazumdar (2002) emphasized the positivistic quality of orthodox qualitative research methods and suggested RDCT: Reliable – Deep-Complete-Thought knowledge concept. According to his classification of social research forms, though empirical research includes both qualitative and quantitative studies, in non-empirical research, studies that are not quantitative and not automatically qualitative in their orientation ought to be categorized as non-quantitative studies. Similarly, studies that are not qualitative may not automatically be categorized as quantitative. These should be categorized as non-qualitative studies.

Evaluating and appreciating the worth of an innovative research method takes time. Transactional researchers might continue to confront difficulties similar to the one that Barker and Wright faced for a while when they discovered behavior settings. Learning environment research could be the best research field to integrate both cognitive and ecological methods, if the teacher as a researcher or the researcher as a teacher would adopt not only academic achievement but also various benefits of education as educational outcomes. Re-activating learning environment research in environmental psychology would be also beneficial for future studies in environmental psychology.

References


