Environment-Behaviour Studies in the Classroom

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Introduction

This article briefly outlines a summary of some aspects of a thorough literature review performed by Horne (1999) looking into the classroom environment and its effects on the practice of teachers. Below is outlined an overview of the subject. Intuitively, we know that the physical environment of the classroom has an impact on the behaviour of both teachers and pupils. The difficulty is understanding how this impact occurs, and how much of this impact is consciously and deliberately planned by the teacher. The knowledge of these relationships can benefit teachers in their awareness of their environment and this knowledge is empowering, enabling teachers to take control of the space and deliberately design it. Any teaching can be effective if teachers understand their setting and how it influences behaviour. Beyond that lies the need to feel capable of responding to this understanding by having a proactive rather than a defeatist attitude towards the setting. Design and Technology is an area of the curriculum that would benefit greatly with the enhanced knowledge about how space relates to behaviour, learning and teaching. It is part of Design and Technology's nature to manipulate space, materials and resources, so the better awareness of the effects of these on its users would only be beneficial to subject development.

Overview the Environment-Behaviour Field

Although human beings have been investigating the nature of their surroundings since the dawn of history, the use of research as a tool for the improvement of buildings is of relatively recent origin (McGuffey, 1982). The first hints of the field began in the 1940s, followed by some activity in the 1950s, growing throughout the 1960s into a more powerful force in the 1970s (Gifford, 1987). In the early 1950s, psychologists and other behavioural scientists began to show increasing concern for the relationship between the properties of physical settings and human behaviour and experience (White, 1979). Early in the 1960s the development of the field of environmental psychology was accelerated. It was during this decade that the term environmental psychology became the more common designation for the field. It replaced terms such as architectural psychology, man-environment studies, socio-physical technology, behavioural ecology, ecological psychology, person-environment relations or environmental design (White, 1979; Proshansky et al., 1976; Preiser and Taylor, 1983; Rivlin and Weinstein, 1984). Today the term mostly used is Environment-Behaviour Studies which is concerned with the transactions between individuals and their physical settings.

Research in this area calls for a multidisciplinary approach since there are few, if any, fields that do not at some point touch on the relationship between humans and the environment (Heimstra and Macfarling, 1978; White, 1979; Proshansky et al., 1976). Research dealing with environment and behaviour inevitably attracted people from many intellectual disciplines including anthropology, geography, political science, psychology and sociology. Many applied areas also contribute to the field such as architecture, industrial design, interior design, engineering, environmental design, landscape architecture and urban design (Heyman, 1978; Gump, 1975).

What is the Environment?

The environment plays a significant role in the lives of people (Rivlin and Wolfe, 1985) and humans are active organisms that can both select and modify their own surroundings.

> The environment can be seen as a series of relationships between things, things and people, and people and people. These relationships are orderly, that is, they have a pattern and a structure - the environment is not a random assemblage of things and people any more than a culture is a random assemblage of behaviours or beliefs. In the case of the environment, the relationships are primarily, although not exclusively, spatial objects and people are related through various degrees of separation in and by space. (Rapoport, 1982: p.178)

The literature suggests a number of elements that can be classified into three inter-related groups of issues: physical, social and cultural. These groups are clearly linked as the physical environment affects the social interactions and the cultural environment affects the physical environment and its social components.

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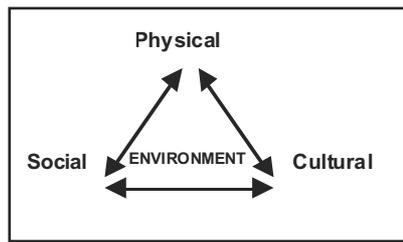
Figure 1 – *The Environmental Triangle*

> We are all some place all the time, and without even trying. But being there and being aware of the impact that the place is having on us are two different things, and the awareness lags far behind the being. (Steele, 1973: p.1)

This literature review focuses on some of the elements of the physical and social environments as displayed below.

The Physical Environment

The physical environment is concerned with what we can actually see and almost touch (almost because elements like noise and heat are part of the physical environment but can not be touched, but rather felt or heard). The built environment affects people directly or indirectly through the interference of an object (Ahrentzen, 1983). Objects can be defined as any material thing that can be seen or touched (including the space itself). Physical dimensions have important effects and the design factors are typically overlooked in discussions of the environment (Weinstein and David, 1987).

Scale and Size

If we think of the various features making up a room as either fixed or flexible, size and shape are undoubtedly the most rigid. The way we perceive scale will reflect on our behaviour and attitudes related to that space. Weinstein and David (1987) state that among other influences, the design of environments is the result of a variety of codes and standards, especially in the case of institutional buildings (e.g. schools, hospitals). The way furniture is arranged can influence people's perception and evaluation of room size (Heimstra and Macfarling, 1978). The size of a setting may offer opportunities for people to put distance between themselves or it may limit their options (Zeisel, 1981), hence it directly influences the social relationships within a setting.

Scale and Size in the Classroom

Physical dimensions of the classroom have important effects on students' behaviour and attitudes and the design factors are typically overlooked in discussions of learning environments (Weinstein and David, 1987; Rivlin and Weinstein, 1984). The literature searched identified issues mostly related to classroom size and class size. Classroom size is related to the physical size of a room while class size is related to the number of pupils in a classroom. Class size is typically defined as a student/teacher ratio independent of the size of the classroom space the class is contained in (Lackney, 1994).

Moore and Lackney (1994) found considerable evidence that characteristics such as school size and classroom size make a difference in academic achievement. They identified that high density conditions (number of students per space unit) have been found to lead to increased aggression and decreased social interaction. In classrooms with fewer students, teachers can have more interactions with each pupil providing a richer array of interactions, establishing learning centres and teaching strategies that improve the quality of interactions with each pupil. It is argued that these effects may lead to increased educational performance, though no study has been found that clearly established this increased performance.

Loughlin and Suina (1982) observed the way that teachers look at their classrooms, seeing only part of the available space and overlooking the rest. When furniture is placed in a classroom, the appearance is affected in terms of the available space, highlighting some areas and camouflaging others. Although teachers are different and see spaces in different ways, some kinds of spaces are more likely to be invisible to teachers' eyes than others and these areas are the most often neglected areas in spatial organisation.

Function

One of the most significant influences of a room is its purpose. In many cases, a room's function is partially defined by the purpose of a larger system; a classroom in a school building for instance, placing constraints on the activities occurring there (Heimstra and Macfarling, 1978). Space can have different

purposes and it is very difficult to balance out the conflicts among these when designing a setting. Steele (1973) has identified six functions to the environment. *Security and shelter* refers to protection from physical elements such as rain or cold or even noise or other people. The *social* function refers to the arrangements of the spaces that enhances or inhibits social interactions. The *symbolic* function refers to the messages sent by the settings to a person. The fourth function refers to the *appropriateness or inappropriateness* of a setting to perform a specific task. *Pleasure* gives the user the feelings of satisfaction towards a specific setting, normally met when needs on other dimensions (shelter, social contacts and so on) are fulfilled. And finally, the sixth function refers to how the setting *stimulates the user's growth*.

Function in the Classroom

Schools, like all physical settings, serve a variety of functions. The most obvious function is the school's responsibility to educate. In addition, schools at different times in history have been expected to assume the responsibility for socialisation, transmitting ideas and values of society and preparing children for their adulthood. All of these functions have been emphasised at different points in time while others have been played down. The same happens with the emphasis given to areas of the school curriculum. At different times the school has focused on literacy, practical and manual skills, classic subjects, rote learning, independent learning, the arts, the basics and health among others (Rivlin and Weinstein, 1984). But whatever focus is given at a certain time, all built environments for children should serve certain common functions with respect to children's development: to foster personal identity; to encourage the development of competence; to provide opportunities for growth; to promote a sense of security and trust; and to allow both social interaction and privacy (Weinstein and David, 1987).

In the processes of teaching and learning, the physical environment arranged by the teacher provides the setting for learning and at the same time acts as a participant in teaching and learning. According to Loughlin and Suina (1982), there are two major interacting elements in a classroom that will either strengthen or limit the environment's

contribution to education. One is the architectural facility and the other is the arranged environment. Each is essential and each influence behaviour and learning.

Arrangements and Layouts

Arrangements of space and objects influence interaction in settings such as hospitals, libraries, and classrooms (David, 1975). Observations in classrooms identified predicting patterns of participation in class activities from seating arrangements, patterns of which teachers were not aware. Steele (1973) mentions that arrangements of facilities and spaces, such as the location of a coffee machine in an office where people accidentally come face to face with one another can either hinder or promote social interaction.

Arrangements and Layouts in the Classroom

The amount and arrangement of space in educational settings is very important for classroom performance and behaviour. Classroom layout affects the social interaction of both teachers and students (Gifford, 1987). The design and arrangement of space and furniture are factors in implementing educational goals (Gump, 1987; Proshansky and Wolfe, 1975). Physical and spatial aspects of a learning environment communicate a symbolic message of what is expected to happen in a particular place. The atmosphere of a classroom is readily apparent when one enters it and is reflected by subtle cues in the physical arrangement as well as by the style of teaching. The arrangement of classroom space can communicate expectations for behaviour that are reinforced by institutional policies.

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Figure 2 - *Different classroom layouts, different expectations of behaviour*

The effective arrangement and management of space can facilitate the learning process, while the unplanned ineffective use of space can result in unforeseen and unexpected interference, and may even serve to instigate conflicts. The teacher sometimes does not realise that certain behaviours occur in the classroom as a result of how the room has been arranged (Proshansky and Wolfe, 1975). When children exhibit puzzling behaviour, the environment should be checked. Turning furniture around or re-routing traffic are some ways to change patterns of behaviour in a classroom (Loughlin and Suina, 1982). Placing chairs in a circle, instead of in rows and columns, for instance, makes it clear that discussion and interaction are involved

(Gump, 1987). Rivlin and Rothenberg (1976) examined the distribution of furniture and activity in elementary school classrooms throughout the school year and found that the physical layout of the classroom remained quite stable over the course of the year. This means that although teachers were free to make changes, these changes were not made during the year.

Loughlin and Suina (1982) state that teachers can use spatial organisation to design settings that stimulate children's work. The arranged environment can work in partnership with the teacher. Spatial organisation is the task of arranging furniture to create appropriate spaces for movement and learning activities.

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Teachers accomplish this task by defining spaces within the environment, planning traffic patterns, and arranging furniture. Room arrangement is more than a casual responsibility or a matter of aesthetics, because spatial organisation influences so many behaviours. New spaces are created each time a piece of furniture is put in place or moved. Spaces and their relationships will influence behaviour, whether planned or not. Spatial organisation requires clear perceptions of the space, and an understanding of the particular effects of space on movement and activity patterns. Teachers who perceive classroom space in informed ways can use deliberately organised space to facilitate children's movement and support physical activity for learning.

Figure 3 – *Teachers' reorganising their space reflecting on changes that can be made in the classroom (professional development workshop for teachers – March 2004)*

Rivlin and Weinstein (1984) described a study made in preschools which compared the behaviour and cognitive development of randomly arranged classrooms and planned classrooms. Equipment, furniture and materials in the classrooms were the same but in one they were set up in a casual fashion and the other they were set up thoughtfully and intentionally organised to promote specific learning outcomes. Scheduling, activity choices, and interaction patterns were similar in all rooms. The findings were clear. In the spatially planned room, children engaged in more manipulative activities and they also produced more complex work using the materials available. The most striking finding was that conservation of knowledge was achieved earlier and by a greater number of children in the spatially planned rooms. Moore (1986) found, in a similar study, that the spatial definition of behaviour settings is related to cognitive development behaviour degree of engagement and exploratory behaviour in preschool children. The built environment is not to be considered the major influence on the developing child but it would appear that the developmental process can be influenced by characteristics of the physical setting (Weinstein and David, 1987).

Circulation, Traffic and Pathways

Circulation can promote the kinds of access (entry/exit) a space has, the traffic that takes place, and how much movement there is, and this can lead either to better understanding of the space or to spatial confusion (Rivlin and Wolfe, 1985). Paths determine movement or traffic patterns. A clear path is visible, it is empty space that seems to be going somewhere, it tends to draw people from one place to another and facilitates movement through the environment (Loughlin and Suina, 1982).

> Space communicates with people - in a very real sense it tells us how to act and how not to act. What it tells us to do is related to what is in the space and how these things are arranged or organised.
> (Kritchevsky et al., 1969: p.9)

Circulation, Traffic and Pathways in the Classroom

Spatial organisation influences much of the movement and physical behaviours of children in the classroom environment. Teachers can define spaces within the environment, planning traffic patterns, and arranging furniture. Furniture can be useful for defining work areas and paths. Movement is a normal accompaniment to learning experiences for children. The environment can facilitate the movement that is important for working and

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learning. Movement provides communication. When spatial organisation encourages movements and other behaviours that conflict with the teacher's wishes, the productivity and communication of classroom movement are reduced. Circulation patterns surrounding activities encourage children to look around and see what is available, and fluid traffic patterns provide a means for better communication (Moore and Lackney, 1995; Loughlin and Suina, 1982). Where traffic patterns are not clear, disruptive behaviour may occur. It's easy to assume that the problem lies with the children, but the teacher-arranged environment may also be at fault when this happens. Teachers can unknowingly encourage children to act quite differently from the expected ways by the arrangement of classroom furniture through the environmental messages sent by the setting. When this happens, much energy and time must be spent verbally setting and enforcing behaviour expectations that contradict the behaviour suggestions made through spatial organisation (Loughlin and Suina, 1982).

Paths tend to draw people from one place to another and facilitate movement of children through the environment. Loughlin and Suina (1982) found that teachers sometimes see paths that children do not. Some paths seen from teacher's height just disappear at the working level of children. Furniture can completely block the children's view of a path, without interfering at all with the teacher's overview. They argue that the teacher might be wanting to block children's view from one area to another but this has to be a planned decision. Since the purpose of spatial organisation is to facilitate the activity and movement of the children, it is necessary to find out what children see from their eye levels. Teacher planned paths that are not seen by children, are teacher's paths, not children's.

Figure 4 – Teachers' paths during a Design and Technology lesson

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Since good organisation facilitates freedom of movement, it appears that when space fails to direct children's movement constructively, teachers may need to compensate by providing other cues in the form of rules, restrictions and directions. Paths can be unclear for a variety of reasons, but the result is always the same: there is interference with children's seeing, moving to and from different areas (Kritchevsky et al., 1969). Confusing circulation patterns creates unnecessary chaos and disorganisation (Moore and Lackney, 1995).

The Social Environment

The social environment is concerned with the individual and with groups of individuals. Built environments are always social, for as we have already noted, there is no social environment that is not also a physical environment (Weinstein and David, 1987). As individuals or groups of individuals, we occupy a location within the space and depending on the context of the environment, our attitudes related to each other or ourselves vary according to the implied social norms of the setting. In the school these impacts are very much related to the social and institutional norms of the setting.

Behaviour is an aspect of the classroom social environment of major importance. The influence of group norms, which define rules about how a space should be used, determines what can be done in any space. Children look at the environment, physical as well as social, for ways in which to understand their surroundings, to satisfy needs, and in doing so to behave appropriately. By definition, the school is a designed agent of socialisation. In comparison with the home and neighbourhood settings, the school is in general the most predictable and most rigidly structured socio-physical setting in the child's life. Part of the socialisation of children involves learning to use the physical environment in specific ways and to understand its social and personal meanings. Children are as greatly impacted by the physical environmental qualities of the settings in which they are placed as they are by the social organisation of those settings (Rivlin and Wolfe, 1985).

Place-identity

Place-identity is conceived of as a substructure of the person's self-identity that is comprised of understandings about the physical environment that serve to define who the person is, distinct from the physical environment as well as from other people. We look towards the environment, physical as well as social, for ways in which to understand our surroundings, to satisfy our needs (Proshansky and Fabian, 1987; Weinstein and David, 1987).

Place-identity in the Classroom

Allowing children in a classroom to personalise the environment encourages them to claim this important sense of ownership becoming familiar with their surroundings. The results of this feeling of ownership develops a sense of security which gives children confidence (Trancik and Evans, 1995). With personalisation, the child not only learns the appropriate labels for objects and for people but also learns through social interaction and object use what his/her given relationship is to such objects and persons. These relationships between the child, other people and objects, indirectly help the child to define himself, both for himself and for others. In this way children learn to view themselves as distinct from the physical environment as well as from other people and do so by learning their relationships to objects, spaces, and places including ownership, exclusion, limited access and so on. All of this contributes to a place-identity in which competence and control of the physical world is an emergent aspect of self-identity (Weinstein and David, 1987).

Legibility

An environment that is legible is easy to understand as individual parts are easily recognised within a comprehensible whole. Legible environments inform the user of their orientation in space and of the way an object or space is to be used. It is easy to understand the environment through form, landmarks, boundaries, pathways and visual access (Trancik and Evans, 1995).

Coherent environments are places which can be organised into comprehensible patterns through shapes and geometric forms. When the form of a building is legible it complements the interior cues that help the user of the space

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orient themselves (Trancik and Evans, 1995). The shape of a setting affects primarily visual and perceptual relationships. If people want to, they can use the cues that shapes provide to consider areas within one space as separate places (Zeisel, 1981).

Affordances are environmental cues which tell how an object or space is used (Trancik and Evans, 1995). They are features of the environment consisting of everyday objects and places, which are identified because of their functional significance.

Legibility in the Classroom

Classrooms need to be legible to function well both physically and socially. Legible classrooms inform teachers and students of their orientation in space, easing movement through it. If a classroom can be organised into patterns, it is coherent. Features that support a coherent classroom environment are landmarks (e.g. the whiteboard), boundaries (e.g. activity centres for specific tasks), pathways (empty spaces that lead from one place to another) and visual access (e.g. the placement of displays where they can been seen). Different floor levels or ceiling levels, textures and colours, can be perceived as boundaries. When a room lacks delineation, it can be unclear where an activity takes place and can cause confusion creating an imbalance in the distribution of spatial use. Visual access keeps the environment coherent when it allows children in a classroom to see what is going on around them (Trancik and Evans, 1995).

Privacy, Density and Crowding

The ability to regulate our social interactions can be allowed or not by a setting (Trancik and Evans, 1995). Density, crowding and privacy are concepts that support this social regulation. Density is a physical concept, while crowding is a psychological concept. Density, as a physical meaning, is the number of people per unit of space. It has no inherent psychological meaning. Crowding, on the other hand, is a psychological state, a personal reaction that is based on the feeling of too little space (Steele, 1973; Heimstra and Macfarling, 1978; Moore, 1979). Whether a layout seems crowded will depend on the norms and needs of the people who use it. Crowding may result from high density. But more importantly, crowding is a function of perceived density, and this

perception is also subject to the effects of mood, personality, and physical context.

Although density is a necessary condition for the development of the feeling of crowding, density alone is not always sufficient to create the feeling. For example, in many situations, such as a party consisting entirely of friends, the density level is high, but there is no feeling of crowding. However, in another situation with the same density level but with strangers present, crowding will be experienced. Whether a situation is perceived as crowded depends not only on the number of people present (that is, density) but also on a variety of personal, social, and environmental variables (Heimstra and Macfarling, 1978).

When people have a feeling of lack of privacy, they are usually saying that they have no way of controlling their relation to their social surroundings either because they cannot control who comes into contact with them, or they cannot prevent being overheard or observed by others. Privacy is therefore a result of having "control" over the amount and quality of the visual and auditory cues sent and received, it refers to an individual's freedom to choose what will be communicated about himself or herself (Steele, 1973; Proshansky and Altman, 1979; Moore, 1979; Trancik and Evans, 1995).

Privacy, Density and Crowding in the Classroom

Teachers feel that some environmental qualities are in part their responsibility even if they are unable to control them, and privacy is such a quality (Lackney, 1997). Teachers are not trained to be aware of the way space can support or hinder group dynamics, individual privacy, and feelings of crowdedness (Lackney, 1994).

Many studies have looked at classroom size and classroom density and their impacts on educational outcomes. The main results, as reported by Moore (1979) in his review on density and crowding, are that high-density conditions have been bound to lead to increased aggression, decreased social interaction, and non-involvement. In classrooms with fewer students, teachers can have more interactions with each student, can provide a rich and vastly differing array of interactions, can establish learning centres and

other teaching strategies, all of which improves the quality of interactions with each student. These effects may in turn lead to increased educational performance, though Moore's review (Moore, 1979) reported no study testing this relationship. He reports though, that higher absolute density and greater perceived crowding are associated with decreased attention, lower task performance, some behavioural problems like increased aggressive behaviour, and social withdrawal. Lackney (1994) reported that as pupil density increased, so did movement and distraction.

> Nowhere else are large groups of individuals packed so closely together for so many hours, yet expected to perform at peak efficiency on difficult learning tasks and to interact harmoniously.
> (Weinstein, 1979: p.585)

Environmental Awareness and Competence
Environmental awareness is the ability we have to analyse our spaces critically and to function intelligently within these spaces. Developing our environmental awareness prepares us to become more autonomous and effective, but also to be able to evaluate the places we live in. Certain effects of the environment on behaviour are easy to observe, for instance if a room is too cold or too hot or if we are seated on an uncomfortable chair. There are other levels of awareness that require more sensitivity to be able to perceive. For instance, the amount of space a person requires between himself and others in order to feel comfortable, or how messages are transmitted via the environment. Such knowledge or awareness can be used to seek out more satisfactory spatial arrangements or to design structures that better meet users' needs (David, 1975).

Personal awareness is the ability to become autonomous within the environment and able to continuously evaluate the setting (David, 1975). Awareness of our own environmentally relevant skills, abilities, needs and values would support this ability (Gifford, 1987). Knowledge about the surroundings may include scientific knowledge relevant to the environmental issues or even knowing how to find your way around. Steele (1980) says that technical knowledge of our surroundings (e.g. the difference between fluorescent and

incandescent lighting) is an important component of environmental awareness because it allows us to draw upon it if we are faced with a problem. Making sense of an environment is a process of perception, involving the way we organise what we are aware of in a situation. The interpretation people place on what they perceive is its meaning to them (Zeisel, 1981). Environmental conditions are bound to deteriorate when people are environmentally anaesthetised (Huse, 1995).

> Environmental literacy is the application of the generalised vocabulary of awareness to ones immediate surroundings in a problem-solving fashion. (David, 1975: p. 166)

People are continually interacting with the environment, both human (others) and non-human (furniture, for instance). It is the nature of this continuous interaction that must be understood (David, 1975). Learning how to deal with the environment involves not only assimilating information but also experimenting and changing. Most environments, no matter how stimulating they may be initially, become "invisible" with repeated experience. We become more aware of their characteristics when change is introduced, or when we are in an unfamiliar setting (Ittelson et al., 1974).

In a sense, the goal in developing environmental awareness is to reach a new understanding of how the environment relates to human activity. But awareness, by itself, might create an individual who is only literate in identifying the relationships or problems occurring in a setting but not necessarily capable of using this new knowledge to carry on a meaningful dialogue with the environment to transform it to fit their requirements. Heightened awareness may not prompt any movement away from being passive to the demands of the environment. It may not be enough to provoke one to take action and rearrange a setting that has proved dysfunctional. According to David:

> the development of environmental literacy involves the transformation of awareness into a critical, probing, problem-seeking attitude toward one's surroundings. (David, 1975: p. 166)

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Developing awareness only overcomes passivity when the individual becomes active in the definition of choices and demonstrates willingness to experiment with a variety of spatial alternatives challenging the environment. I would argue that this is when the individual becomes environmentally competent and capable. The environmentally competent individual will question the setting and look for solutions and for purposeful change. The environmentally incompetent individual is likely to give up the inquiry before it begins (Gifford, 1987). According to Steele (1980), environmental experiences should lead to two different goals: to help people to be aware of their own experiences (their personal reactions to the settings) and to increase the individual's awareness of consequences of their own choices on how well they get by in their environments. But he goes on to argue that becoming an effective environmental learner puts one in the position of being adaptive rather than trapped by a situation.

Teacher's Environmental Awareness and Competence

The learning environment can be a powerful teaching instrument at the disposal of the teacher, or it can be an undirected and unrecognised influence on the behaviours of both children and teachers. As Loughlin and Suina (1982) state, informed attention to the arranged environment and the conscious use of it to support teaching and learning goals, have not been widespread in schools, but understanding environmental influences is important for all teachers. Lack of awareness of physical and spatial needs in the classroom environment can interfere with the optimal functioning of the classroom. Proshansky and Wolfe (1975) found that a great deal of attention is generally given to lesson plans but little attention is given to space planning.

Lackney (1994) believes that buildings are often conceived solely as relatively fixed objects that are not amenable to significant change. However, the process by which the building is formally or informally designed, maintained and modified, has not been recognised as an important factor affecting the effectiveness and efficiency of the educational process. It seems as though the problem is not that teachers do not use the environment as the architect intended. It is that they are not

prepared to use it. David (1975) understands that in the absence of an active attitude towards the environment, teachers are reduced to defensive postures and attempts to traditionalise the environment.

In a seminar report by the Organisation for Economic Co-operation and Development (OECD, 1988) about the quality of the physical environment of the school and the quality of education, participants expressed many opinions on the subject. They report that teachers are responsible for spaces for teaching and learning and should attempt to make them exciting and stimulating and be prepared to develop them. They also mentioned that a lack of awareness of the potential of an environment could be rectified through staff training in issues concerning the environment, including architecture and design. The participants speculated that by raising such standards amongst teachers, teachers would impart this knowledge to their pupils who, in later life, would apply this understanding in their own environments.

In a study by Lackney (1997), it emerged that teachers feel that some environmental qualities are in part their responsibility even if they are unable to control them. This raises questions about the need for educators to become more aware of the potential and opportunities that the physical setting presents to them. Knowledge of the relationships between physical surroundings and actions should be a practical tool the teacher can use. Loughlin and Suina (1982) believes that a well trained teacher can predict behaviour in classroom settings. This seems to be another piece of evidence leading to the need for teachers to understand space. The ability to predict behaviour in certain settings would probably mean that teachers could arrange settings to promote particular actions.

A pilot study is currently being undertaken in order to provide teachers with environmental awareness and competence in the use of their classroom space. Results on this study are going to be available by the end of 2004.

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Figure 5 - *Teachers' environmental awareness professional development workshop*

The Classroom Environment and the Teacher
Research in the classroom environment (Horne, 2002) has identified a need for teachers to learn how to question their settings in a constructive way, looking for solutions and being proactive in feeling in control of change over their classroom settings. Taking a proactive attitude would permit the teacher to experiment, and with experimenting find out what works and what does not work since each teacher and each group of students will be different. The classroom cannot be allowed to exist as a static feature. According to Trancik and Evans (1995), the ability to control the environment leads to feelings of accomplishment and independence whereas a lack of control may result in helplessness. When teachers realise that they have control, they feel empowered by this same environment that once would have defeated them.

Design and Technology teachers demonstrated a higher level of awareness of their space then teachers from other subjects (Horne, 1999). This is not a surprise as it is in the nature of the subject to manipulate resources. However, this level of awareness can be enhanced by the increased understanding of the relationship of the environment and behaviour.

What an architect provides with a building is a "finished beginning". Because of the hierarchical nature of the process by which classrooms are designed, and the fact that teachers inherit classrooms, there is a tendency to create a passive acceptance by teachers of the space they are given (Horne, 1999). It is necessary to find ways to give teachers greater authority in designing and redesigning the spaces in which they teach. The implications of this should be recognised directly in teacher training and in teacher's professional development in terms of enhancing their environmental awareness. Horne argues that teachers should be self aware of these relationships and that this awareness should not be left to chance but rather should be deliberately developed in them. The training of teachers in understanding the effects that the classroom has on them is therefore clearly a matter of importance. However, it appears that it is not an official requirement. At the time of writing this review, the Teacher Training Agency standards did not mention any significant issues of the impact of the classroom environment on teaching. The only mentions were either highly generalised or related to health and safety (TTA, 1998a; TTA, 1998b; TTA 1998c). None of the TTA references related to understanding the setting and learning about the relationships that exist between the setting and the practice of teachers. Since so little understanding has been required, it is reasonable to suppose that there is equally little training for teachers in this area.

One of the most significant issues emerging from the review is the suggestion that the arranged environment can be used as a deliberate teaching strategy, complementing and reinforcing other strategies the teacher uses to support children's learning.

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