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The Playground Project: A case study in participatory design.

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THE PLAYGROUND PROJECT: A CASE STUDY IN
PARTICIPATORY DESIGN

by
Karen McRorie

A Thesis
Submitted to the College of Graduate Studies and Research through Communication Studies in Partial Fulfilment of the
Requirements for the Degree of Master of Arts at the
University of Windsor

Windsor, Ontario, Canada
1999
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Abstract

This thesis presents a case study of the importance of participation in instructional development. The project began with the assumption that children can have a central decision-making role in changing their playground design, an assumption based in the theory of participatory design. The research goal was to develop a new participatory model for designing school playgrounds. This goal was reached through the education of children in playground design theory and the creation of meaningful opportunities for children to plan and design existing playgrounds. Yael & Schlomo Sharan's Group Investigation was the education method selected to implement a participatory design process with children. In the implementation of the curriculum unit, referred to as the Playground Project, instructional goals were negotiated and modified, certain instructional strategies improvised, and aspects of the Group Investigation method abandoned. The departures from the initial planned unit were a natural feature of participatory planning in which children actively negotiated all aspects of the research and learning process. One outcome of the Playground Project was the development of an instructional unit for teaching children about play and playground design theories. Another outcome was to provide a case study analysis of the Group Investigation process and the issues of participatory research with children. It is hoped that this information will add to the knowledge of Group Investigation and participatory research processes and help to promote their underlying ideals.
Dedication

In loving memory of Janice Nathan
November 7, 1969 to July 18, 1997

It was your nature to laugh and fly, mine to sigh and dig down deep.
I wish you were here to smile at all this shovelling.
Acknowledgements

This thesis would not have been completed without the generous contributions of Juanita Rivait. I would also like to express my appreciation to Helen Arbour and the Greater Essex County District School Board for the opportunity to work in a Windsor classroom.

I will never forget all that my advisor, Dr. Richard Lewis, has done in the last three years. Thanks go as well to the other members of my committee, Dr. Stuart Selby and Dr. Wilfred Innerd, for their academic insights and guidance. My gratitude is extended to the Department of Communications and to Mary Gold, Irv Goldman, Kai Hildebrandt, Myles Ruggles, and Jim Winter for their friendship and interest in my work.

Unfortunately, those to whom I owe my greatest debt must remain unnamed (all names are changed to protect the identity of participants). Thank you and best wishes to the children who participated in every aspect of the Playground Project with full hearts and open minds.
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Introduction

There are good reasons for children to become more involved in the design, development, and maintenance of playgrounds. "The more children are involved in developing and therefore understanding their environment and their community, the greater their involvement and identification with it" (Heseltine & Holborn, 1987, p.28). The research goal is to provide children with the knowledge, skills, and values necessary to become competent playground planners, or genuine participants in a co-operative planning effort, for their community's and their own needs. The purpose of the Playground Project is to take up playground designer and researcher, Paul Hogan's (1974) provocation to his industry: find a way to encourage children to build playgrounds for themselves.

The Playground Project is based on the premise of participatory design theory that the end users of a design should have a central decision-making role in the creation of that design. In sharing the control of a design process with non-expert end users, the designer encounters a two-fold responsibility. First, the designer must be concerned with identifying and monitoring the conditions of the design process to ensure they support genuine participation. Second, the designer must account for the final design product, ensuring that it is both realistic and of high design quality according to industry standards. Given the frequent incompatibility of process versus product goals, planning for participatory design tends to be provisional and the relationship between analysis and implementation is spiralling rather than linear.

Research Goals

Participatory design projects have two equally important goals. First, the purpose of the process is to create the opportunity for participants from the community to learn new information, skills, experience, and new community ties that
may empower them for further action. Second, the result of the process must be a feasible, quality design solution of quality. Therefore, Playground Project tries to support an educating process while producing a feasible, quality product. The trick in developing and facilitating a participatory design project is in balancing the often conflicting requirements of meeting both product and process goals.

Literature Review

An overview of playground theory and existing models of participatory design for playground development shows that there are good reasons for developing a better participatory process. The problem for playground developers is that children have cognitive, social, cultural, and physical limitations that impede a process of genuine participation in playground design. Education theory be combined with participatory design to provide a fruitful approach. Yael and Schlomo Sharan's Group Investigation (1990, 1992) may provide the theoretical and methodological links between participatory design theory and education theory so children can participate meaningfully in the development of their playgrounds. It is the fit of Group Investigation with participatory design and the outcomes of its application which lie at the centre of my theoretical analysis.

Theory

Group Investigation is a method of instruction and classroom management that is based in theories of cognitive and social constructivism, small group theory, and co-operative learning methods. It is a useful framework for developing participatory process with children due mainly to its four component features: intrinsic motivation, interaction, interpretation and investigation. These four components are both descriptions of the ideals of genuine and meaningful participation as well as prescriptions for the necessary actions and conditions to ensure participation and
A limitation of Group Investigation is that it is a process-oriented theory. Therefore, it is not a suitable method for achieving the second goal set of participatory design, which is a quality, feasible design product. Accordingly, lessons and activities that are designed around prerequisite learning for playground design are prepared and delivered as needed throughout a Group Investigation implementation. Sharan and Sharan suggest that the Group Investigation method can be enhanced with direct instruction and intervention of this kind. Finding an appropriate balance between product and process goals is a central issue in both the methodological development and implementation of the Playground Project.

Methodology & Implementation

In adapting Group Investigation to a participatory playground design project (the Playground Project), I mixed instructional methods to address process and product-related goals. Group Investigation method was used to address the process issues of genuine participation. It was used to identify and cultivate the conditions of genuine participation, these being investigation, interaction, interpretation, and intrinsic motivation. To address product-related goals, a more systematic instructional design process was used to determine the prerequisite knowledge and skills needed by children to become competent playground planners. This instructional design process produced a sequence of goal analysis, conditions and learner analysis, and strategy selection, and implementation.

The participatory aims of the Playground Project required that all pre-implementation planning be provisional, however. Therefore, goals were grouped in flexible sets that could be negotiated with the teacher and learners during implementation. As well, planning was done in stages and layers as the application of Group Investigation evolved through implementation. Given the interdependency of
planning and implementing, an important "method" was journal-keeping and a
detailed account of how theoretical analysis evolved from the situated actions and
context. Thick description within a case study-approach documented the planning
and implementation stages in the development of the Playground Project.

One important outcome of the Playground Project was to refine the initial
curriculum unit, thus moving toward a ready-to-use resource for schools who are
making changes to their playgrounds, and who recognise the value of involving the
children in those changes. (The Playground Project was not submitted to formal or
systematic evaluation and must be considered as a project in the early phases of
instructional development). Another important outcome was to document the non-
linear design process which participatory design incurred, and to contribute to the
literature on participatory methods of research and design.

Discussion

Participatory design is a cultural event as much as a designed one.
Consequently, a discussion that reflects a participatory approach will incorporate both
constructivist and systematic perspectives. In discussing the Playground Project, I try
to temper general abstractions and prescriptions with authentic, information-rich
representations of the context in which the Playground Project was implemented.
Beyond the task of assessing the components and functions of a participatory
methodology, the discussion is concerned with the real world outcomes of the
implementation.
Literature Review

Defining Participatory Design

Participatory design is a collaborative process between experts and end users with the aim of designing and developing new technologies or systems (Anonymous, Participatory Initiatives [On-line reference], September 30, 1998). It suggests that the end user of a technology, system or design can identify needs and possible uses that the designer may not have anticipated. Therefore, the defining feature of participatory design is that it designates a central research role to the end users, eventual benefactors, and stakeholders in the design project and for this reason, participatory design is often described as a "bottom-up" approach. Simply put, "A participatory approach is one in which the participants are in control" (ibid.).

The use of the term participatory design first appeared in Scandinavian workplace research in the 1960's, but has found extensive applications in the last ten years in the fields of engineering, computer science and artificial intelligence. Bjerkens and Bratteteig cite three reasons that participatory design is initiated in a practical scenario: to improve the designer's knowledge of the system in which the product functions; to improve the user's knowledge of the product and its functions; to improve democratic process in the workplace, whether at the local, organisational or inter-organisational level (1995, [On-line reference]).

A related term is participatory research, a method and philosophy in conducting research that emphasises community participation in the process of acquiring knowledge. The underlying assumption in participatory research (sometimes called participatory action research) is that research should be an aid to community action and a tool for empowerment, rather than an end in itself (Barnsley and Ellis, 1992, p.9). Participatory research promotes collaboration between an
academic or professional researcher and a community group to focus on a real social problem in the community (Alary, Beausoleil, Guedon, Lariviere & Mayer, 1990; Fals-Borda, 1992; Frideres, 1992). Three purposes define participatory research: to improve or resolve a real world problem; to educate the community; and to create new knowledge (Forrester & Ward, 1992).

Participatory research began in the 1970's with development projects in the impoverished world and has extended into urban development and regional community planning. Its appeal to academics then as now is that it offers a response to the seemingly empty findings and over-specialisation of academia and suggested a bridge between theory and practice (Fals-Borda, 1992). The underlying philosophy is constructivist with inflections of Marxist ideology. Knowledge is considered to be power, and providing a community with access to new knowledge which is otherwise unattainable is considered to be an empowering feature of participatory research (Fals-Borda, 1992; Forrester & Ward, 1992). Participatory research is also based on the belief that community ownership and control over the process is essential. Decisions about what issues to study, what methods of study, and what meanings to draw from the findings should always take into account the insights and concerns of the people who experience the problem. The benefits of participatory research are the opportunities it provides to non-experts and members of the community.

Participatory research provides the opportunity for community members to build their skills, confidence and knowledge (Barnsley & Ellis, 1992). It provides them the opportunity to work together and form better associations, as well as a chance to mobilise the community to action by raising awareness of issues and possible solutions. To sum up, all participatory research should aim at developing strategies and programs that take learning into action, and what is learned is based on real life experiences rather than theories or assumptions (Barnsley and Ellis, p.10).

Whereas the term participatory design has its origins in organisational
management, engineering, and computer sciences, the term participatory research has its origins in community development, emancipatory social and political theory, and qualitative research paradigm. Therefore, participatory research is more concerned with explicating the cultural and political values inherent in adapting a participatory approach. When applied to the domain of playground design, the connotations of both participatory design and participatory research apply: while the term participatory design will be used throughout the rest of the thesis, the values and goals defined by participatory research will be discussed or inferred.

**Playground Design Theory**

The general body of playground research has demonstrated that playgrounds seldom reflect current playground design theories and principles or support children's play needs and preferences (Frost & Klein, 1979; Weinstein & Pinciotti, 1988; Carr, Rivlin & Stone, 1992; Cheskey, 1993). This disparity between theory and practice seems to have existed (with a few notable exceptions such as The Environmental Yard in Berkeley, California) since playground research began as a specialty domain combining environmental and developing psychology. As the field has matured, playground research has extended its inquiries from the study of relationships between play environments and play behaviours, to the problem of disseminating expert knowledge for practical applications. Originally, researchers identified the problem to be the inability to predict and control the relationships between play behaviours and play environment. In recent years, the problem is one of appropriate uses and applications of playground design theory.

The initial playground studies of the early 1960's in Britain raised critical awareness of the inadequacy of play environments to provide for children's play needs (Allen of Hurtwood, 1968; Smilansky, 1968). This rising awareness of children's play needs was soon followed by empirical research into the relationship between play
environments and play behaviours, as well as tentative models and design theories about how to design better playgrounds (Hayward, Rothenburg & Beasley, 1974; Frost and Klein, 1979). The problem, concluded Hayward, Rothenburg and Beasley, was the unsystematic nature in which children's playgrounds had cropped up. "It appeared that all planned play spaces embodied untested assumptions about the users, the nature of the activity and the interaction of the physical environment and children's play" (1974, p.133).

Interaction among children on playgrounds was the object of study of most of the playground research during the sixties and seventies, particularly the ways in which the play environment shapes cognitive and social development. Several studies conducted in the 1970's confirmed the general findings that creative areas in playgrounds were selected more often by children and promoted more desirable cognitive, social, and physical behaviours (Brown & Burger, 1984). The research of the 1960's and 70's did engender some important innovations in the way playgrounds were designed: for example, the "contemporary" playground emphasised novel themes and aesthetically pleasing structures, materials and textures (Hayward et al, 1974). However, in 1978, in the midst of the furore of publication on children's playgrounds, Frost and Klein wrote:

In the main, school playgrounds are concrete and steel jungles, hazardous, unattractive to the eye, unsuitable to developmental play needs, and oriented to two important but limited forms of play, exercise and organised games (as cited in Weinstein & Pinciotti, p.346-7).

The problem was not a lack of theory supported by empirical research on children's preferences and needs for a playground, or a lack of innovative prototypes. Rather, it was a problem of not communicating the available information to urban planners, school board officials, PTA's, and the broader community (Weinstein & Pinciotti, 1988, p. 347).
Participatory Design Approaches

One solution to the gap between experts and the community is to educate concerned community members about play and playground design theory, but this is only half of the solution. The other half is to ground theory and research in local, community-based problems for which the professionals are designing. In this way, a reciprocal relationship is built between the development of expert, technical knowledge and first-hand, experiential knowledge. A participatory design process embodies this solution of reciprocity.

Participatory design approaches enjoy current popularity in many areas of urban planning and community development. Randolf Hester's twelve-step participatory design model provides a detailed sequence of the communicative and organisational events that take place when community members collaborate with professionals in defining local issues, prioritising community needs, and searching out alternative design solutions (see Carr et al., 1992). According to Hester's model, a participatory approach respects the complementarity of community spaces and community members. As Hester explains, the dimensions and uses of public space affect the atmosphere of a neighbourhood and contribute to the attitudes of community members toward the particular space and public space in general.

Community members, in using a public space, give it energy, utility and meaning (ibid.). In keeping with a participatory approach, any change to a playground needs to be considered as change to the whole school community and the system of values and powers that circulate therein. The school playground is also an interesting case example of the complexity of private and public ownership where ownership is taken to be a variable mix of economic and emotional claims upon a space (Carr et al.,
1992, p.249). These two levels of ownership need to be reflected in planning for changes. Not only should decision-making power be distributed fairly, but also knowledge about the issues and options and responsibility for actions taken.

In the research on playground development, most participatory design projects can be classified as following one of two existing models of participatory design, these being the adventure playground and the "community built" model of development. Adventure playgrounds, sometimes derisively referred to as "junk playgrounds", were an innovation of Danish architect, TH Sorensen in the 1940's. Although numerous in Scandinavian countries and in Britain, adventure playgrounds have never gained widespread acceptance in Canada (Canadian Mortgage and Housing Corporation, 1980, p. 5). In this model, the construction of the playground is literally child's play, as children build forts and clubhouses, garden and landscape, and camp out (CMHC, 1980, p.1). There is no final product or design in an adventure playground, and thus each summer's generation of neighbourhood children participate in its design. The underlying assumption of adventure playgrounds is that children "are gluttons for life" and require freedom and opportunity to imagine, create and shape a reality (Bengtsson, 1972, p.16).

By far the most popular of the participatory design models in North America, is the "community built" model promoted by the Community Built Association (CBA). CBA is a not-for-profit professional affiliation of playground architects, builders, manufactures and academics. CBA describes "community built [as] a dynamic new process of creation based on old community traditions: a collaboration between professionals and community volunteers resulting in a structure that

Communities that begin to work with the Leathers and Associates Architectural firm receive extensive guidance in using the "Leathers' Way." The community receives manuals that describe the stages of a community development project, the volunteer roles which need to be filled, strategies for fund-raising and media awareness campaigns, and finally, logistics for mobilising volunteer building crews. A "community organiser" initially fields community inquiries and consults with the community in setting budget and fund-raising goals, meeting deadlines and developing networking strategies with corporate sponsors. Later, a project manager is permanently assigned to the community (Leathers & Assoc., "Step by Step", 1996). An important stage in the "Leathers' Way" model is "Design Day" during which the playground designer works in the school, collecting suggestions from students, and presents a design proposal by the end of the day.

One weakness in the community-built model is that the children themselves have very limited involvement in decision-making and building, despite the claim by Leathers and Associates that their playgrounds "are designed, to a surprising extent, by the children who will use them" (Wolkomir, 1985). A case example is the "Design Day" which I was invited to observe in a Toronto school. The itinerary for the day required that the designer visit each of the grade levels for about ten minutes, collecting children's preferences and ideas for the final design. The process was rushed and its final effect seemed superficial. The designer had a very rigid format for interaction that consisted mainly at delivering information and inciting the enthusiastic children to draw their parents out that night to the unveiling of their
playground design. It would be unfair not to mention that the designer pointed out
during "Design Day" activities that she found the school had not sufficiently prepared
for her arrival. This was manifested in weak support for the project among the
teaching staff and it appeared that only two or three of the teachers had incorporated
the project into their class's curriculum.
The problem of children's superficial involvement may be due to a failing of
community co-ordinators to actively recruit children and adults according to the
"Leathers' Way" model as specified in the company's brochures & guide books (see

In a recent conversation, the designer updated me on this school's playground
development. The parents, teachers and students were so inspired by their new
"Leathers" playground, and so pleased with the result of their own labour, that they
have continued to raise money and volunteer-power for playground improvements.
The tarmac and lawn areas have been landscaped and naturalised with student gardens
and the staff have revitalised the curriculum in order to use the playground in science,
math and the arts. This update shows that the real strength of the community-built
playground is the community-building that occurs. While the students may have had
limited participation in the hands-on planning and building of the physical play
equipment, they were able to be directly involved in the follow-up playground
development activities.

In some ways, is hard to imagine an alternative design model in which
children could be more active in organising and building a playground of comparable
quality. This is partly because the scale of a "Leathers Way" project is enormous.
The playgrounds are vast, complex wooden structures, wonders of architectural prowess, and products of several intensive days of heavy construction. Whereas naturalised playgrounds and more modest building programs can incorporate children in hands-on ways, the typical site of a community built project is far too busy and dangerous for children; however, children can be safely involved in the stages of needs assessment and playground design. Therefore, a starting focus for expanding children's involvement in community built projects will be the preparation which occurs in classrooms leading up to "Design Day."

A New Model of Participatory Design

I propose to extend the participatory design model of "community-built" playgrounds by creating an instructional unit on playgrounds that could precede the actual design and development activities, and that would involve children in the community-built project more meaningful ways. My underlying premise is that when children are provided with the opportunity to study the theories and issues of design and to work together in their own sub-task committees, they will be responsible for a greater decision-making role in the development of their own playgrounds. There are two means of involving children in a participatory process. The first means is to educate the children about the needs and issues involved in their particular playground project, and the theories of design which respond to these needs. Two published exemplars that immerse children in principles of design are: Ann Taylor and George Vlastlos' Learn by Design (1990) and the London Board of Education's Design and Technology: Playground Design (date unknown). Educating on theory and principles assumes that pre-requisite knowledge and expertise is needed before children can begin to take on the adult project of playground design. The danger in theory-based instruction is that playground studies is memorisation work rather than participation in
community development.

The second means of involving children in a participatory process is to socialise them to manage the freedom and responsibility of making their own decisions, building and maintaining their own playgrounds. Such a process would give children opportunities to discuss and negotiate their ideas, consider different perspectives, manage conflict, prioritise needs, present proposals, and implement changes in a real life context of developing playgrounds. I have found no such models or curriculum units specifically designed for playground studies. Therefore, the emphasis of the Playground Project, a participatory design process for the study of playgrounds, is on controlling the social and organisational aspects of learning. Sharan and Sharan's theory of Group Investigation will provide the theory and methodology for doing so.
Theory

Introduction to Group Investigation Theory

Group Investigation is an instructional model developed by Yael and Schlomo Sharan for teaching through co-operative and inquiry-based learning. It is designed to promote higher order thinking skills through a program of investigation, interaction, interpretation and intrinsic motivation (Sharan & Sharan, 1992, 18). The central feature of Sharan and Sharan's model is that the social and organisational conditions of the classroom are directly controlled in order to enhance learning outcomes. Thus, in a co-operative learning classroom, small groups are the basic learning as well as social units (Johnson & Johnson, 1994, p.69). Sharan and Sharan develop their model for co-operative learning from four educational and learning theories or methods. These are John Dewey's basic philosophy and principles for education, a constructivist psychology of cognition, methods of social ecology as developed by Lewin and Thelen, and methods from motivation theory.

Theoretical Foundations: Philosophy, Epistemology, Sociology

Primarily, Group Investigation puts into practice the ideals of a Deweyian philosophy of education (Sharan & Sharan, 1992, p.1). As a philosopher, Dewey was a pragmatist and a moderate relativist. He introduced the concept of relativism into developmental psychology, suggesting that children of different ages have different perceptions and experiences with respect to the "real" world. He wrote in The Child and the Curriculum, "Interests in reality are but different attitudes toward possible experiences; they are not achievements; their worth is in the leverage that they afford, not in the accomplishment they represent" (1956a, p.15). The importance of this statement to educational practice is that children's own interests, own experiences, values, and beliefs are the most essential tools for enhancing further learning: it is always in the context of the child's mental representations of the world that new
knowledge is acquired.

Closely linked to Dewey's philosophy of education is a constructivist psychology of cognition, the second component theory for Group Investigation. Like Dewey, Jean Piaget documented qualitative changes in children's interpretations of and interactions with reality as they develop. He contributed to a constructivist view of learning by specifically identifying major stages of development, each characterised by "structures" of cognition, capabilities and limits in understanding (Gardner, 1991, p.30). Neo-piagetians, such as Jerome Bruner, Howard Gardner and Lawrence Kohlberg, have furthered the early constructivist's work by explicitly linking cognitive theory to curriculum design and instructional development.

The epistemological foundation of cognitivism is the belief that, "Knowledge is what people construct out of elements of information, feelings, and experience, not something that exists in chunks in the external world that we imbibe as is, with the requisite amount of repetition" (Sharan & Sharan, 1992, p. 10). There are three assumptions that provide a common base for constructivist approaches. First, learning is a process of construction rather than accumulation. Second, interaction is essential for this construction process to take place. Third, the concept of true and absolute knowledge can be misleading, since knowledge is a social construction and therefore varies in its meaning across individuals and contexts (Wells, Chang & Maher, 1994).

Ultimately, a new model of cognition and learning leads to a new model for the social roles in the classroom. Expository or conventional instruction, although affording appearances of success (in particular efficiency), is viewed by constructivists as offering disjointed knowledge and limited applicability of learning. "Novices feel they know way is important despite their not perceiving essence. They do not understand shallowness because they do not experience depth" (Blais, 1988, as cited in Grennon-Brooks & Brooks, p.627). Conventional instruction relies upon a transmission model of communication, in which packets of information are sent from
the teacher and received by the student. By contrast, learner-centred approaches use a constructive model of communication (Wells et al., p.1994). Knowledge is constructed, modified, and reinterpreted through interactions between the expert and the learner. Both contribute to its meaning, and the roles of teaching and learning may be assumed by either one at different times in the learning process. The corollary of these principles is that education must make effective use of social interaction for individual learning.

This leads to the third component theory for Group Investigation that is the theory of social ecology of Kurt Lewin and its specific adaptation for an education context by Herbert Thelen. Lewin established the importance of social interaction and context in understanding individual human behaviour. He developed methods for designing relationships, improving effectiveness of interpersonal relationships and communications. Equally important, he observed that behaviour is more than individual action, but is a response to and acquires significance in social, organisational and physical environments (Sharan and Sharan, p.7). Thelen combined Lewin's theories with Dewey's to present management strategies for group learning in education (ibid.). He also added a dimension of motivation theory, in recognising the importance of and developing methods for increasing the personal involvement of the learner in the content, pathway and outcomes of the learning process (ibid., p.8). Thelen's view of learning and methods for teaching provide the organisational framework of Group Investigation. This view of learning is "the conduct of inquiry by students who work together and co-operate in small groups with the theory and method needed for the effective management of groups that solve problems and make decisions in a democratic fashion" (ibid.). Based upon Thelen's theory, the social and organisational conditions which Group Investigation proposes to control for improved learning are:

- The patterns of interactions among individuals in the classroom,
including teacher-student and peer interactions.

- The way students organise their study in small groups and interact with one another within these groups.
- The [share] planning of the study project's topic and goal.
- The evaluation of the results of the group effort.

(ibid., p.9)

Organisational and Social Changes to Traditional Classroom

One of the most important innovations in Group Investigation is the change in the nature of the role of the teacher in the classroom. The emphasis shifts from the teacher-as-supervisor and teacher-as-director to the teacher-as-facilitator. Many of the instructional strategies are aimed at encouraging learners to discover their own expertise and pool it with other learners (Wells, Chang and Maher, p.59). While traditionally the teacher enjoys complete control over the lesson planning and learning evaluation, these activities are made public and open to negotiation in learner-centred approaches. The principal tasks of the teacher in a learner-centred approach include: providing opportunity for the learner to find meaningful purpose in the learning activity; sharing with the students in setting goals and identifying benchmarks of progress and achievement; supporting children's feelings of self-confidence, a sense of belonging, and a sense of achievement (Thorton, 1995, p.105-110).

The belief that co-operative learning supports whole person development is common to all variations of collaborative learning theory, among which Group Investigation is one model (Davidson, 1994). The epistemological assumption of collaborative learning theory is that education is an "effect" of both the classroom community and society (Britton, 1994, p.4). Consequently, collaborative learning theories develop and prescribe methods to create and maintain some kind of a social
network within the classroom in order to facilitate students teaching and supporting other students (Wells et al., 1994; Johnson & R. Johnson, 1992, 1994; Pradl, 1994). The treated conditions and desired outcomes of collaborative models of instruction, including Group Investigation, relate as much to teacher and student roles and to the processes of learning as to the products of learning (ibid.). One important outcome is to demonstrate an attitude of co-operation, rather than of competition or individualism. Proponents of co-operative or collaborative learning do not dismiss the value of using competitive and individualistic goals to promote learning; however, these are most effective when they are developed within a context of co-operation (Johnson & R. Johnson, 1994, p.69). By contrast, traditional models of education tend to emphasize individual autonomy over the intersubjective nature of learning (Pradl, 1994; Britton, 1994).

The Four Critical Components

To summarise, the central method of Group Investigation is to design social and organisational conditions and context in order to make the learning process more meaningful for the individual. Sharan and Sharan write, "A genuinely instructive approach to teaching, based on the view just presented, should maximise students' opportunities to:

- learn by asking questions
- obtain information relevant to these questions
- interpret this information and their experience" (1992, p.12).

In developing what they hope is a genuinely instructive approach, Sharan and Sharan have identified four critical components that relate to the social and organisational conditions under the control of Group Investigation: investigation, interaction, interpretation, and intrinsic motivation (Table 1).
Investigation

Sharan and Sharan describe investigation as referring to "the organisation and procedures for directing the conduct of classroom learning as a process of inquiry" (Sharan & Sharan, 1992, p.19). The goal of this investigation is to "create the conditions that allow students, in collaboration with their classmates, to identify problems, plan together the procedures need to understand and cope with these problems, collect relevant information and co-operatively (though not necessarily collectively) prepare a report on their work, usually in some creative and interesting way" (p.5). By this definition, investigation subsumes the other three components, intrinsic motivation, interaction and

Table 1 Group Investigation:
Anatomy of the Critical Components, Goals, Methods & Strategies

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<tr>
<th>Component</th>
<th>Goal</th>
<th>Method</th>
<th>Strategies</th>
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<tr>
<td>Investigation</td>
<td>Maximise students' research opportunities.</td>
<td>Provide opportunities to acquire and practise planning and problem-solving skills.</td>
<td>Teach problem solving, research skills and tools. Give manageable, small research tasks. Collaborate with students and model good investigative skills.</td>
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<tr>
<td>Interaction</td>
<td>Increase opportunities for students to ask questions, work collaboratively, talk actively.</td>
<td>Foster classroom environment that encourages discussion, sharing, co-operation, mutual help and reciprocity.</td>
<td>Arrange seating plans for small group work. Teach rules of good communication. Establish ground rules for co-operation. Engage class-wide reflection on group process.</td>
</tr>
<tr>
<td>Interpretation</td>
<td>Give students more opportunities to think for themselves and relate learning to own experiences.</td>
<td>Encourage students to make connections between personal life and learning, and to listen, respect and build upon peers' ideas.</td>
<td>Designate a lot of classroom time for reflective evaluation and sharing about learning. Ask open-ended and directive questions. Encourage thinking out loud and discussion during work.</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>Encourage students' emotional involvement and personal interest in learning.</td>
<td>Give or share with students important decision-making power about content, significance, style, products, and quality of learning.</td>
<td>Plan with students for learning, share goal-setting and evaluation. Monitor group work and individual performances. Provide choices about styles and outcomes of learning.</td>
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interpretation, is facilitated by them, and is perhaps meaningless in the attempt to
discuss it independent of them. Investigation, as it refers to the organisation of the
classroom for inquiry learning, makes use of each of the other three components in
order to facilitate inquiry learning. In other words, the conditions and methods for
implementing learning through investigation are intrinsic motivation, interaction and
interpretation.

Interaction

Interaction is the component of Group Investigation that refers to the
"interpersonal, or social, dimension of the learning process as it unfolds in the
communication among members of small groups in the classroom" (Sharan & Sharan,
1992, p.19). Sharan and Sharan write that,

Education should strive to have students acquire a profound sense of
belonging to social groups, without losing their individuality, rather
than fostering disconnected individualism through competition for
artificially limited resources . . . . This view of education seeks to
provide as many students as possible with the opportunity to develop
their abilities to the fullest and excel in the knowledge and grasp of
matters. The message is that excellence need not be realised at
someone else's expense (1992, p.5).

This aim is typical of a philosophy of co-operative learning, a broad category
encompassing different learning theories and models which are methodologically
similar in creating and maintaining a supportive social network within the classroom
(Davidson, 1994; Wells et al., 1994; Johnson & Johnson, 1985, 1994; Pradl, 1994). A
co-operative learning philosophy advocates a social constructivist view. This view
states that all learning has a social component and that recognises the importance of
peer relations and interactions in classroom learning (Johnson & Johnson, 1994;
Bodrova & Leong, 1994).

One of the pioneers in small group research, Kurt Lewin (1935) said the
essence of a group is interdependence among its members, for one, and a tension which is also intrinsic that motivates movement toward the accomplishment of goals (Johnson & Johnson, 1985, p.103). Building upon Lewin's theory, Deutsch (1949) theorised that depending upon the nature of the goals and the effects of other people's actions on those goals, individuals will behave co-operatively, competitively or individualistically as seems most appropriate for the nature of the goal and the path to its accomplishment (Pepitone, 1985, p.18). Since Lewin and Deutsch, co-operative learning theorists have attempted to discover the conditions and controls which promote co-operative over competitive behaviour. It is argued that traditional education tends to overemphasise competitive and individualistic goal structures with the use of individual testing and zero-sum, normative distribution of marks and praise (Johnson & Johnson, 1985; Pradl, 1994). Consequently, co-operative learning methods emphasise the use of roles, the strategies of grouping, and the development of instructional and learning tasks that can create co-operative goal structures, and thereby stimulate pro-social attitudes and behaviours in the classroom.

However, as research shows, simply forming groups of learners will not automatically ensure attitudes of co-operation and teamwork (Kagan, 1985; Johnson & Johnson, 1985, 1994). New social and intellectual hierarchies emerge within the groups, and competition can be quite fierce to secure a position high up on the pecking order. Johnson and Johnson attempt to account for the internal dynamics of groups that lead to co-operative, competitive or individualistic behaviours. Their list of variables includes: the nature of the learning task and quality of learning strategies employed to accomplish it; the occurrence of controversy among group members; interaction including feedback and encouragement; the ability levels of group members; the active involvement in learning; feelings of support and acceptance (1985, p.113-4). Some strategies which are available to the teacher to encourage greater co-operation include: systematic selection of group members to ensure no one
personality dominates; the assignment of specific and essential roles to individuals within groups; attention to the character of learning tasks so that it is impossible for only one student to perform all of work for the entire group (Kagan, 1985; Graves & Graves, 1985). Sharan and Sharan address the issues of co-operation, power and participation in group activities by examining the method for forming groups and the use of roles within groups. They endorse four different methods for forming groups: random selection, formation based upon friendship, formation based upon shared interest, and teacher selection (Sharan & Sharan, 1992, p.44). The factors to be considered in deciding group composition include the nature of the task, the duration of the group and the individual characteristics of the students (Sharan and Sharan, p.45). Sharan and Sharan suggest that students adapt roles within their groups during Stage Two, "Groups Plan Their Investigations." The recommended role categories are: recorder, who acts as secretary for the group; the co-ordinator or chairperson, who serves as leader during group discussions; the resource person(s), who is responsible for finding research material; and the member of the steering committee, who represents for the group during class-wide meetings (Sharan & Sharan, 1992, p.80).

Interpretation

An important feature of Sharan and Sharan's definition of interpretation is that it "occurs at both the interpersonal as well as at the individual cognitive level" (p. 19). The interpersonal, or social, aspect of interpretation is identifiable in the designated interpretive activities and stages of the Group Investigation model (Tables 2 & 3). For three of the six stages of Group Investigation, interpretation is at the centre of the learning activities: in Stage Three, "Groups Carry out Their Investigations," students select, organise and analyse information and begin to form conclusions; during Stage Four, "Groups Plan Their Presentations" students co-operate to interpret the results of
their research by integrating information, identifying main ideas, and deciding how to organise and present main ideas; in Stage Six, "Teacher and Students Evaluate Their Projects," the

<table>
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<th>Stages of Implementation</th>
<th>Teacher's Role</th>
<th>Student's Role</th>
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<tr>
<td><strong>Stage I: Class determines subtopics and organises into research groups</strong></td>
<td>Leader of exploratory discussion that determine subtopics; facilitator of awareness of interesting aspects of general topic.</td>
<td>Generate questions of interest; sort them into categories; join research group of choice.</td>
</tr>
<tr>
<td>Students scan sources, propose questions and sort them into categories. The categories become subtopics. Students join the group studying the subtopic of their choice.</td>
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<td><strong>Stage II: Groups plan their investigations</strong></td>
<td>Helps groups formulate their plans; helps maintain co-operative group norms; helps find source materials.</td>
<td>Plan what to study; choose resources; assign roles and divide the study task among themselves.</td>
</tr>
<tr>
<td>Group members plan their investigation co-operatively; they decide what they will investigate, how they will go about it, and how they will divide the work among themselves.</td>
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<tr>
<td><strong>Stage III: Groups carry out their investigations</strong></td>
<td>Helps with study skills; continues to help maintain co-operative group norms.</td>
<td>Seek answers to their questions; locate information from a variety of sources; integrate and summarise their findings.</td>
</tr>
<tr>
<td>Group members gather, organise, and analyse information from several sources. They pool their findings and form conclusions. Group members discuss their work in progress in order to exchange ideas and information, and to expand, clarify, and integrate them.</td>
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students are engaged with their teacher in collaborative, class-wide assessment of the whole project. Moving from Stage Three, to Stage Four through to Stage Six, interpretations are progressively more social and collaboratively constructed, as pieces of knowledge and expertise from individuals and groups are added to a
shared vision of the whole project. In this way, the components of interpretation and interaction work interdependently to enhance learning. By working in small groups, presenting their ideas, and listening to their peers' alternatives, students actively give meaning to the information they have gathered (Sharan & Sharan, 1992, p.19).

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<th>Table 3</th>
<th>Stages and Roles of Group Investigation (Cont'd)</th>
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<tr>
<td><strong>Stage IV: Groups plan their investigations</strong></td>
<td>Organises plans for presentations and co-ordinates them with the steering committee.</td>
</tr>
<tr>
<td>Group members determine the main idea of their investigation. They plan how to present their findings. Group representatives meet as a steering committee to co-ordinate plans for final presentation to class.</td>
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<tr>
<td><strong>Stage V: Groups make their presentations</strong></td>
<td>Co-ordinates presentations; conducts discussions and feedback.</td>
</tr>
<tr>
<td>Presentations are made to the class in a variety of forms. The audience evaluates the clarity and appeal of each presentation.</td>
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</tr>
<tr>
<td><strong>Stage VI: Teacher and students evaluate their projects</strong></td>
<td>Evaluates learning of new information, evidence of higher level thinking processes, and co-operative behaviour.</td>
</tr>
<tr>
<td>Students share feedback about their investigations and about their affective experiences. Teacher and students collaborate to evaluate individual, group, and class-wide learning. Valuation includes assessment of higher level thinking processes.</td>
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(Adapted from Sharan & Sharan, 1992, "Stages of Implementation of Group Investigation", p.72 and "Stages of Group Investigation, Teacher's Roles and Students' Roles", p.95)

To promote active interpretation, Sharan and Sharan also prescribe teacher-lead discussions. They identify three factors that make teacher-lead discussion effective for developing children's interpretive and reflective skills. First, in teacher-lead discussions, the teacher models the skills of listening, paraphrasing, staying on focus and responding in non-judgmental ways to new ideas (Sharan and Sharan, p.27).
Second, the teacher models the art of asking questions which help to draw out information or clarify the problem. Third, the teacher presents a model for reflection by identifying what happened, analysing why and how it happened, and generalising how new learning might be applied to other problem-situations (Sharan and Sharan, p.33-4).

**Intrinsic Motivation**

According to Sharan and Sharan, intrinsic motivation "refers to the nature of the students' emotional involvement in the topic they are studying and in the pursuit of the knowledge they seek to acquire" (p.19). Intrinsic motivation can be differentiated from extrinsic motivation in that the push to learn comes from the natural interest the learner expresses in the learning task. By contrast, extrinsic motivation (created through reward or discipline) is imposed from outside the learner's interest in or use for the skill or information being acquired. The framework for this definition of learning comes from educational philosopher John Dewey, who stated that two conditions identify intrinsic motivation: 1) the learner takes up the learning activity or goal because she sees it as useful or necessary for achieving her personal goals; 2) when she is intrinsically motivated, the learner will go out of her way to become engaged in the activity, work at it with more intensity and for longer (Sharan & Sharan, 1992, p.16, 147; Dewey, 1956b, p.112).

Dewey observed that children's natural curiosity and industry tend not be tapped by traditional, didactic teaching methods. As well, exclusively intellectual curriculum fails to incite children's enthusiasm for learning and fails to appeal to "our impulses and tendencies to make, to do, to create, to produce" (Dewey, 1956b, p.26). He reasoned that curriculum should be designed after the natural learning which occurs both in play and in the occupations of real life experiences which children
apprentice to, when they do domestic chores alongside their parents, for example. That is to say, left to our own devices, humans tend to spontaneously seek out stimulation and challenges, and once simple challenges are mastered, seek new ones that build upon our knowledge base (Sharan and Sharan, p.16). The implication for motivation theory is to emphasise the attitudes and affects brought to a learning context, as well as the processes of learning. Individual values, beliefs and responses are the object of study, as opposed to "the lawful ways in which changes in behaviour occur" (Groppe, 1974, p.106).

In operationalising intrinsic motivation, John Keller's motivational design theory (1979, 1983) is helpful. Appearing to agree with a Deweyan conception of learning, Keller writes that motivation is "the neglected 'heart' of our understanding of how to design instruction" (1983, p.390). For Keller, motivation is a function of values and expectations residing within the individual with respect to the learning context: "a person will approach activities or goals that are perceived to be personally satisfying and for which the person has a positive expectation for success" (p.394). In order to help to systemise the design and implementation of instruction with greater emotional appeal, Keller identifies four conditions which increase intrinsic motivation: interest, relevance, expectancy and satisfaction. The strengths of motivational design theory are that it integrates various theories on the correlation between affect and performance (such as locus of control theory, attribution theory and beliefs and attitudes), and that it suggests a systematic, problem-solving approach to improving deficiencies in learner motivation (Keller, p.395).

Interest is defined by Keller as a condition which occurs when an unexpected or inconsistent event stimulates curiosity, or when the learner perceives a gap between what she knows and what she desires to know (p.400). He distinguishes between perceptual curiosity, which can be stimulated by a change in the environment, or the occurrence new or paradoxical events, and epistemic curiosity, which is stimulated by
events or ideas which are intellectually puzzling and leads into a process of investigation and problem-solving (p.399-405). Both perceptual and epistemic curiosity may be usefully employed by the instructional designer to engage the learner. Therefore, Keller recommends that instruction include strategies that stimulate curiosity by presenting novel, paradoxical, incongruous or new ideas and events. As well, he recommends that learners are given the opportunity "to learn more about things which they already know about or believe in" (p.401-2). Keller suggests that interest and curiosity can be increased and sustained through personal language and concrete stories (p.401). Clearly, interaction discussion and informal teacher-student conversations provide more occasions for this style of communication to occur than the traditional lecture mode.

Relevance refers to the learner's perception that his or her personal needs can be met by some aspect of the learning event (p.406). These needs include the need for power, for affiliation and for achievement. The power motive may be met by providing students with "choice, responsibility and interpersonal influence" (Keller, p.410). Affiliation may be met through a co-operative classroom climate that builds trust and reduces the amount of risk (Keller, p.412). The need for achievement is best met under conditions of moderate risk with opportunity for excellence. According to Keller, expectancy entails the learner's beliefs about the likelihood of experiencing success or failure in a learning situation. Expectations may be subdivided into categories of the expectations of others and the expectations of oneself for one's performance. Positive expectancy increases when the learner feels she has personal control over her success or failure (p.420). It also increases as the learner has more experiences of success, and connects these successes with her personal effort and ability (p.418). On the part of the lesson planner or instructional designer, there is a need for clear directions and criteria or expectations to help students experience success: students need clear and important purposes for their learning, as well as well-
defined learning tasks and a clear direction emerging in the course of their learning (Cook, 1982, p.138). The final component, satisfaction is influenced by the outcomes of learning as they relate to a set goal and its accomplishment (p.422). Satisfaction is intrinsic in learning when the rewards grow naturally from the learning process itself. Motivational and formative feedback are most effective for producing intrinsic satisfaction (p.427).

To increase students' curiosity and motivation to find out more, one strategy recommended by Sharan and Sharan is to present learning in the context of a real life dilemma or problem that the class will try to resolve. This strategy stimulates students' interest and a chain of questions that can be developed into sub-topics for investigation (p.73-4). As well, Sharan and Sharan recommend that "at the onset of the investigation it is appropriate to spell out exactly what is expected of the students" (p.70).

**Group Investigation and Participation**

In light of the ideals of participatory design, perhaps the most important lessons that a child learns through Group Investigation are those pertaining to the learning process. Participating meaningfully in the construction and real life outcomes of learning, the child may develop an empowering belief in him/herself, his or her powers as an individual, his or her responsibilities within the immediate social context of the classroom. If indeed the child develops a strong sense of him/herself and his or her ability to know and interpret, and if s/he can negotiate these interpretations with others, then her value to the immediate community and society is manifold (Dewey, 1956a; Bruner, 1986).

Ideally, the education system should produce individuals who can think critically for themselves as well as learn within a community where knowledge is constructed collaboratively. The combination of the four critical components of
Group Investigation are designed to help achieve this ideal: the democratic process of debate and the free exchange of ideas is modelled in the social organisation of the classroom; the unquestioned authority of the teacher is mitigated by the distribution of decision-making power and expertise (S. Sharan, 1990, p.31). In this way, the theoretical framework and methods of Group Investigation parallels the goals of participatory design, and the four critical components may be used to define the criteria and conditions of meaningful participation.

**Participatory Planning Model**

Planning for Group Investigation is a chicken and egg dilemma: the skills which are developed through Group Investigation (investigative, interpretive, interactional skills) are those which are needed in order to carry it out. The outcomes or products are also the methods and process. A traditional model of planning for instruction is one in which instructional goals, strategies and desired learning outcomes are stated in advance of implementation (Reigeluth, 1983). This model of planning is not well suited to either the methods of Group Investigation or the goals of participatory design. Planning must not be seen as something belonging to the expert or teacher alone, existing within theory and based upon a set of cognitions and intentions. Planning should reflect the participants' intentions, expectations and justifications for learning. Therefore, participatory planning requires simultaneously the systematic pre-planning of traditional instructional design, and the flexibility of being able to respond intuitively and correctly to a constant stream of user feedback.

This new model of planning is likely to contain many layers of plans, more and less specific, reflecting the various hopes of all participants (experts and learners alike) that are in turn based upon their prior experiences of similar events. Another way of putting it, planning consists of constructing relationships between past actions and our accounts of those actions (Suchman, 1987).
One of the features of a participatory planning model is that the participatory designer, or expert and process facilitator, is considered to be part of the system in which the design is implemented. This has obvious impact on the designer's hope to predict and control. "The project of instruction-writing is ill-conceived, therefore, if its goal is the production of exhaustive action descriptions that can guarantee a particular interpretation. . . . The intent is rather to identify the mutual intelligibility of action as the problem for sociology" (Suchman, p.62-3). While the aim of participatory design theory is to produce a theory or model that can be practically useful, the method for doing so is much more personalised and the claims of the model much more provisional. Added to the tasks of planning lessons, implementing them and studying their effects, the participatory designer attempts to explain how prescribed models and plans are carried out in real situations and to record in fine detail the interactional effects for the participants and for the designer herself.
Methodology

The Playground Project was designed to achieve two ends: to produce a feasible and quality playground design as a proposal for change; and to educate participating children with knowledge and skills. Its design and development consisted of five strategies. One, the holistic method of Group Investigation was used to promote meaningful participation by children in learning about playgrounds. Two, the systematic analysis of instructional design was used to identify specific goals, conditions and methods related to the creation of a feasible, quality playground design. Three, the goals derived from systematic analysis were grouped together as flexible sets in recognition that in a participatory process, all goals, learning content, and analysis are subject to negotiation and re-interpretation. Four, planning and implementing activities occurred interdependently; as details about the particular needs and demands of the learners and the situation became more clear throughout the course of the implementation, old plans were ejected or adjusted and new plans formed. Five, journal-writing with thick description and analysis were important tools in keeping account of the relationships between planning and implementing, the flexibility of expert and novice roles, and the reciprocity of social conditioning on the designer and the participants.

Holistic and Systematic Analysis

Although Sharan and Sharan recommend the Group Investigation model for all subject domains and across age groups, certain instructional conditions and certain desired outcomes were better suited to Group Investigation than others. A practical limitation was that Group Investigation tends to emphasise process over product, long-term effectiveness over learning efficiency, and the mastery of broad competencies over particular subject content. Sharan and Sharan warn of this
limitation: "Group Investigation does not involve production type tasks, when every
element is specifiable and where outcomes are largely preplanned" (1992, p.153).
The teacher must be able to
cope with uncertainty with respect to the outcomes of a Group Investigation project.
The teacher must be comfortable with relinquishing the role of centrality in the
classroom, as well as be capable of doing so. Sharan and Sharan acknowledge that at
various stages of the investigation the basic inquiry method of learning may need to
be supplemented with direct teaching or highly structured activities. The tasks for the
instructor are how to determine when a direct teaching intervention is required, and
how to make sure that direct teaching benefits rather than hinders co-operative and
inquiry learning.

In order to achieve the Playground Project's goal of a feasible, quality
playground design, there was a great deal of domain-specific knowledge and theories
that the participants had to master. Several conditions were taken into account. The
first related to the starting point for learning as the children begin with almost no
knowledge of the domain of playground design, nor do they possess the mathematical
and aesthetic foundations for design; in addition, it was reasonable to assume that the
children have no experience participating in community development projects. The
fact that children had no expert knowledge or skill base for designing playgrounds
suggested that concept lessons needed to be developed in order to provide that base.
Another interesting condition for a playground design project was no one correct
solution, in other words, there were many possible playground proposals which a
class might devise. This meant that children would have to negotiate over which
values would predominate and what criteria would be the measure of good
playgrounds; children would be required to discuss, compare and evaluate their own
and their peers' design proposals based on a multiplicity of factors. More concept
lessons would possibly be required. As well, the children needed to be coached in
negotiation strategies.

Grouping of Instructional Goals

The process-oriented instructional goals related to the ideal of participatory design; children should participate meaningfully in the information-gathering and decision-making processes of playground design. The definition of a "meaningful participation" process was adapted from Group Investigation's four-component model. Meaningful participation was described as ensuring that children are active in investigating and interpreting information, that they are constantly interacting with their peers in these activities, and that their learning is buoyed by high levels of personal interest and intrinsic motivation. Instruction could not create these conditions of meaningful participation. However, there was a role for instruction in facilitating it. Meaningful participation could be supported by helping the children to develop investigative, interpretive and interactional skills. Interest and intrinsic motivation were learner conditions that could not be imposed from without, but the conditions for the flourishing of student interest could be put in place. Therefore, the role of instruction in supporting interest and intrinsic motivation was to ensure these conditions exist.

The process-oriented instructional goals were divided into three sets of outcome statements relating to learners' skills for investigation, interpretation and interaction, and one set of outcome statements relating to the teacher's own performance in creating conditions for learner motivation. First, in developing investigative skills, the children would:

- recognise and explain a four-step problem-solving model and use it to plan the stages of their own research;
- make decisions about what to learn, what resources to use, and how to present information.
In developing interpretive skills, children would:

- summarise and present information from a variety of sources;
- use charts, maps, catalogues, observations and interviews to gather information;
- receive information from other groups and provide feedback.

In developing interactional skills, children would:

- describe the different roles used for organising group work and adapt these roles to guide their own group behaviours;
- make group decisions, co-operate to complete assignments, designate tasks to different group members.

In order to enhance children’s intrinsic motivation, the instructor would:

- present new theories and concepts in concrete and familiar terms;
- encourage children to talk about learning and to generate examples and stories from their own experiences that relate to learning;
- give children informative, positive feedback as they work;
- encourage children to explore their own interests and questions.

All of the product-oriented instructional goals were derived from the final objective, which was to produce a high quality and feasible playground design (or proposal) at the end of the unit. Conversely, the children’s final playground design or proposal was in itself a measure of the degree to which the Playground Project goals were achieved. Its quality and feasibility could be compared with professional standards and design theory (such as theories found in Moore, Cohen, Oertel & van Ryzin 1979; Rohane, 1981; Shaw, 1987). In terms of evaluating learning outcomes, the quality and feasibility of the final playground design was also a measure of the extent to which children were able to:

- design or propose playground changes based upon the theory of
developmental needs; and/or

- design or propose playground changes based upon the four design considerations; and/or

- design or propose playground changes based upon the identified strengths and weaknesses of the current playground design; and/or

- design or propose playground changes which respond to specific uses and needs and which reflect the diversity of its usership.

Ideally, the children's playground design or proposal would incorporate all of these considerations.

**Layers of Planning and Implementation**

Group Investigation is an inquiry teaching model that allows for both direct instruction and discovery teaching methods to be used within it. Either method may be used when the teacher feels intervention is necessary (Sharan & Sharan, 1992, p.83-4). The dilemma was not in designing the individual lessons, but in deciding how these lessons fit into the whole Group Investigation project.

Inquiry teaching is distinguishable from direct methods of instruction, sometimes called subject-based or "fact-based" (Erikson, 1995, p.64). Inquiry teaching methods such as Group Investigation emphasise the centrality of the learner in selecting the content of learning, actively interpreting information, and sharing in the construction of theories. By contrast, direct instruction, or content-based teaching, constitutes the traditional classroom model in which the teacher supplies all of the content and relational structures of information through direct instruction and control over resource material. The role of the learner is to memorise the facts and theories, and later, to show her familiarity with the subject by applying her knowledge in a test situation. One of the main advantages of direct instruction is efficiency, since pre-digested information can be conveyed much more quickly by the teacher than the
learner can uncover the information independently or with the help of her peers.

The difference between inquiry and discovery teaching is subtle. Both approaches promote contextualised learning, with interdisciplinary knowledge and skills being applied to real world problems, and both approaches can be used with collaborative and group learning. Inquiry teaching tries to guide students through a sequence of observation, action and reflection upon a set of relevant, student-generated questions related to a broad and complex topic. Discovery teaching tries to engage students in hands-on problem-solving activities in order to reveal an underlying principle or phenomenon. Whereas inquiry teaching makes use of real world, multifaceted problems with numerous investigative possibilities, discovery teaching focuses upon problems with limited possible outcomes and meanings. The learner's experiences are more directed and predictable than inquiry-based activities. Discovery activities are especially suited for young learner who require concrete learning experiences and for revealing procedural knowledge.

Direct instruction was the principal method used to provide students with theoretical background on playground design. Specific concept lessons were given in the theory of five developmental needs and the design model of four considerations. An example of my planning for direct instruction is the "Thinking about Play and Development" (Appendix A) poster series, which I designed to identify and organise important concepts in playground theory. Discovery activities were the main method used to introduce strategies for managing the collaborative learning process. Discovery activities were designed to reveal the principles behind the four-step problem solving model and the nature and uses of roles in organising group work. An example of my lesson planning for discovery activities is "Designing the Classroom: A Problem-Based Approach" (Appendix B).

In proposing to supplement Group Investigation with prerequisite instruction and activities, a major concern I had was in not compromising the spirit of meaningful
participation in the learning process. The spirit of meaningful participation was considered effective if students expressed that their most important learning came from:

- asking their own questions;
- making their own choices about what to learn and how to learn it;
- interpreting the information for themselves, from their own experiences.

Therefore, the importance of prerequisite knowledge never surpassed the importance given to the ideas, experiences and information that the children contribute. Prerequisite knowledge was not the end of learning, but rather a tool to provide further and more satisfactory student-lead learning. And, despite the connotation of the word prerequisite, in fact I was not certain that the prerequisite content lessons I had planned needed to precede the students' own investigative activities.

A participatory planning model is provisional, and decisions are shared with the students about lesson sequencing and new learning content. I outlined my personal goals for the playground project, and correspondingly analysed the methods and designed the lessons that might best help me to achieve them. However, these were all subject to change depending upon the wishes and needs of the children and their teacher once the Playground Project began. Therefore, each of the lesson plans could be potentially introduce the Playground Project activities, or could be used as a supplementary lesson offered later as the need arises. Indeed, some or all of the lessons were not be used at all; such was the nature of participatory design.

**Thick Description and Reporting as Methodology**

Partly due to the intuitive and non-systematic way in which the Playground Project evolved, and partly due to the richness of my experiences in the classroom, I wasn't satisfied with a simple evaluative report on the effectiveness and flaws of my
original unit. The most important research tool during the planning-implementation phase of the Playground Project was the writing and re-writing of my field notes into a theoretically informed, thick description. In this thick description I attempted to represent the complex interrelationships between planning and implementation, theory and practice, expert and novice.

Generally, participatory research relies on qualitative methods of reporting in order to focus on how an issue or problem is experienced by people and communities. A central purpose for participatory research is to know what practical differences can be made to people's lives and why (Barnsley & Ellis, 1992). Decisions about what issues to study, what methods of study, and what meanings to draw from the findings should always take into account the insights and concerns of the people who experience the problem. Keeping a daily journal, recording conversations on tape, and extensive interviewing were all qualitative methods used to help track the students' perspective on the Playground Project. Daily and self-conscious writing also recorded the dilemmas I faced as an instructional designer and my incidental frustrations and momentary triumphs in the process of participatory design.
Implementation

Method and Conditions of Implementation

The implementation took place at a public school in Windsor, Ontario between the months of February and May 1998. Having received the Windsor Public School Board’s consent, and through the mediation of her school principal, I contacted a Grade Four Enriched classroom teacher. I met with the teacher twice before meeting her class of 25 students. During our first meeting the teacher and I established common goals and agreed upon general terms of my research in her classroom. The terms to which the teacher and I verbally agreed were as follows: 1) I would provide all initial lesson plans and resources that belong to or support the Playground Project for her to deliver in class; 2) I would ask questions of the teacher and seek her input and the teacher and I would collaborate directly to select and prepare for lessons, identify learning needs, and monitor time goals; 3) I would be present during the implementation of the Playground Project and would be an active participant-observer in the classroom activities, which would include talking with the students about their work, talking with the teacher about the activities, observing and recording student behaviours.

The purpose of the Playground Project, as I described in writing for the teacher’s approval, was to develop and revise a set of ready-to-use resources and activities for classroom use. The method of instruction would follow Sharan and Sharan’s Group Investigation, adapted for the study of playground design, and modified as the teacher and I deemed appropriate and necessary for her specific classroom needs. The students would work in small groups and their research would contribute to the general question, "What changes should be made to our playground?" Activities which I envisioned might be encompassed with a Group Investigation project included: conducting interviews and surveys to poll the needs
and preferences of the school community for changes to the playground; selecting and using printed resources to identify a broad range of design solutions to playground problems; using maps, models and charts to gather and interpret information about the school ground and to communicate proposed changes to it; finally, interpreting, integrating and summarising findings and presenting them formally to the school principal. Additionally, the teacher was made familiar with my research interests in participatory design and Group Investigation theories. The teacher agreed in general with these objectives, although she expressed doubt about whether her students could manage the complex inquiry learning process of Group Investigation.

I found the school community to be receptive and responsive to the Playground Project and its goals. During my meetings with the teacher and the school principal, I learned that the school community was supportive of any playground development initiative. Evidence of this support was in the fact that twenty thousand dollars had been allocated recently to improving the playground. The improvements were planned in three phases with one beginning that summer that would see a new rubber surface and climbing equipment installed on the primary playground. The other two phases included a plan for a rubber track crossing the muddy field behind the school, and more equipment for older students. The principal underscored her desire to receive student feedback on these plans, and if possible, students suggestions for further or better changes for the school playground. Sustaining the school and community’s dedication to playground improvements was the parent-teacher “Action 2001 Committee.” It met approximately once a month to plan fund-raisers and review design options. The acting chair of Action 2001 was a teacher who also donated many off-hours in the upkeep of landscaping and naturalised beds along the front and side entrances to the school. All the adults I had opportunity to speak with were eager for the children of the community to become active and responsible in the development of the schoolyard.
Implementation

I met with teacher and students a total of eleven times over the course of the Playground Project. Our schedules varied somewhat, but we tended to meet once a week on a Monday or Tuesday for the first two periods of the afternoon session. This gave us approximately 22 hours together in total.

Of the lessons and activities for prerequisite skills and knowledge which I had planned in advance of entering the research site, only two were actually used during the implementation (these were "Designing the Classroom" and "Planning for Needs and Preferences"). I was not surprised or disappointed by this fact since these plans were at best provisional and based on very little specific information about the learners and their needs. Over the course of the implementation, six new activities were created or modified from existing models in order to support learning ("Role Nominations," "New Ideas for Our Playground," "Planning for Group Investigation," "Dream and Design," and "Playground Observations"). Of these lessons: four were designed to deliver new concepts or skills related specifically to playground design theory; one lesson ("Role Nominations") was designed to enhance group skills; and, one ("Planning Group Investigation") was designed to enhance planning and research skills.

A typical afternoon during the Playground Project began with five minutes of class-wide reflection time, which the teacher and students called "Plusses and Wishes." Sometimes this time was extended in order to incorporate carry-over from the previous day. Immediately following "Plusses and Wishes" was a concept or skills lesson, usually not lasting longer than ten to fifteen minutes. This lesson lead into a directed activity or theme for small group work that would last from forty-five minutes to an hour-and-a half, depending on the activity. Most afternoons, the last ten minutes before recess was reserved for more class-wide reflection, during which time
the students assessed their own performance, critiqued the activities, related previous learning, and looked ahead to what kinds of learning might follow.

Day One

After brief introductions, the first day's planned lesson, "Designing the Classroom," was implemented. The teacher and I had selected this activity as our starting point for several reasons. She liked the idea that students could participate in the re-structuring and re-designing of their classroom environment. She also found the hands-on experimentation and real life feedback which the lesson provided suitably concrete for her grade four learners.

I liked the lesson because it epitomised the problems of matching public space design to diverse community needs. As well, the activity previewed what difficulties could arise in a more extensive Group Investigation project. Sharan and Sharan forewarn that Group Investigation is a relatively complex co-operative learning method, and although appropriate for all ages, they recommend that a teacher and class work on the pre-requisite skills of interactive discussion and co-operative planning before engaging in an extensive Group Investigation project (Sharan & Sharan, 1992, p.21, 47). In terms of need-based planning and teaching, the afternoon's work would tap into all of the skills eventually required to work on the Playground Project. Consequently, the activity would help the teacher and I to assess the students' abilities to: think in concrete and abstract terms about design issues, adapt to the problem-solving model provided them, and manage their individual study and group skills. At the end of "Designing the Classroom" the teacher and I would plan how the Playground Project should proceed according to students' strengths and weaknesses.

"Designing the Classroom" was also designed to present to the students an
important research tool, the four-question model for problem solving and investigation. The model is comprised of the following questions: What do we know? What do we need to know or find out? How will we go about finding out? How will we know and show when we get there? The four-question model is an adaptation of (Cook, 1982). The original model was designed to guide students through an open-ended problem-solving or investigative process. The straightforward questions encourage students to reflect critically about the purpose of their investigations before they begin and to plan their research task.

The teacher prepared for the lesson by writing out the four-question model on chart. She had pre-arranged the class to work in groups of her selection. She also prepared notebooks in which the groups would record their ideas. Unfortunately, this last set of preparations was the result of the teacher following my written lesson plan step-by-step and word-for-word, rather than interpreting and improvising around it. The mistake was mine in not planning more specifically for her classroom and how it operates, and not being clear enough about the formative nature of my lesson plans. In general, the lesson plan that I supplied to the teacher was flawed, as I was still learning the precise language of lesson planning and writing educational outcomes. Evidence of the poor communication between us, the teacher later reported she felt as if the lesson were delivered to the kids third or fourth hand, passing from me to my written guidelines to her own interpretations to the kids. Her discomfort with the lesson was evident in the fact that she kept her notes and my original planning scores on hand as she worked from the blackboard, and interrupted herself three or four times during the lesson to check with me about a definition or explanation.

The teacher began the lesson, according to my written directions, by sharing a personal anecdote to illustrate how problem solving occurs in everyday life. She related a story about her daughter who had lost her car keys at the shopping mall the weekend past. Referring to the four-question model for problem-solving that are
posted on the wall behind her, she directed the class's analysis of her daughter's problem. Students offered ideas and suggestions about strategies that her daughter might have used to solve her problem. Together the teacher and students decided where each idea fit under the four-question model. Then, pivoting on the key word "problem," the teacher introduced the group activity that was to "redesign this classroom to make it very efficient for working on our own playground project". Her brief introduction was followed with class-wide brainstorming over ideas for each of the four questions. The responses of the students appeared to give reason to be optimistic about the task ahead. For example, to the question, "What do we need to find out?" the student answers included: "What things we can move"; "How to arrange the desks"; and, "What changes we are allowed to make."

The lesson itself took less than twenty minutes to convey, but the teacher and students were obviously confused about what was expected of each of them. Nonetheless, the teacher arranged the students in groups of four and handed out notebooks for each group. She directed them to write down the four questions and try to come up with two ideas for each. As well, she directed them to assign the roles of recorder, chairperson and reporters within each group.

Not surprisingly, the groups struggled just to begin. The first problem they encountered was in organising themselves quickly as a co-operative unit. They debated which group member is best suited for the role of recorder, who will write down the groups' ideas as they occur to them, who will be the boss or chairperson. In one group, the question was resolved by a student simply ordering another to start writing. In another group, this conflict was never resolved and the would-be-recorder sulked and protested by disrupting his group. Another problem was that the designated recorders didn't know how to perform the task. In one group, the recorder was at a loss over what to write and stared at a blank page. There was much criticism and disagreement coming from two other members of the group over the recording
procedure: "She said write all of the questions first!" "But we haven’t answered the first question yet." "Leave eight lines and come back after you get the questions down." Two students chose not to become involved in the debate and sat back to watch, daydream, and drift into a discussion of Star Wars cards.

The groups had been working for twenty minutes, when the teacher and I agreed that they needed to be re-focused. The teacher called the class to attention and simplified the task, "In the next ten to fifteen minutes remaining, your goal is to generate two questions or two ideas under each heading." A sense of urgency settled over the groups, and the bickering grew more intense, but also more on topic: "Who cares if there’s a mistake. Just get it down." "Ya, we need our work don more than we need it spelled right." The time limit interrupted one group’s free flow of ideas on whether or not it would be fair to change the class’s floor plan without telling anyone in advance, a group member interjecting, "Only sixteen more minutes!" Meanwhile, the students were only able to use the problem-solving model mechanically. Rather than providing a systematic framework for inquiry, the model seemed to check creative thinking, and the students appeared to be are more caught up in the requirements of neatly filling in the blanks than in developing creative design solutions to their classroom.

The "Designing a Classroom" activities ended with the recess bell. After recess the students and teacher engaged in their own traditional classroom activity, called "Plusses and Wishes." A daily ritual, during "Plusses and Wishes" everyone speaks honestly and thoughtfully about the tasks, accomplishments and regrets of the day. Both teacher and students openly assess their own performance as well as that of others. The afternoon’s shared reflection time provided evidence of how "Designing the Classroom" failed to appeal to the students. When asked for a show of hands, about three-quarters of the students raised their hands to agree that they experienced frustration. The teacher then invited the students to comment upon whether or not
they felt their groups were successful, and to speculate as to the reasons why. Overall the groups agreed that getting off topic was key to their problems. One group complained that the reporter could not write fast enough or did not know what to write down. When polled about their preference for independent versus group work, about one third of the students raised their hands that they prefer independent work. Another third reported no preference, leaving only one third of the class reporting a preference for group work. This is contrary to Sharan and Sharan's theory that working in groups enhances motivation and positive affect toward learning.

The class reflected specifically on listening skills. One student offered, "On a scale of one to ten, I'd rate my group a seven." This immediately became a popular method of evaluation, with another student piping out of turn, "On a scale of one to five, I'd give my group a two to three." Another student chose to talk about her group's performance in terms of the levels of achievement system (The Ontario Curriculum, 1997). This occasioned a collective craning of the neck while everyone glanced at the student outcome chart posted above the blackboard. A debate ensued as to how the apply the levels to listening skills. The final determination went something like this: Level Four is distinguishable by "waiting your turn" and "looking at the person when they talk to you"; Level Three is "basically the same except sometimes you might try to cut in"; Level Two is "fooling around"; and Level One is "daydreaming."

By way of wrap up, the teacher asked the students to summarise all of the skills needed to be an effective group member. The list included "listen actively, understand each other even if you disagree, remind us to stay focused, explain yourself thoroughly, be clear and precise, think actively, contribute ideas, don't cut in, support others." In planning for the next day's activities, the teacher and I build upon the students' concerns expressed during "Plusses and Wishes" and their list of suggestions.
Day Two

The result of the implementation of "Designing the Classroom" was that the teacher and I decided to plan the following class around group skills. Both of us were disappointed in the group process that we had observed, particularly the mechanical awkwardness with which students took on task-related roles. The students' own insights and feedback into their difficulties and weaknesses suggested to us that a good strategy would be to define the group roles and break down group tasks more explicitly. We identified four sets of skills needed in order to work effectively as groups:

1. Active listening strategies. Active listening means paying attention and being careful not to interrupt. It also means contributing ideas and asking questions which build upon other group members' ideas, and in general, supporting others and encouraging them to participate.

2. Chairing strategies. Chairing strategies include different methods of making sure everyone participates, such as applying round-robin turn-taking. They also include phrases and signals for recognising speakers, encouraging speakers to elaborate or by contrast, to get to the point.

3. Recording skills. The skills of recording emphasise accuracy and efficiency, rather than neatness.

4. Planning and organising skills. The skills range from keeping track of time limits and goals to selecting and adapting a model of problem solving.

We debated how much direct instruction and exercises should be applied. A deterring consideration, the students were anxious after the first day to begin activities on the "real" Playground Project in concrete and hands-on ways. However, the teacher and I decided that a day of direct instruction and training in group work was necessary.

The teacher suggested adapting a sociogram method for providing hands-on
reflection and exploration of group skills. We created a model based upon this method in which students would be nominated for different group roles by their peers, and the nominations would be processed by myself and the teacher. This activity, titled "Role Nominations" served two purposes. First, in making their peer nominations, the students would reflect on the definition of each role and the skill subsets specific to it, as well as reflecting more generally on the nature of group work and the skills required. Second, combined with her own personal knowledge and observations of each student, the number of nominations for each role and of total nominations would provide the teacher with data about each student's popularity and perceived strengths. This information would be applied in forming the groups for the Playground Project because the teacher could ensure that every group was composed of students of diverse but complementary abilities.

Sharan and Sharan's Group Investigation specifies four distinct group roles: chairperson, recorder, resource person, and steering committee member (1992). The teacher and I adapted Sharan and Sharan's model to provide the students with more descriptive titles and a broader selection of active roles, at least one of which they would find themselves adapted. We maintained the chairperson and recorder roles since we didn't wish to confuse the children or frustrate them further by throwing out what they had already learned about these roles. We derived definitions for the chairperson and recorder roles the descriptions provided in the class-wide reflection of "Plusses and Wishes." Obvious from the students' confused performances in this role, the chairperson role needed to be simplified. Therefore, we created the new roles of "interpreter," "opinion and idea gatherer," and "big picture tracker." The interpreter role would take over one of the key duties of Sharan and Sharan's chairperson, which is to make certain that everyone's ideas are understood and that the recorder knows how to transcribe these spoken ideas into writing. The role of the opinion and idea gatherer would be to ask questions and to ask for new points and perspectives. The
big picture tracker in a group would be responsible for watching the clock and keeping the group focused on the main problem. With many of its the facilitation tasks divided, the "chairperson" role was narrowed to the responsibility of opening and closing discussions and guiding the groups to consensus.

A final role was created in which weaker students especially could identify their own participation in positive terms. Therefore, the role of "creative resource person" was created, its definition extended from Sharan and Sharan's original definition of resource person. The role was created as a catch-all title for anyone who might offer interesting solutions, perspectives, creativity, as well as support for others. In this definition, we tried to recognise the value and pleasure that the social aspects of group work can provide. While the activity had concrete objectives of collecting peer nominations, the main purpose of "Role Nominations" was to give the students cause and time for reflection on the kinds and relationships between various skill sets in doing group work.

The next class, students were presented with these new roles and their descriptions and then are asked to work in their groups to nominate class members for a role. This introduction took no more than ten minutes and students appeared to find the concepts easy to digest.

The class worked in the same teacher-formed groups of the previous day. Each group received a class list. They also received two 11X17" pieces of paper that contained the titles of each role, followed by a point form description of the role, and lined space for the students to fill in under the sub-heading, "Skills Needed." This feedback was requested in order to confirm that the students understood the role definitions and could identify or elaborate upon the defining characteristics or skills. Below was a second sub-heading, "Nomination for (Role)" and space for student response in four numbered blanks. The numbered blanks were provided in order to encourage the students to consider all of the roles and to not dwell too long upon
nominations for only one role. In general, the straightforward nature of the instructions and hand-outs appeared to make this activity an easy one for the groups to manage and I observed that group work went much smoother, characterised by more co-operation and less non-task-related chatter. The students worked effectively for the remainder of the class time (approximately 40 minutes) before recess. Each group handed in all of the handout materials with the names of its members recorded on the top of the page.

The intent of the Peer Nominations activity was to encourage students to reflect upon the skills needed for effective group work and to rationalise their nominations for each role. My observations of the group work suggested that students were more focused on the product, a completed class list of matching, than on the process. Besides simply being used as a measure of popularity and status, nominations were also done in a fill-in-the-blank mentality with groups trying to fill in all of the blanks in as short a time as possible. The teacher mused about the nomination process, "if students who don't stand out for particular skills are treated as leftovers rather than matched to appropriate roles"; she is particularly surprised by the lack of nominations for one student who "has a lot of strengths and a lot of skills but doesn't stand out in class. I wonder if he is a student who is falling through the cracks?"

In almost all of the groups, certain peers were nominated more than once while others were not nominated at all. Students tended to nominate themselves and the members of their group most often and the most charismatic students received the most nominations. Out of the 24 students in the class, 18 were nominated by their peers for one role predominantly over other possible roles. One possible interpretation, this may have indicated that the students in the class knew each other very well, and having worked together in groups before, were familiar with the skills and weaknesses of their peers. However, this interpretation was inflected by our
suspicion that role nominations had been misinterpreted as a kind of popularity contest or class ranking system.

In examining the role descriptions students offered, we concluded that students appeared to understand the general description but not the purpose of the roles as related to the smooth functioning of a group. For example, the teacher noted that the students seemed to interpreting the "chairperson" role and "recorder" roles as having higher status. She drew this interpretation based upon the fact that the "big ego" students tended to guard these roles for themselves, rather than select roles that she thought they might enjoy more or find more suited to their strengths. She also noted that the two student parliament representatives for the class received the most votes for "chairperson" and wondered if "the role description you provided resonated with the job description of student parliament and triggered recognition?" For "recorder," the teacher made the following observation: "Erin, Quentin and Lucy all had three or more nominations for recorder. These are the three students who were not part of the class penmanship group when it began. They all had no need for cursive writing practice so they went into "fancy lettering" instead. This tells me the class sees the role of recorder more related to penmanship, than the other role description of recorder, i.e. summarising important points" (personal communication, February 21, 1998). The fact that there were very few nominations for the roles of "opinion and idea gatherer", "big picture tracker" and "creative resource person" we determined was likely due to the fact that these were the last roles on the two form sheets and in general, groups ran out of time before completing the exercise.

The second intended outcome from the Role Nominations activity was to provide a guideline for creating groups. Using the compiled profiles and respecting the peer nominations at face value, the teacher assigned students to groups according to their roles. Six groups were formed consisting of four students (in one exception, a group of five was formed). Each group included a "recorder", "chairperson" and
"interpreter" and one or two students whose nominated role was "other." The teacher and I each kept a copy of the group lists with the assigned roles; however, the groups received only the list of names. We decided that since the roles had become a measure of popularity, it was best if the results were not shared directly with the students. Furthermore, we were curious whether the students would adapt the same roles spontaneously as they were nominated for, or whether they would adapt different roles and strategies for group work.

Day Three

The purpose of day three's "Planning for Needs and Preferences" was to differentiate between a need and a preference, and to call students' attention to the wide diversity of personal preferences they and their peers hold for play and playgrounds. It was hoped that as the result of the activity and follow-up reflection, the students' would incorporate a broader perspective in their own playground plans, that their planning would take into consideration more than their own immediate play preferences.

The method of instruction conformed to a discovery model, wherein the students gradually achieve understanding of a concept through hands-on experiences, and only after does the teacher confirm that the discoveries are accurate. In "Needs and Preferences" students worked independently following the teacher's instructions. Each student wrote a list of play activities that he or she enjoyed doing outside. Then students worked in groups to compare their lists and to code the activities on them for relative popularity, age and gender appeal, and year-round enjoyment. Through the discussions generated by comparing personal lists and the class-wide discussion that followed, students reflected on the variations and universality of choice. Finally, during the class-wide discussion that followed, students were introduced to the concepts of "need" and "preference" and asked to apply them to how they might
approach planning for a playground.

The first step was to follow the teacher's verbal directions and visual example by folding a sheet of paper lengthways. All of the students were quiet and concentrating, affording some amusement to their teacher. When she presented the second step, to write the numbers 1 to 20 down the right hand side of the crease, she gently remonstrated, "You don't have to be fancy-dancy, just get the numbers down." While delivering the instructions, the teacher circulated to check on the workmanship and called out loud, "It is interesting to me that some of the students have their pages creased up and some them have their pages creased down." True enough, wherever specific directions were not provided, immediately the students invent variations.

During "Needs and Preferences," the teacher used very specific time limits to pace the students through the next step, in which they write down "one or two-word ideas" to make a list of twenty things they like to do. These time limits tended to be very short, which she explained later can always be negotiated and lengthened easily; in general, she finds the brevity helps the students to focus and work intensively. Genuine Group Investigation learning would not have had these kind of teacher directives and limits imposed upon the learners; however, the teacher had pre-warned me that her students were not ready for inquiry learning and certainly the first day's experiment ("Designing the Classroom") seemed to have confirmed her students' unreadiness to manage unstructured tasks together with open time limits. For "Needs and Preferences," the teacher has adapted her directions to the students so that the number of choices and amount of freedom is curtailed. For example, although a time limit was set for each step, students were able to negotiate for more time in order to reach a satisfactory level of achievement. Furthermore, my initial written directions were submitted to negotiation. As she circulated, the teacher discovered that despite their best efforts, most of the students could not reach the goal of a twenty-item list. Consulting with me first, the teacher adjusted the time allowance and the expectations
for success: "Who has eight or nine ideas down already? [half the students raised their hands]. It might be hard to think of twenty ideas, so take a couple more minutes and try to get over ten." I observed that success was still important to the students. In Group Two, the students looked up intently from time to time to peek at their neighbours' progress. Their expressions then turned anxious or smug, depending upon their relative performance. One boy turned to me and bragged, "I have 17 already!" Overhearing this, a second boy lowered his head and shielded his work with the crook of his elbow as he wrote furiously.

Once it is established that most of the students had an item list of ten or more, the teacher directed them to number their activities from most to least favourite. There was a moment's confusion about whether the students had to re-write their ideas. The teacher repeated the instructions and then simplified them: "Don't write! Just put the numbers on the left hand side." When these rankings are completed, she then suggested that the students discuss their lists in small groups. She offered some specific suggestions as to how they might compare lists: "See how many of the activities you all have in common. See which activities are unique to your list or to someone else's. Compare your favourites. See what order you gave them."

The students were not given specific directions about whether or not they should record their discussion or use their roles. Immediately Group Two's members turned to me and asked if they were supposed to use their roles for this exercise. I replied that they should decided, and to my disappointment, they were relieved not to have to take on the roles. Immediately, one athletically handsome boy assumed a natural right to power and dominated the group, "I think we should take turns reading from our lists and asking who else has the same activity. Okay? I'll start." He began, "Does anyone have..." and read his top activity. The rest of the group responded "yea" and "nay," then took turns in round robin fashion, with each member following the formula set by their leader. When it was his turn, a dark-eyed, quiet boy read
randomly from his list and was immediately corrected by the leader, who was reading over his shoulder. "Okay, you've got to go in order. So, you should take your top item. Except since soccer has already been said, you just pick the next one down. See?"

The teacher interrupted the groups after ten minutes and asked them to report their discoveries that arose from sharing their lists. She offered her own discovery that "I discovered something very interesting. There were some of you who wrote down just things they could do in our schoolyard. How many of you did that?" Four students raised their hands. One explained that when she instructed them to write down things they liked to do outdoors, he thought she meant outside on the school grounds. A few others agreed with this explanation of the misunderstanding. The teacher then asked the groups to share what strategies they used to work in groups and compare the different lists. The athletic boy reported for Group Two that "We took turns in a clockwise direction." Group Four reported that "We waited until one person was done and then another went." The teacher confirmed that by this, Group Four took turns in a random order. Group Three reported that they took turns, sharing their "first favourite" activity and comparing the ranking or "order of favourites," while Group One "traded papers and looked to see what others wrote" and Group Six "took a vote and put a check mark beside the activities." Group Five reported that "We just huddled and said, 'Oh, I have that too but it's my least favourite.'"

The last ten minutes of the class was used for "Plussses and Wishes." The teacher asked, "If anyone has some insight about what we have done today?" One student hypothesised, "I have a little suspicion that we were supposed to write about only playgrounds." His teacher responded smiling, "Your suspicion is unfounded. But it does seem reasonable to expect this activity to have something to do with playgrounds since Miss McRorie is here." The student attempted to draw out the logical debate and offered his evidence: "This is the first thing we did that I
understood the purpose, how it would help us and why we were doing it." Through this brief exchange, the student and his peers grappled with the significance "Planning for Needs and Preferences" in relation to our overall shared goals for the Playground Project.

During "Planning for Needs and Preferences" and the reflections that followed, I began to worry that the students lacked a purposeful, big picture of the Playground Project. As one spokesman complained during the "Plusses and Wishes" that followed, "We planned what we should do, but will we ever get to do it?" It is a general problem that no matter how sound is the relevance of a learning activity according to theory, the engagement and will to learn can only occur when it is apparent to the student: "Our learning should be purposeful, and our purposes are more important to us than those of the teacher. So we need to know what we are to do, and why we are to do it" (Cook, 1982, p.135). Therefore, in order to respond to their need for a clearer vision, I built two new activities from "Needs and Preferences."

In one, I drew a large plot plan (bird's eye view) of the school ground. I wrote on chart paper in five coloured markers the theory of play and development. After recess, I presented a brief introduction to the theory of play and development. I explained that five play needs are universal to all children, these being physical development, social development, emotional development, intellectual development and spiritual development (Dale-Shipley, 1993). A student raised her hand and asked for a definition of "intellectual". Other students offered guesses until one girl recognised that the root is "intell" as in "intelligence." By way of elaborating upon definitions, I offered a specific play activity that might help promote a particular domain or "kind" of development. Then the students generated their own examples. For the next twenty minutes, they took turns offering favourites from their lists of play preferences, suggesting one developmental domain that the play activity supported,
selecting the appropriately coloured marker, and marking an "X" on the plot plan where they could enjoy this activity on the school ground. Quickly the plot plan filled with blue "X's," the colour for physical development. The students were observant of this pattern, as well as the complete absence of orange, the colour for spiritual development. When I asked the students how they might relate this information to their own planning for changes to the school ground, the students began to brainstorm about ways to ensure a better balance of the play developments.

For the second improvisation on "Needs and Preferences," I compiled the information from their individual inventory sheets and presented it in a table, "Analysis of Our Play Preferences" (Appendix E, Table A3). Down the left column, all of the students' favourite activities were listed. Across were six categories for analysis, four of which corresponded directly with the coding categories the students used. "Do it on our playground?"; "Girls and boys enjoy it?"; "Do it year round?" and "Do it alone or with others" are the four categories which the students used in coding their own lists of favourites. Two new categories, "Frequency" and "Some Ideas and Recommendations," were added. I presented this table at the beginning of the next class and took a few minutes to explain how to read the columns and rows. The students requested that I clarify the term "frequency," since they were only familiar with its use in discussing the physics of sound. The class had just begun a unit on charts and graphs, and so the students were comfortable making sense out of the table. They were interested to discover the most popular activities. One sensitive child puzzled out loud why "working with DC [developmentally challenged] kids" only received one vote. They brainstormed what value the charts might have in the context of the entire Playground Project: "So people in the class can see what we do;" and "So we can see what we should add in the playground." I reminded the students of the third question in our problem-solving model, "How are we going to go about finding out?" We then touched upon the definition of a "method," and how different
methods of finding things out could help to reveal different aspects of the whole situation. The students brainstormed about who they might poll for play preferences, such as younger and older grades, as well as about other coding categories that could be applied to the analysis of stated preferences, such "Can DC [developmentally challenge] kids do it?"

*Day Four*

Independent and shared investigation is one of the critical components of Group Investigation. Sharan and Sharan describe it as referring to "the organisation and procedures for directing the conduct of classroom learning as a process of inquiry" as well as to "the teacher's and students' orientation toward the process of learning" (Sharan and Sharan, 1992, p.19). The goal of this organisation, according to Sharan and Sharan, is "to create conditions that allow students, in collaboration with their classmates, to identify problems, plan together the procedures needed to understand and cope with these problems, collect relevant information and co-operatively (though not necessarily collectively) prepare a report of their work, usually in some creative and interesting way" (p.5). In theory, therefore, a project such as the Playground Project should have been ideal for catalysing an investigative approach to learning:

> Working through authentic problems and developing elaborate projects are fertile ground for reflections. This is partly because these complex problems or projects embody a number of distinct dimensions for consideration, and such variety can only be sorted out through careful reflection (Walters, Seidel and Gardner, 1994, p.296).

However, the second and third days' lessons had reflected very different styles of teaching and learning, and the activities seemed to have only occasionally incorporated students' interests and questions, rather than being driven by them. The fourth day's activity, "New Ideas For Our Playground," was planned after Day Three
in response to this issue, raised by students and teacher alike. Indeed, one of the primary goals of "New Ideas" was to arouse genuine investigative learning.

The organisation and instructions for the day's activities were very simple. The students were instructed to work in their new groups (the ones based upon the students' peer nominations), and to select a recorder who should record all of their ideas for changes to the school playground. At the beginning of the class, I took a moment to underscore the strategy of recording ideas in point form and few words, rather than elaborating in complete and perfect sentences. Much of the preparation for "New Ideas" had been done months in advance, when I was collecting playground resources and materials. This set of resources included glossy, full-colour manufacturer's catalogues for play equipment, newspaper clippings and magazines articles on play or playgrounds, how-to manuals for building naturalised areas on a playground and for building "movable parts," durable boxes, tables and storage bins for outdoor use. As well, I had borrowed books from the library, which, although written for an adult audience, were replete with pictures and diagrams, and in fact, none of the materials were written with a child user in mind. Finally, in my collection of playground resources I had a red binder of my own authorship in which I was beginning to draft a "how-to" for teachers and students who wanted to initiate changes to their school playground.

Before beginning, one student raised the issue of how to distribute the resources fairly, "So that one group doesn't hog one of the books all class." The teacher suggested that everyone honour a fifteen-minute limit, especially for popular materials. The students were anxious to begin so little time was wasted in transition. The teacher and I circulated, coaching in the resolution of conflicts and observing how groups worked when under no specific direction.

Group One's members flipped through the glossy pages of manufacturers' catalogues, stopping on the blueprint diagrams of playground equipment and perusing
the specifications on the bottom as they hunted for ideas. I could hear their commentary from the other side of the classroom, escalating from time to time above the din of the other groups similarly engaged. Group One occasionally fell off task; however, these lapses were brief. The members appeared to be co-operating by working in tandem, with one or two students to a book. They scanned quickly through the catalogues and provided summary comments to the other group members about the contents, and occasionally called upon the recorder to note a particularly worthy idea.

Meanwhile, Group Four worked with almost no verbal interchange among its members. The lone girl was reading an article on naturalisation projects in a back issue of FWTOA Newsletter. The two boys were bent over Canada Mortgage and Housing Corporation's Creative Playground Information Kit 1, mostly reading the diagrams and scanning the how-to-directions for building home made play equipment. A copy of the Evergreen Foundation's "Resource Package" for the Learning Grounds program was lying in between them, as well as the recorder's notes, shoved off to her right and slightly rotated around so that the boys can see what she has written so far: "trees."

I observed from a little distance and heard one boy repeating "Gate, gate, gate" while the others quietly ignored him and browsed their own material. I could not resist the urge to intercede on his behalf and reminded the recorder that it was her job as recorder to write down all of the ideas, and not to decide which ones are good ones. She answered, "Well I wanted to write down garden but they wouldn't let me."

"Okay, well remember that the task for today is to get down your ideas -- everybody's ideas, all of them. You don't have to agree about everyone, that's not the task for today." I left Group Four for a few minutes and then returned to their vicinity, lurking around to over hear whether they had resolved the stalemate. Whether merely a coincidence or a question of patience, the conversation became more lively and
injected with a spirit of co-operation now.

Rounding the classroom perimeter, I approached Group Two and heard, "Hey, you guys, here's a better one!" followed by a succession of "ooh's". Like Group One, Group Two had also attained some of the colourful, glossy pre-fabricated equipment catalogues. It was significant that the quieter and less enthusiastic Group Four were last to the resources and got stuck with black and white line drawings and low-cost publications, which despite their rich content offered little for a ten-year old's imaginative eye. This suspicion was supported by a student's off-handed direction to another about Canadian Mortgage and Housing's Adventure Playgrounds Information Kit 2: "Maybe you should fold that one up. There's not much in there."

Once Group Two had developed an extensive list, its members adapted the methods we had used in "Planning for Needs and Preferences," and code and analyse their ideas. The recorder's key included: "m=maybe, n=no, y=yes, w=wish, t=needs." Beside each item, on the left-hand side, the recorder had coded first for yes/no/maybe, which Group Two reported to represent their collective perception about the likelihood of that particular idea being implemented on their schoolyard. Then the recorder coded "w" for "wish" and "n" for "needs" to indicate priorities.

Their teacher was also floating among the groups all this time. She passed me her notes after class for my musing. Her notes indicated that the students were initially suspicious of the freedom of "New Ideas." Group Six complained to her that they didn't know what they were looking for, while Group Four wondered if they were supposed to be looking for how to survey the Grade Sixes (personal communication, March, 1998). There was only very modest evidence that the students had embraced their group roles and were using them effectively. The teacher did overhear one boy from Group Three abiding by his responsibility as "Big Picture Tracker" and announce to his group, "Don't get off topic!" However, within the same group, the chairperson ignored her responsibility to maintain order and fairness and
dominated her peers by "hogging" the resources and taking over the role of recorder.

During "New Ideas" I overheard some consultation between groups. A delegate from Group Three meandered over to Group Six to report, "We found a garbage can in ours" which was met with appreciative chuckles. Group Five checked with Group One about sharing the catalogue resources and the impending time limit. Both groups respected the suggested fifteen-minute guideline and no adult intervention was needed to solve their dispute. There was some comparison and competition too amongst groups as "spies" dropped by to observe and read over the recorder's shoulder what another group had come up with. The cross-group referencing was one of the features that suggested to me that group work induced more active and independent (from the teacher) learning.

Day Five

The purpose of Day Five's activities, "Planning Our Investigations," was to launch officially the Playground Project and converge with the methods of Group Investigation and the ideals of participatory design from which my lesson planning had strayed. We had spent three of the four previous classes practising the skills necessary for Group Investigation, these being roles related to group work, communication skills, and problem-solving. "Planning Our Investigations" would be an afternoon dedicated to planning, in the sense of how Sharan and Sharan describe Stage Two of Group Investigation, "Groups plan their investigations."

In preparation for Day Five, I created a set of aids for the planning process that included: an 8" x 11" plot plan of the school similar to the large one posted on a bulletin and that we had discussed and used already; a report sheet with five questions designed to help the students plan their investigations; and a table reporting on the results from "New Ideas." This table was several pages long. In the far-left column, the students' suggestions were listed in alphabetical order. Beside this column were
four blank columns beneath column headings that were intended to incite critical reflection about the advantages and disadvantages of each suggestion.

Additionally, I collated the students' questions that had arisen from the work of the previous four afternoons and which I had recorded. The framework of my grouping was the analysis of playground planning tasks presented by Leathers and Associates architect, Kelly Hayes (Toronto, February 26, 1997). According to Hayes' model, there were four design considerations: site, such as topographical and natural features; materials, their selection based upon cost, safety and durability; budget; and program, what is installed and implemented. In organising the students' questions, I found a natural continuum between their curiosity and concerns about planning the school playground and Hayes' model. I added an additional category to Hayes model, "human resources," that would take into account my own questions as well as the children's about planning issues. Using this modified version of Hayes model, I created five charts corresponding with the five considerations for playground design and planning.

This preliminary planning and definition of the subtopics for investigation seemed to be in keeping with Sharan and Sharan's accepted methods. The authors cite an example of a Group Investigation project in which the teacher sorts student questions into subtopics (Sharan and Sharan, 1992, p.101). However, my organisation of subtopics according to a theoretical model of which the children have no experience served to further remove the ownership of the Playground Project from the students. Already I had deferred their stated desire to work actively in the planning (by which they mean designing, drawing and dreaming) of the playground. Their groups were not ones of their own choosing but imposed through a technical nomination process. Furthermore, just as the students were beginning to master the new knowledge and skills our four afternoons together had produced, I introduced new knowledge which seemed to hold overarching importance. In hindsight,
"Planning Our Investigation" demonstrated not the students inability to manage open-ended inquiry so much as of my inability to move into a participatory framework of trust, collaboration, and negotiation with the students.

The introduction to the activities consisted of an explanation of each component of the tool kit. It took nearly forty-five minutes because the students were all so clearly confused. Particularly confusing for the students were the charts created under the theoretical categories of the adapted Hayes model. Most of the students thought the task was to answer one-by-one the questions written out on the chart paper. Several students repeated the question, "Where are we supposed to write our answers?" since the chart paper left little white space for student response. Finally, the teacher interrupts the student questions in order to set the groups to work. She expressed the hope and belief that the task would become more obvious once the students started to work hands-on.

Once divided into groups, many students found the directions even more perplexing. In her observation notes, their teacher reported that Group Two complained they "don't understand the questions" written on the chart paper. The groups also wanted to know, according to her notes, "What are they supposed to do again with the New Ideas pages?" She observed that both groups she visited "immediately want to fill out the New Ideas chart." Group Two hypothesised that perhaps each person was supposed to take a page, since first inspection seemed to reveal seven copies of the same page. Meanwhile, I had also watched other groups dive into the "New Ideas" charts upon discovery. Group members debated who should read them and who should fill them out on behalf of the group. Several students eagerly volunteered for that responsibility, presumably happy to let someone else to figure out the rest. The charts were perhaps a secure and familiar format: neat, straight columns of clean empty spaces that called for a clear course of action.

I found myself tugged in all directions as groups clamoured for me to explain
once again what was expected of them. After several unsuccessful attempts to make myself heard by individual groups, I turned off the lights and called for attention from the class. The problem was that I could not convey the abstract and subtle distinction between planning a course for subsequent research, and doing research itself. I asked for students' examples to help me identify any misunderstandings; I accepted several ideas and invited students to clarify and build upon each other's definitions; I distilled my instructions to the most essential and concrete ("Do not fill out the New Ideas charts!"); I repeated myself for emphasis. And, despite our best efforts, we still were unable to understand each other.

While the rest of the class returned for a second attempt, I discover that Group Six had totally aborted the assignment. Instead, its members were debating the mechanics of how to build a slide into the hill. Group Five was painstakingly still trying to fill in the "New Ideas" charts, as was Group Two. At this point, I suggested out loud that any sheets or material which groups find confusing, they could hand back to me. One delegate from Group Four submitted its seven pages of half-filled "New Ideas" charts. With a strained voice and nerves, I directed Group Three to select just one question from the list of possible topics and write it down on their report sheet. The recess bell rang just then to my great relief.

Over the recess, I analysed the breakdown of the Playground Project from its optimistic beginning until this point. I suspected that I had betrayed the trust between teacher and student, leader and participant. I had certainly abandoned the spirit, if not the model, of Group Investigation. In fact, Sharan and Sharan have something quite different in mind. They write that "students must be given the opportunity to exercise a reasonable degree of choice regarding subject and method of their study" and that the social and structural organisation of the classroom should support students asking their own questions, seeking information about topics of their choosing (p.17). The problem was not inherent to the Group Investigation method, but in the prejudicial
way in which I attempted to implement it. The Playground Project was overburdened with prerequisite lessons and intended learning outcomes. The students were being attacked with an impenetrably holistic, continually fluctuating, possibly ideological barrage of lessons, questions, and activities that did not seem to have much to do with their school playground problem.

As a result of Day Five's miscarriage, the teacher and I agree to begin again and abandon most of our preconceived notions of what the children must achieve and produce from the Playground Project. The challenge we set was to focus instead upon day-to-day, need-to-need planning, listening carefully for clues from the children for what they were ready to do or need to do next. We also set a new, more generous time line than the estimated eight to ten hours we had originally set. The first priority for the next would be to rejuvenate the students' enthusiasm and curiosity for the Playground Project. The best means for doing so we agree would be to let the children begin to plan and research the changes they would make to their school ground, if given the chance.

Their teacher also offered general advice for tailoring the remainder of the program to the students' learning style and needs. Restating her initial concerns, she noted that a Group Investigation project was too complex for her learners. As well, the problems stated were often too abstract, which was why the students often fixated on one concrete item (such as the "New Ideas" list). More concrete instruction with very specific criteria would be helpful. She offered the insight that often when open-ended activities are presented, in fact, very specific outcomes are desired, but these may not be recognised by even the instructor herself. The challenge was to accept a more laid-back approach: "Give it. See what they do. Take if from there." She suggested less front-end instruction and more periodic interventions during group work in order to address problems and questions as they arise. In adapting this plan, we abandoned the intent to implement a Group Investigation methodology but
returned to the goals of participatory design.

*Day Six*

The purpose of Day Six's activity, "Dream and Design", was mainly restorative. Having detoured away from the objective of meaningful participation, as defined by the four components of Group Investigation, I intended to entrust the students with more control and ownership over the Playground Project. By the end of the afternoon, I hoped that the students would again feel the excitement they had expressed for the project during our introductions. Heeding the teacher's advice to take a laid-back, "see what you get" approach, I planned "Dream and Design" to be a fantasy day. Groups would research, draw or write about their hopes and fantasies for their school playground. Individual students within the groups could select to work independently or in teams within their group. By way of preparation for the afternoon, I organised the resource materials for student's use, updated the red binder with the results and tables from our previous learning, and made large copies of the plot plan for pairs' or small groups' use.

As follow-up to "Planning Our Playgrounds," the next afternoon together we begin with "Plusses and Wishes." I invited the students to speak honestly about the last day's experience. The consensus was that the activity was confusing and frustrating, although students had varying theories to explain why. One boy suggested that the bad weather may have contributed to the overall bad mood and inability to concentrate that afternoon because the class had missed their morning and lunch hour recesses. I asked the students to reflect upon my own performance, and in particular, whether or not I had been "too bossy." Reluctant to hurt my feelings, the students proffered a "maybe" and deflected their response into a philosophical discussion of what a teacher's role and power should be. One boy admitted that I had been bossy but that "Teachers are allowed to be bossy. A lot of teachers are." The
girl beside him immediately railed against this, exclaiming, "Teachers aren't allowed to be bossy!" A debate ensued among the students regarding the matter of teacher directives and student freedom.

I followed the debate with my own confession and apology for losing track of our shared goals, then introduced the purpose of "Dream and Design Day." The students expressed incredulity at first, asking questions to confirm that they were really allowed the choices and freedom that the day seemed to promise. Once over these doubts, they quickly and noisily got to work. Again, the teacher and I took on the roles of observers and resource people, although in fact, neither of us was approached with a serious question or issue by the groups who appeared fully engrossed in their work.

The level of classroom noise crescendoed several times, and several times the teacher turned off the lights to call attention and requested that the students work more quietly. I observed that there were more conflicts within groups during "Dream and Design" than during any of the previous activities. In Group One, the boys were pitted against the girls over who should get to draw on the plot plan and whose ideas were worthy of being represented. Group Six had elected to break apart rather than work collaboratively. One boy had found himself some paper and coloured pencils and was making an elevation drawing of his fantasy playground, consulting occasionally with the others to share ideas. The lone girl of the group had also opted to work out her own ideas on paper, but consulted with the others far less. The two remaining boys researched their ideas using the red binder before drawing them on the plot plan.

At first glance, the remaining groups appeared to be more successful in balancing the interests of all their members while working co-operatively on the plot plan drawings. Group Two took turns drawing. Group Three brainstormed before beginning to draw, then assigned drawing tasks to each member. Group Four divided
the plot plan into four sections for each member to fill. Group Five's members simply began drawing from the four edges and worked in toward the centre. Group Four and Five's members engaged in only a small amount of debate and negotiation compared to the other groups, since each member had his or her own independent territory. The resulting playground designs were almost nonsensical and the groups were at a loss to identify an overall theme or concept for the playground, or to even recognise the content of their own work a few days later.

Fifteen minutes before the recess bell, the teacher asked the class to vote on whether to wrap up their work in the next five minutes and join her in "Plusses and Wishes" or to continue working. The class unanimously voted to keep working on their designs. A few students also requested to stay through recess in order to work longer. The teacher offered to donate another period the following afternoon for the groups to present their Dream and Designs to the rest of the class. This was enthusiastically accepted.

Day Seven

The purpose of the follow-up to "Dream and Design" was to help the students apply some of their previous learning about playground design theory and concepts. Each group would take a turn presenting their drawings and summarising the main ideas. As well, the students would build upon their fantasies and designs by asking questions about age and gender appeal, and about the breadth of development needs that their fantasy playground design met.

In preparation for Day Seven, I created three charts for guiding the discussion of presentations. The first chart contained a table titled, "Kinds of Development Supported in Group Proposals. Group One, Two, Three, etc. were written down the left column, each designated a row. Across the top of the table was written each of the five kinds of play development (physical, social, emotional, intellectual, spiritual).
After each group presented, its members were asked to decide which "play developments" their designs supported. Occasionally a peer would question the group's approval. More often the groups' own self-assessment was much harsher than that of their peers, who volunteered examples from the presentation that demonstrated a certain developmental potential.

The second chart was titled "Kinds of Appeal in Group Proposals." The top row contained the column headings, "Age Groups," "Activities," and "Most Interesting Idea." The presenting group and its audience considered what age groups the playground appealed to, determined by some debate followed by a class vote. They also identified the range of activities and interests represented. The class then voted on the one or two most interesting ideas that came from the presentation. After a few minutes of discussion and debate, the class nomimates the activities and then votes in order to determine the most interesting among the nominations. The third chart was titled "Realism Rating Scale." On it I had drawn a single line with three points on the scale: "Reasonable: a possible or creative solution idea", "Fantasy: desirable but not likely," and "Unreasonable: silly or impossible." Each proposal was discussed for its realism, and the class compared the advantages and disadvantages in relation to the other proposals. This rating exercise also induced some philosophical discussion about the value of practicality and feasibility versus creativity and fantasy in planning for change.

To reinforce the categories of evaluation that I had supplied them, we follow the last Dream and Design presentation with a video produced by the Evergreen Foundation, called Grounds for Change. This is a visual beautiful video, full of colourful fieldscapes, bees landing on gently swinging flowers, frogs resting under the shade of tall pond grasses, and children blowing dandelions. All of the scenes show the effects of an intensive naturalisation project on a Toronto schoolyard and are the most persuasive argument for the spread of naturalisation projects throughout
Canadian schools. The class was attentive throughout the video, especially when shown images from innovative playground projects in Britain and Europe.

A "Plusses and Wishes" reflection followed the video. One girl pointed out that so far the video showed the most realistic playground because it actually existed. A boy interrogated the logic of this statement: "But it's not realistic if we can't have it on our school." Someone else pointed out that, although the animal farming existed somewhere else, it was probably more in the middle range of "fantasy" for their school because "the teachers wouldn't let us have it." The students also used the five developmental play needs to evaluate how desirable a naturalised playground might be for their schoolyard. A girl pointed out that there was lots of opportunity for spiritual development in looking at the flowers and watching the animals. Her classmate counter-pointed that a weakness of a naturalised playground may be "there isn't a lot of physical things that you can do on that playground." Yet another student wondered if this type of playground was as appealing for older kids in grade seven and eight, and his observation sparked some accord. Students reasoned that they would be in those grades by the time most of the changes to the schoolyard take place; they wondered if they would still like to pick flowers and look at birds by that age.

Day Eight

The purpose of "Playground Observations" was to respond to the students' request for more hands-on and direct studies of their school playground. It was planned to extend the discussions of evaluation that had occurred during the presentations of the Dream and Designs. In becoming better playground designers, it was my hope, the children would shift their critical reflections from their own fantasies (they own preferences) to an assessment of the existing playground design problems and play needs of the entire school community. Participating in "Playground Observations" the children would identify, record, and tally all types of
behaviours as they observed them using observation sheets and short hand coding. Later they would fill in the detail with written field notes, summarise, and report their observations to the class.

In preparation for Day Eight's activities, I zoned the plot plan into twelve distinct observation areas, subsumed under the three main areas of the primary playground, the blacktop, and the field. The field zones only extended as far as students were allowed to play so that all observation teams could expect to record some student activity (much of the soccer field was out of bounds due to mud and water). I designed a simple observation sheet for pairs of students to fill out together while observing regular recess behaviours. The sheet contained a few examples of codes, mostly three-letter short forms, which suggested a quick method for recording observed behaviours. The sheet also provided space for coders to tally how many students were observed participating in a particular activity or displaying a particular behaviour. Finally, there was space for "field notes," which the students are instructed to leave blank while outside observing and fill in immediately after recess. As well, I made a large version of the observation sheet on chart paper to use as a visual aid in providing instructions. Before class, I prepared observation kits by attaching two to three observation sheets and a pencil to a clipboard, enough for twelve teams of observers.

In introducing the activity, I reminded the students of our four-question problem-solving model and the questions, "What do we need to know/want to find out?" and "How are we going to go about finding out?" The purpose of the observations, I explained was to find out what happens on the school playground, whether there are specific problems and where they occur. I reviewed the zones on the plot plan, then demonstrated how to fill out the observation sheet using the visual aid. The students volunteered coding suggestions for behaviours that they expected to see and these were added to the visual aid. Fifteen minutes before the afternoon
recess bell, the teacher and I lead the students outside and assigned zones to pairs of students (teams of their own choosing). The pairs were instructed to walk along the boundaries of their zones to ensure there was not overlap or misunderstandings. The students were instructed to aim to observe for the full fifteen minutes of recess, which their teacher and I cautioned would require enormous efforts in concentration. When the recess bell rang, the observation teams were quickly overwhelmed with the fury of activity as four hundred students crowded on to the playground.

I had not anticipated how overwhelming and absorbing the observation work would be. Five minutes after the recess bell, each team at its station, teams called from all corners for more observation sheets. Of the eleven observation teams (we were short one team due to absenteeism), all completed observations for at least on sheet, and most of the groups ran out of sheets and space before the recess was over.

Several teams devised methods for tallying their observations rather than record the same observed behaviour several times. Another common strategy when they ran out of space was to use the back of the observation sheet. During our post-recess "Plusses and Wishes," students complained that they could not see in all directions or write fast enough to record accurately. Much remained transparent and taken-for-granted according to their observation sheets, however. Fighting, running, screaming, arguing, disturbing were tallied against a background of getting along, walking, chatting, joking and playing which are not. Only in a few exceptions were "socialising," "sitting and standing around" and "walking." The students noticed for the most part only behaviours and events where rules were being broken or things were going wrong.

While the findings from the students' observation did not present a scientifically valid representation of what actually happened in the schoolyard, they did tell a lot about the coders themselves. Reviewing the observation sheets, I noticed that the students rarely invented their own coding categories or symbols in order to
represent their observations. Rather, the teams used my "examples" of coding categories; furthermore, my examples may have been treated as delimiters of what constituted notable behaviours, thereby narrowing the focus of observation. In other words, from my explanation and use of examples, the students may have interpreted their task to be to report only the behaviours I had shown interest in rather than the behaviours that occurred. One result was that the reports of fighting and arguing seemed proportionally too high.

During their reports back to the class, the students seemed to take vicarious pleasure in describing the escapades of their tumbling, tousling schoolmates. The team assigned to observe the equipment related the rules of a "Duke Nuk'e'm" game involving several primary boys, to the receptive hilarity of the class followed by more accounts of "great fights" that were observed. Meanwhile, the team assigned to the field and the borders of the out-of-bounds area of the playground interpreted their role to be one of policing as well as observing, and they reported having spent much of the recess trying to shoo students back into bounds. Overall, Playground Observations may have accrued an additional layer of significance for the students than the ones that I had intended: the act of observing, rather than being morally neutral, may have been interpreted by the students to be an act of tattle-tailing.

Day Nine

The purpose of Day Nine's activities was to follow-up "Playground Observations," to present the students with results from their observations, and to encourage students to interpret patterns and significance in the findings. In preparation, I compiled the observation teams' tallies for the eleven zones, collapsing them into the three major areas of the schoolyard, the primary playground, the blacktop and the field. I created three detailed tables on handouts and replicated them on chart paper for visual aids. Along the top of each table was the title, "Results from
Observations of Playground Behaviour," and sub-title, "Activities and Number, Gender and Age of Participants by Main Zone." The column headings corresponded with the headings on the observation sheets: "Activity," "Number of People," "Girl/boy," "Approximate Age," and "Notes." The three charts represented findings for the three main areas of the playground, these being the primary playground, the blacktop, and the field.

While creating the "Results from Observations" charts, I wondered whether the students would notice some of the methodological flaws in making our findings, such as the difficulty in estimating an accurate number of people engaged in an activity spread over more than one observational zone. With two exceptions, all of the children accepted the tables at face value and treated the numbers as valid and reliable when presented in table format. One student asked how we could know if the same skippers moved around, that two or more teams counted them for their zones. Another student pointed out that usually there was more fighting during afternoon recesses than in the morning or noon hour recesses, and therefore we should conduct our observations again at a different time.

Day Nine, towards the end of the afternoon, I reminded the students that our time was running out and that we needed to talk about wrapping up the Playground Project. I suggested we frame a "Plusses and Wishes" discussion around two questions, "What have we done?" and "What next?" I wrote these questions down on chart paper. Under the first question, we inscribed a column of terms that the students have learned to discuss their work: these are "methods, observations, comparisons, analysis." Under the second question in another column, I wrote the words "interpretation" and "presentation": these were new terms in this context. The students were invited to hypothesise about their meaning. One boy guessed that interpretation means "explaining something to someone who doesn't know what it means." The class elaborated upon his definition to describe the interpretive task they
were faced with: "to find patterns" and "to decide what it all means." A volunteer
recorder wrote while the students listed their ideas and hopes for the project:

What next?
* groups choose developments
* switch developmental groups
* present a complete map
* very realistic
* something realistic
* somewhat realistic
* individual non-fantasy maps
* "Playground Ideas by 4R"
* look in playground books
* give ideas to Mrs. Arbour
* cost
* safety and materials
* space
* location
* interest level
* adults approve.

The "developments" referred to the lesson on the five developmental needs that play
satisfices, and the first two points are different ideas about how the students could find
out more about them and present the information in a meaningful way. The next five
points centred around a debate about how to pull together all of the ideas presented
during Dream and Design and by what criteria the class could decide between
different ideas. One contentious point is the degree of realism that a proposal must
reflect. Two students argue about the usefulness of keeping a proposal realistic if the
playground is not "fun" and "different" from the usual "boring" school ground. As the
debate continued over the continuum of realism and fantasy, another student
suggestion was to allow everyone a chance to create his or her own individual
playground plan, each which would be presented to the principal; however, this idea is
quickly dispelled. Most of the remainder of the points referred to suggestions for
further research, which the class recognised as valid but not possible due to our time
constraint.
Day Ten

In the days following "Playground Observations," the main purpose was to bring closure to the Playground Project in a way that would honour the nature and objectives of participatory design. Namely, the purpose was to bring about real world consequences for the students' work and learning, while at the same time encouraging the students to feel responsibility and control over how this closure would take place.

In preparation for Day Ten, "Planning our Playground Presentations," I took home the chart paper and studied the students' ideas. My goal was to develop a presentational format or lesson that would help the students to convey as many of their ideas and concerns as possible. I was particularly wary of avoiding the trap of over-planning, which had been one of my errors early in the Playground Project when I developed the activities for Day Five ("Planning for Group Investigation"). The issue was to avoid giving the students too much "preselected, prepackaged, and previously interpreted information" and not enough time in class for students to digest the material with relatively little direction. (Sharan & Sharan, 1992, p.12). I decided to prepare packets of "raw data" that had come from the Playground Project activities; the packets also included the tables I had created from the data.

The first packet contained the student hand-ins from "Planning for Needs and Preferences." It also contained the six pages of chart information derived from the hand-ins and tabled according to favourite activities. The second packet contained the original lists of playground ideas from "New Ideas for Our Playground" generated by groups while perusing manufacturers' catalogues and building manuals, books, Website print-outs, newspaper clippings and magazine articles on playgrounds. The table, "New Ideas for Our Playground" which listed the ideas alphabetically was also included. The third packet included the groups' presentation notes for "Dream and Design," the Dream and Designs themselves, as well as 8X11" versions of the wall charts we had used to evaluate the proposals. The fourth packet included the
observation sheets used by the students for "Playground Observations" and the three tables of results. I am curious about what kind of interpretations groups can make from the tables. Will they be able to perceive the patterns of playground behaviours that emerge when all of the observations are compiled? Will they link the observations with the theory of play and developmental needs or with one of the several activities that have polled preferences and ideas for change? Because these interpretations seem the most difficult, I created an "A" and "B" exercise sheet (Appendix J) to guide reflection and analysis. Sheet "A" asks the students to conduct numerical analysis of the data in the tables. Sheet "B" presents more open-ended questions for qualitative analysis of the data in order to develop a living picture of the reality that the data represents. I plan for two groups to work separately on the fourth packet. These packets were distributed ad hoc fashion by the teacher in order to avoid competition among groups. Group One had asked permission and then decided to disband, its members joining other groups. Groups Four and Five both worked on interpreting and presenting on "Playground Observations."

On Day Ten, I lead a brief introduction to "Planning our Presentations." Their teacher had encouraged me to simplify and make concrete my instructions for the students. I prepared slips of paper with three categories of reflection, these being: "We are presenting on..."; "The important points are..."; and "This is what should happen next...". The categories roughly corresponded with a suggested method found in Sharan and Sharan that reflection include the components of identifying, analysing, generalising and goal setting (1992, p.33). The teacher's suggestion, to present small slips that the students could not write one, was designed to encourage oral planning, which was easier for her students to manage. During the introduction, students asked for a specific example to illustrate what is expected of them, which I delivered using Group Four's work. In addition to the slips of paper, I equipped the students with a time limit of fifteen minutes to do their initial oral planning. The
groups did, in fact, appear to find oral planning easier than written planning. We extended the fifteen minutes time limit to twenty minutes upon class consensus, which seemed to be appropriate. Only Group Three complained that they did not have enough time to "do a good job."

At the end of their oral planning, the class assembled and the groups took turns presenting. One boy volunteered to play the role of master of ceremonies, which freed the teacher and I to make notes and give feedback. Group Two presented first on "Rethinking our Dream and Design Plans." The level of interpretation by Group Two was superficial, true of most of the presentational material of all the groups. Group Four's presentation on "New Ideas for Our Playground" was the weakest, which might have been predicted based upon the problems which the material had presented during other activities (this packet contained the charts from Day Five, "Planning for Group Investigations"). The most insightful presentation was given by Group Five who worked with the packet on "Playground Observations." This might have also been predicted. The differences between Groups Two, Four and Five may be accounted for in the different amounts of guidance and structure they had received in the prepared packets.

In the "Plusses and Wishes" that followed, the students and teacher agreed that all the groups could use at least one more day to polish the presentations. The teacher donated extra class time and added "Playground Project" to the acceptable free time activities so that the students could practise the presentations. At the end of a tiring and heated debated, the class also decided that a team consisting of delegates from each group should meet and work on an introduction and conclusion for the final presentation to the principal. Consequently, I met with four students (two volunteers dropped out) over two recesses to prepare an introduction and conclusion based upon the students' perceptions of the most important points from our experience. I further contributed to the students' preparations by submitting my notes from their oral
presentations. For each group I organised these under three columns: "Your Point," "My Questions," and "Response." This provided the students and I with a means of communicating beyond our classroom time together, which was now being cut very short.

Final Day

On a sunny afternoon at the end of April, the groups presented their proposals to an audience of three, their school principal, the chair of the Action 2001 Committee, and my thesis advisor. The proposal was comprised of five presentations in which groups each report on a research activity, what took place that class and the most important and interesting things we have learned. Group One did not present because its members elected to disband, but its members were dispersed among the presenting groups and each of them seemed to have found a more comfortable role within these new groups.

Group Three was the first to present, reporting on the activities during "Needs and Preferences for Play." They explained to the audience that their favourite playground activities were coded by "gender, seasonings and individuality" (whether boys and girls both enjoy an activity, in which seasons it is done, and if it is done alone or in a group). I was not convinced of a logical transition between the description of methodology and the conclusions that the group draws. Personal preference was being given a forum, rather than an objective assessment of the data taking place.

In contrast to the bouncy, egocentric opportunism of Group Three members, Group Four offered barely a whispering of original thought. The two girls, whose group elected them as representatives, made a terse presentation on behalf of their group's review of "New Ideas for Our Playground". Next, Group Two meandered for five minutes in their report on "Dream and Design." The first speaker rambled about
realism versus silliness, and physical and spiritual developments in the Dream and Designs. He then strained to interpret for the audience weird statements made by others in his group, such as, "On the drafts, we had some very strange ideas, like a mall, a tai-fighter rental and a black hole. These aren't possible but they seem like fairly reasonable ideas." Another Group Two member finally cut to the chase: "We need some actual activities that could happen in our playground. We thought of some activities like animals caged up that you could feed, a maze made up of bushes so that if you got stuck in the maze you could just walk out, and a trampoline just to jump and play on. We also need a bigger playground for more grades. Such as kindergarten to grade three could go on one playground and the other grades up to grade eight could go on another one that is just as much fun."

Group Six was newly formed with the addition of two boys from Group One, the resignation of one original member, and the absence of another. It was well organised and presents a rehearsed and logical argument that links methodology to recommendations.

*Nicholas:* The research activity we are reporting is our observations of the playground. First we worked in pairs during the afternoon recess in certain zones. We observed how and what kids were playing and then after, when we came in, we made some notes about this.

*Matt:* One of things we observed was that mostly boys fought. So what we need to do about that is get more equipment for boys to encourage them to play and not fight.

*Andrew:* We need more equipment, especially in the primary zone because we found out lots of people fight. And, if we get more equipment, lets say basketballs and basketball nets, or baseballs and skipping ropes, then less people will fight. Maybe not anyone will fight and there can be more fun there.

*Nicholas:* We also noticed that we need more equipment to encourage the girls
to play sports. Like basketballs, basketball nets, skipping ropes, etc. There was only one girl that played sports.

*Daniel:* We also need more blacktop for less crowding on raining days because we can’t go on the field and everyone is all crowded on the blacktop.

Group Five began by reiterating Group Six: "We are reporting on observations we made about our playground. First we split up into different zones and then we paired up. After that we took notes about what others did." One member reported that, "We found overall in the playground, eighty-eight people were fighting." She and another could not seem to resolve between them why the solution is to create more blacktop, and consequently, they remained on that point. I was disappointed that the students were not better able to convey to the audience some of the imaginative problem solving which they had done previously. Group Five had created a diversified wish list for their playground from "New Ideas," when they sifted through manufacturer's catalogues and magazines. The list included: drinking fountain, sand pit, climbing boards, play house, slat bridge, jungle gym, tire dome, pulley glide, barrel crawl, tire swing, trampolines, maze and a handi-trail for wheelchairs.

In total, the group presentations lasted less than 20 minutes. While the students did communicate a few original and practical ideas for improving the school playground, these tended to be disjointed and unrelated to the discussion of their research efforts (with the exception of Group Six). Having anticipated the rough nature of Grade Four logic, I had collated the tables and charts that summarised the students' findings from each day's activities (these were the same charts that I had presented with the students for their own interpretations). The day of the presentations, I gave the principal, Action 2001 chair, and my thesis advisor each a copy of the set of findings to supplement the students' presentations and to help the adults understand better the enormity of the children’s interpretive task. Later, when I
returned with a university team to film a video version of the presentation, the children had an opportunity to elaborate upon their ideas and presentations by speaking candidly on film. In editing the video, I used these candid moments to enrich the content of the children's presentations.

Closure for the Playground Project was achieved by increments. On the day of their presentations, I also gave a report on my learning to the children themselves. Delivered orally and in writing, I summarised what new knowledge and skills I had watched the students master, what obstacles and successes they met in working as groups. Between this day and the day of video recording, I talked with the teacher over the telephone to confirm scheduling and an order of events. The video footage was shot in the middle of May and I returned almost a month later with an edited version to screen for the class. After the video we enjoyed one final "Plusses and Wishes" and I took my leave from the site and the people of the Playground Project.
Discussion

The Participatory Process

Planning for and implementing participation was threatening. Sharan and Sharan warn of this uncertainty: "Group Investigation does not involve production type tasks, when every element is specifiable and where outcomes are largely pre-planned. The interaction among individual learners in the group cannot be entirely predicted or controlled by the teacher"; and, another cause for diffidence, "Teachers may wonder whether students will ask enough questions, 'cover the material,' understand the main point of what they read, and know how to summarise the material. In all likelihood, the students will share the feeling of uncertainty about the process and outcomes of Group Investigation, especially the first time they carry it out" (1992, p.153). It is this uncertainty that must be sustained and managed in any participatory process, since it is the natural consequence of the designer letting go of scientific control over all aspects of the project.

Meaningful participation, as defined by the four critical components of Group Investigation, was achieved. However, optimum results were achieved when the ideals of the four critical components were modified. For example, the ideal of independent (from the teacher) student investigation was not achieved, but meaningful learning leading to critical thinking and problem solving was achieved when the students' investigative efforts were mediated or scaffolded. Similarly, group work for learning through interaction required a lot of adult intervention, and yet, some of the most powerful learning grew out of intense conflicts. The children drew their most in-depth interpretations when guided through teacher-lead reflection time. Finally, intrinsic motivation was perhaps the most important but also most ambiguous component of the children's participation in their learning.
Investigation: Scaffolding & Mediation

Knowledge is something that is constructed, modified, and reinterpreted through interactions between the expert and the learner: "Teaching recipes will only help the newcomer to reproduce aspects of his culture, whereas taking part in the social activity that amends the rules or generates new ones allows for the production of cultural forms" (Britton, 1994, p.7). Learning, therefore, can not be isolated from its social context either in terms of what is learned or how it is learned (Bodrova & Leong, 1994). The management of social relations and organisations, including teacher-student interactions, is central to facilitating inquiry. In theory, the Playground Project should have been ideal for investigative, or inquiry, learning:

Working through authentic problems and developing elaborate projects are fertile ground for reflections. This is partly because these complex problems or projects embody a number of distinct dimensions for consideration, and such variety can only be sorted out through careful reflection (Walters et al., 1994, p.296).

However, learning tasks that required complex planning and well-developed independently learning skills were too difficult for a grade four class, a fact that their teacher had predicted in response to the Group Investigation method (personal communication, February 9, 1998). This finding is a little disheartening, since the premise of the Playground Project was that children could be effective participants in designing their own playgrounds.

I have had to adapt a moderate view of what meaningful participation means: equality in power, knowledge and action between the expert and the participant is not appropriate at all points and in all decisions in a participatory design. Riley (1997) argues that in this aspect, the expert-participant relationship is analogous to the relationship between expert and novice in Vygotsky's social constructivism. In participatory design, as in constructivist teaching, the science of systematic planning must give way to the holistic art of maintaining a creative tension between too little
and too much information, direction or constraints. "A skilful expert, in this perspective, does only the minimum necessary to make the project possible, because doing too little lends to frustration for the learner and doing too much removes opportunity for the learner to develop" (Riley, 1997, p.429). To complicate things, what exactly is just the right amount of structure changes as novices increase their level of understanding, although a general guideline is that less guidance, or mediation, and more refined scaffolding should be required.

I discovered through practice that participatory planning is a combination of preparing very specific, age-appropriate lead-in activities and materials, imagining the possible routes that the students may choose, the obstacles they may encounter, and building into the plans some escape points where class and teacher could resurface if lessons became too complicated or confusing. In order to do this, "The teacher must have a clear idea of her expectations for the project before beginning the first inquiry with her students. These expectations may be altered as the inquiry proceeds but they should be considered in detail before beginning so that as a teacher you can provide a direction for students" (Caufield & Fedele, 1996, p.3).

The term "scaffolding" accurately describes the method that the teacher used throughout the Playground Project in gradually giving her students more responsibility and choice in managing their investigations. Scaffolding is a term derived from Lev Vygotsky's theory of social constructivism. Building his theory of learning within a cognitive constructivist orientation, Vygotsky believed that children construct knowledge by creating their own representations of experience. However, Vygotsky extended Piaget's formulation of constructivism beyond interactions between the child and the physical environment to include social interactions. According to Vygotsky, mental functioning is the internalisation of external social relations and learning is always a co-constructing process involving a novice learner and an expert or a learner which is more advanced: "This collaboration by a
community of learners is seen as indispensable for cognitive growth. Its role is more than a mere facilitator of events; it is the means by which such growth occurs" (Murray, 1994, p.9).

Vygotsky's theory of a zone of proximal development rests upon his premise that knowledge is social. He observed that children have a level of assisted performance which is different, and usually much higher than their level of independent performance. The difference between what children can accomplish working alone on a task and what they can accomplish when given hints and promptings is called the zone of proximal distance (Bodrova & Leong, 1994). Vygotsky used the analogy of trade apprenticeship to describe this gradual process of transference of responsibility and decision-making: "Learners do not stay in the same place mentally. As they make tentative connections between new ideas and prior knowledge and internalise socially constructed ideas, they are better able to analyse, speculate, and evaluate course concepts. This is why students can take increasing responsibility for their own learning in the same way others take responsibility in the apprenticeships outside the school setting" (Bayer, 1990, p.22).

In the playground project, scaffolding occurred in different ways and at different levels of relationship. My lesson plans, some of them devised months before entering the classroom, represented one form of mediation through direct teaching and discovery activities. Scaffolding for Group Investigation was also done before the student work began by sufficiently narrowing the topic and presenting focus questions or problems. Monitoring student groups as they worked, taking time for reflective and evaluative discussion was yet another form of mediation. In each instance, the teacher was attempting to give the students' learning experience a more perceptible and stable structure.

The instructional goals of participatory design are complex because instead of diffusing knowledge, the designer hopes to diffuse the knowledge-generation process
(Riley, 1997, p.429). At the same time, the more we know about a subject, the more varied and sophisticated our questions about it, the deeper we are able to probe. Therefore, direct and discovery instructional methods can support meaningful participation in investigation and interpretation; again, it is a question of fine moderation. One strategy for supporting participatory investigation is teach above the level of factual information and deliver concepts and theories which participants can use independently and critically (Erikson, 1995). A the teacher and students have taught me, and as theory on inquiry learning (Caufield & Fedele, 1996; Bodrova & Leong, 1994) also suggests, a “mini-lesson” approach may be taken to integrate direct teaching with independent inquiry. During the Playground Project, the need for intervention would be pointed out by observations of group work and direct feedback from the students. In order to identify a need for intervention, it was also necessary to have a view of the learning process and the outcomes we wished to see from it. Oftentimes, I was very fuzzy in my own outcomes and priorities for the learning process, and this made it difficult to recognise when an intervention was necessary and when one was absolutely not.

Directly related to scaffolding and mediated investigation, facilitated discussions are critical for meaningful participation. In the Playground Project, “Plusses and Wishes” discussions followed-up daily the group work and helped students form their own interpretations about what they were learning (or sometimes, not learning). While observing the teacher facilitate, I learned that it is important to talk about the unexpected accomplishments, as well as failed expectations. By creating a trusting, non-judgmental atmosphere, the teacher and I encouraged children to interrogate the validity of our teaching methods and the value of their learning. I used the “Plusses and Wishes” time to open up my own learning and research process, sharing honestly my confusion, my doubts and my hopes for the playground project. One positive outcome was that the children were happy to help me interpret what was
going on and to make better planning decisions. Another was that I was able to reveal
the anatomy of research to them and demonstrate how knowledge is actively
constructed. I demystified some of academia and fore-fronted the role of intuition and
experience in formal inquiry. Perhaps most important of all, a sense of camaraderie
developed as we found ourselves to be engaged in essentially the same problems of
learning.

Interaction: Cooperation and Conflict

In the playground project, the least successful activities at first seemed to be
those that required the children to manage their interactions and investigations
through mechanical roles and protocols. The children themselves reported disliking
these lessons and activities, or not finding them useful and relevant (and, therefore,
not motivating). A second consideration, however, re-evaluates these judgements
because teacher-lead discussions revealed that children did learn about the mechanical
roles and rules, demonstrating in their talk an understanding of how to work together,
the purpose of roles, and the ideal circumstances for co-operation. It seems that while
the children were able to assimilate the roles intellectually, they could not yet modify
their emotions or behaviours to reflect this learning. Changing social dynamics and
roles takes time and a lot of work. As well, it needs to be approached systematically
through intellectual strategies, as well as intuitively and collaboratively through
supportive reflection.

Co-operation was not a taken-for-granted dimension of group work among the
grade four's, but always one of the procedural difficulties of any group assignment.
This might be as expected from criticism of the Group Investigation method:

In theory, there is equal status among the students in Co-op Co-op and
Group Investigation because each has a unique contribution to make to
the group. In practise, however, a status hierarchy often emerges in
these methods when students are allowed free expression and access to
materials, and the group may give more weight to the ideas and areas
of interest of some students than those of others (Kagan, 1985, p.88-9).

Group Investigation is not uniquely imperilled with status hierarchies and within group competitions: these are natural features of a group. The group roles are designed to help remediate some of the hierarchies by providing each member with an essential and unique function, related not only to the task but to the operation of the group itself. However, the students reported that the group roles further encumbered their co-operative efforts. Liam reports that the decisions about who will take on what role are time-consuming and create disagreements: "Sometimes when we were picking the roles, there was lots of arguing over the jobs. Then we decided to settle it with rock-paper-scissors, but the loser would be, 'Hey that's not fair!'" Almost unanimously, the students reported not using the roles at all.

After two days of working in their new groups, I asked the students to reflect on whether or not they felt their group worked more successfully than the first day:

*Brent:* A little, we were more organised.

*Ryan:* A lot more because we were a lot more organised.

*Karen:* Would you use the roles in your group even if I didn't tell you to?

*Ryan:* Yes.

*Nicholas:* No, because kids might think, "I have to do only this role, and don't bother with another person's." Maybe some things won't get done.

*Bill:* Maybe if someone forgot something, but if you stick with your role, your group may not get something done.

*Annie:* The second day, did we have six roles? [The group agrees, yes]. The first day wasn't as good as the second because there were only four roles and three people get to pick a job but one person gets stuck with the last one.

*Karen:* Did you pick your role because you thought it was the most important or because you thought it was something you would be good at?
Annie: Good at.

Nicholas: I think kids picked the role they thought they'd be good at because everyone wants their group to be successful and not leave the job you'd be good at in someone else's hands.

At the end of the Playground Project, when we were reflecting back upon the entire unit, the students present a much more ambiguous attitude toward the use of roles in their groups.

Teacher: Is it important whether or not people stuck to the roles they were assigned to?

Annie: Not really, because if you were having trouble with your role, you wouldn't want everyone to stick to their roles, you'd want someone to help you so you could keep your role.

Heather: In some cases, it would be pretty important to keep your role. Sometimes you didn't need the chairperson because everyone was getting along well and contributing and stuff. I guess the recorder would be pretty much the person who would have to keep their role because they have to write stuff.

Andy: Our group didn't really need a chairperson because mostly everyone paid attention to who got a turn, who wrote what. Mostly the recorder wrote one thing but [for] the rest of the stuff everyone pitched in and did something about it.

Grant: After a while, people forgot about their jobs. Then the person at the beginning who thought he should have that job, he still remembered, so he'd just take over their job without even asking.

Teacher: Did that happen in other groups, that kids just stopped doing their roles? Why do you think that happened?
Liam: Because we were so occupied with our work. Because it was a team effort. Say you were the big picture tracker and you were supposed to keep track of the time, you were getting so caught up in doing the work that you forgot to check the time as you were going along.

Jessica: I think that we forgot all our roles because sometimes we don't need our roles, sometimes you just can't do it or sometimes you don't know how to do it: like the chairperson, they don't know how to close the meeting.

The teacher's own impression was that the students took the roles as literal procedures, rather than guidelines, and that this resulted in an enormous conscious effort that couldn't be managed at the same time as the actually doing the research tasks. In other words, both the teacher and the children were reporting that the roles did not fit organically into the existing group dynamics.

The opposite problem to making group work too mechanistic is that natural hierarchies tended to form in groups and dominant personalities took over decisions and actions and hoarded the learning. Students who were multi-gifted tended to rule over the other children in their groups. Meanwhile, laid-back and insecure students were passive participants in the group work. Roles would have been useful to students and participants for managing their interests, for example, by defining many ways to participate and integrate participation. As well, the definition of groups might have been relaxed so that different people could work together in different social configurations at different times. I think this would be a relief from the tension between incompatible group mates. During their preparation for our presentations, Group Five decided to resolve their arguments by dividing into two teams, a girl's team and a boy's. Having had an opportunity to satisfy their needs for self-expression and having received support from at least one peer, they seemed more willing to tolerate other points of view. In their presentation, the girl's and boy's integrated their findings.
A real concern about group learning is that passive students are even more marginalised than by traditional didactic models because of their weak social and language skills or lack of confidence. My observations of the Playground Project both substantiated and allayed this concern. For example, Group Six was a case example where one student dominated over the others. By the end, the sole female dropped out of Group Six rather than do battle, but the more passive boys volunteered to speak candidly in front of the video camera in our filmed tour of the playground. Before the Playground Project is over, Group One elected to break up and its members joined the other groups to plan for the final presentations to the principal and the chair of Action 2001. The breakdown of Group One may have been due to insufficiently defined task-related roles within the group. Johnson and Johnson forewarn that "Simply placing students in groups and telling them to work together does not in and of itself promote higher achievement and higher level reasoning" (Johnson & Johnson, 1992, p.121). Research demonstrates that group membership and interpersonal interaction are not sufficient to produce higher levels of achievement, but that co-operative interdependence is required (Johnson & Johnson, 1985, p.183-5). The term interdependence underlines the individual accountability of each group member, who neither ride along nor are dependent upon the others. Group Investigation is sometimes criticised for not providing role and reward structures that award individual contributions from group members (Kagan, 1985, p.85). By contrast, Jigsaw (Aronson, 1997) and Jigsaw II (Slavin, 1985) methods of co-operative learning provide an individualistic role and reward structures within the framework of co-operative learning. The central strategy is to give each student unique information which is essential to everyone studying a topic. Since each team or group member receives a unique task or expert role, each person's contribution is essential to the group's success. In hindsight, I might have implemented the Jigsaw method when I diagnosed that there was unequal participation of group members and
domination of groups by single personalities.

A related concern to the problem of learning hierarchies, the more unstructured tasks, such as "New Ideas for Our Playground" and "Dream and Design," lead to more competition within groups. This may be the effect of the motivation to participate being very high, while the opportunities were very low. Several students asked if they could have a chance to do his or her own Dream and Designs and not have to share conceptual space with anyone. The children were not always successful at identifying sub-tasks or finding divergent solutions, such as searching playground catalogues for ideas for their Dream and Designs. Group Six coped with the competition during Dream and Design by working independently, two students drawing playscapes that had no relation to the others' design goals.

A consideration for managing a participatory design process is to accept and welcome the inevitability of conflict. Johnson and Johnson (1985) suggest that conflict is natural within the process of co-operation. Conflict is even essential for promoting cognitive development, critical thinking and an awareness of one's own cognitive strategies. When defending her position, a student must externalise her ideas for critical examination by the group and feedback. S/he must summarise and explain it to her group members. A group full of diverse interests will also prod him or her to consider other perspectives and learn to accommodate different perspectives and ideas based upon different experiences (Johnson & Johnson, 1985, p. 123-5). For example, the weakest student in the class, according to his teacher, was also the only student who said he felt he learned a lot from listening to his friends and was surprised by what he learned: "I learned that was easier to learn things [in groups], but I don't know why I learned that" (personal communication, May 25, 1998). A social constructivist perspective substantiates his report. One explanation is Johnson and Johnson's theory of conflict and its centrality to building knowledge. In conflict, all of the arguments and reasons for competing points of view are laid out, so that the logical relationships
between facts and opinions are more easily perceived. In other words, perhaps the
student benefited from listening to his peers argue and reason over where the primary
playground should be, or whether it is realistic to have a tai-fighter field, because he
was observing how they fit various theories and ideas together.

All levels and kinds of social interaction are essential to the goal of
meaningful participation in the creation of knowledge. In seeking terms to distinguish
participatory design, I like Galtung’s suggested criteria of mutual interest, empathy,
and a horizontal power structure so that the interactions among researchers, between
researchers and the community, and within the community are “mutually
conditioning.” The epistemological assumptions of participatory design fit within
social constructivism. In doing participatory research, the researcher becomes part of
the social reality of the research site. She is in a continual process of conditioning and
being conditioned by the others (Galtung, 1978, p.80). In fewer jargon terms,
participatory design assumes that everyone, including the designer or researcher, has
something to share and something to find out.

Interpretation: Shared Reflection

Meaningful participation, by the definition given in the first chapters, is a
measure of the ability of a participatory process to educate participants. The continual
practice of collaborative interpretation is the best available strategy for ensuring
genuine and meaningful participation. Clearly, a concept of collaborative
interpretation cannot be fully separated from the components of investigation and
interaction. Self-expression and negotiation of meaning through peer interaction are
important tools for helping participants acquire the new tools of knowledge and skills,
as well as to form a community basis for individual values. This process is described
universally by Sharan Nelson-Le Gall:

Learning and understanding are not merely individual processes
supported by the social context; rather they are the result of a continuous, dynamic negotiation between the individual and the social setting in which the individual's activity takes place. Both the individual and the social context are active and constructive in producing learning and understanding. Effective learning in groups should occur when the social environment that is provided by adults and other children constrains the information and tasks available to a child to that structured to fit the child's current understanding and cognitive abilities. Furthermore, the nature of the constraints changes as children gain understanding and skill (Nelson-Le Gall, 1992, p.52).

The common practice throughout the Playground Project of "Plusses and Wishes" is exemplary of the kind of expert-participation discussion that gradually builds mutual understanding. In the Playground Project, students responded well to a sequence of questions and were able to participate in relatively advanced cognitive practices of identifying, analysing, generalising and goal setting. With some experience and confidence, the students were often able to carry interpretations beyond the structured questions and shaped their views according to each other's perspectives. Group interaction where the teacher or expert was absent was also essential for building shared interpretations. According to theory, as much as 80 per cent of class time is scheduled for students talking with each other in a Group Investigation classroom, as opposed to traditional classrooms where less than 20 per cent of class time is used by students talking (Kagan, 1990, p.203). Furthermore, in a Group Investigation classroom, most communication is student-to-student discussion which allows the pace of communication to be adapted to the individual students (Kagan, p.204-5).

Besides scheduled discussion and reflection time, continual feedback was necessary to strengthen and broaden the students' understanding of individual content lessons and the Playground Project as a whole. Early into the playground project, the students and I fell into a method of instructor-student collaboration of interpretation. After each activity, the groups turned in their work to me and I compiled the findings
into tables, maintaining old coding categories and introducing new variable or interpretive categories. I then presented the tables at the beginning of the following class and we discussed what meanings could be derived from them. Our conversations focussed upon the meanings relevant to the problems of playground design, but often I used these occasions to also share how the information contributed to my own learning about Group Investigation. As we progressed through the playground project, the students were able to construct more complex meanings and diverge from the models I provided.

Over the course of the Playground Project, I realised that interpretation is an all-encompassing endeavour. Ideally, the participatory design should enter a new project with the expectation that she too is an active learner and constructor of knowledge. Again this is a Deweyan principle adopted by Sharan and Sharan in Group Investigation: "Dewey sought to make students members of a learning community in which knowledge is constructed collaboratively" (1992, p.4). The participatory designer must be ready to reframe "misinterpretations" by the learners of the instructions or goals of the process, and to consider these misinterpretations instead to be alternative interpretations, directions, and goals revealed by the participatory process.

Of all the misinterpretations or reinterpretations that happened throughout the Playground Project, the most critical were probably those that occurred on Day Five in response to "Planning for Group Investigation." Out of the failure of this day came the inspiration for "Dream and Design" that renewed the students' energy and enthusiasm for the project, and gave a concrete basis for consequent discussions of playground theory.

**Motivation: Heart of Participation?**

A case example of the importance of motivation to participation was the first
day's activity, "Designing the Classroom." Intrinsic motivation, which appeared so high by the end of the introduction to the Playground Project, slowly seeped away by the end of the first activity. Keller's motivational design theory (1983) is helpful in explaining how this occurred. Taking Keller's theory on curiosity alone, "Designing the Classroom" should have been more popular than it turned out to be. The children already knew implicitly a good deal about the social and spatial organisation of their classroom. Keller notes that learners tend to be most interested in their learning when they already know something about it (p.405). Furthermore, the students were provided with the possibility of making real changes to their own classroom, which should have produced high levels of motivation since learners tend to be "more interested in real people and events" (Keller, p.406). One consideration in explaining the failure of the activity is whether the students' motivation exceeded optimum levels, to the point that over-stimulation impeded success (Keller, p.400); however, the key to understanding why Designing the Classroom flopped lies in Keller's concepts of relevance, expectancy and satisfaction.

A flaw in planning for "Designing the Classroom" was the apparent irrelevance of the activity to the Playground Project. While our introductory discussion piqued the children's personal and emotional interest in the prospect of changing their own schoolyard, the follow up activity had no concrete ties to this purpose. The connections between "Designing the Classroom" and the whole Playground Project were based in certain pre-requisite learning skills and concepts, which I anticipated the students would generalise later to the task of planning and designing the playground. For the students, who did not have a complete and clear picture of what the Playground Project would entail, these abstract connections were insubstantial. This is an important point for any participatory designer to remember. No matter how sound is the relevance of a learning activity according to theory, the engagement and will to learn can only occur when it is apparent to the student: "Our
learning should be purposeful, and our purposes are more important to us than those of the teacher. So we need to know what we are to do, and why we are to do it” (Cook, 1982, p.135).

For "Designing the Classroom," another part of the motivational problem was not establishing conditions for helping students experience success. The students were presented with a new model of problem-solving to learn; not only did the students have to learn the sequence of problem-solving questions and their significance, but they were required to apply and adapt these questions to a new situation. The level of mastery that was implicitly expected of them was too difficult for their developmental stage and, therefore, seemed to ensure failure. During our introductory discussion, the rewards of the Playground Project promised to be real changes to the schoolyard; however, once we began "Designing the Classroom," it became obvious that the rewards were too distant and removed from the immediate activities in the classroom. For the day's activity, there was a pointed lack of specific goals and criteria that could identify the students' progress. One possible outcome might have been that the teacher implemented some of the students' suggestions for the classroom design; this never occurred, partly because the students did not arrive at real proposals.

In thinking about the general how-to of participatory design, intrinsic motivation is core to the success of a participatory design project, just as Keller has pointed out that the motivation is the "forgotten heart" of instruction. An alternative way of thinking about motivation and participation is to consider the negotiated learning model (Boomer, 1982; Cook, 1982). Negotiated learning refers to curriculum planning and development that invites students to make suggestions and modifications to what and how they learn. Of course, immovable constraints always exist, such as school board policy and expected outcomes; these are discussed openly, as are the hopes and expectations of the teacher in negotiating what requirements will apply (Boomer, 1982, p.132). Negotiated learning purports to enhance intrinsic
motivation, since "children learn best when they intend to take up a challenge and reach a goal" (Boomer, 1982, p.158). Another major proponent of the method, Jon Cook, explains:

The key to negotiation, both in theory and in practice, lies in the ownership principle: people tend to strive hardest for things they wish to own, or to keep and enhance things they wish to own, or to keep and enhance things they already own. The inverse is just as true and observable all around us: people find it difficult to give commitment to the property and ideas of others (Cook, 1982, p.133).

In the ownership principle, a negotiation model of learning may be distinguished from a motivation model (Boomer, 1982, p.128). In a motivation model, the conditions and strategies of motivation are used to bring the students' intent in line with the teacher's, so that the students work with varying degrees of willingness toward the teacher's goal. In a negotiation model, the teacher and students communicate openly about each other's aims and interests in pursuing a unit of study: the teacher talks about what is to be covered, why it is important and what constraints operate; then, the teacher and students plan the unit together within the range of negotiable options, including subtopics, kinds of activities, goals, criteria and methods of evaluation (Boomer, p.128-9). By following a negotiated model, Boomer argues, the teacher and students share more equitably in the power and ownership over the learning. Boomer's negotiation theory does not contradict Keller's motivational design theory; Boomer is rejecting a behaviourist model of motivation that Keller also points out has only limited value in his differentiation between sensory and epistemic curiosity. The important caution made by both theorists is that motivation cannot be "planted."

In thinking about issues or motivation in meaningful participation, I believe that the Playground Project improves upon the older model of participatory design, the community-built model as exemplified by the "Leathers' Way." I am tempted to call it an example of motivational design at its most manipulative and least beneficial
level, a counter example of the kind of motivation which true participatory design tries to nourish. I recall the evening after Design Day when Kelly Hayes, the architect, hosted a rally for securing the playground project, complete with cheering and singing, drama, multimedia presentations and food. My criticism is measured against the fact that rallies work because they are fun, fast and effect: to write off the use of spectacle as an impure or superficial method of rallying support seems morally high-handed as well as impractical. However, in general, participatory design should try to meet deeper motivating needs than the need for entertainment and, if spectacle is used to catalyse a participatory project, the designer should feel responsible to follow up the initial excitement with substance. The approach to the problem of motivation for participatory design should be more like a teacher's approach to motivation in the classroom, than a salesperson's approach at the door. Motivation should be a tool for helping the participants to learn and become active in their community. Participatory design should also reflect a cultural approach and the designer should be sensitive to whether a project fits with the values, interests and needs of the participating community before actively promoting it.

I suppose a truly participatory process would have begun more like a Leathers playground: the parents and children of a community would have initiated the process and invited me in as an expert to lend support to their efforts. Instead, as a researcher I actively shopped around for a school that was willing to go along with my ideas. So from the beginning, I was concerned with whether the playground project could support meaningful participation. Keller's anatomy of intrinsic motivation -- relevance, interest, expectations, outcomes -- helped me to keep a running inventory on how well I was doing in helping the students find personal place and meaning in the playground project.

I was surprised over the course of the project to note that I most successfully engaged students' interest during our shared reflections about my own learning and
research that spun out of our shared experiences. Keller's theory might be useful in explaining why this was so. With respect to interest, epistemic curiosity must have been piqued with the changing roles of expert and learner. I told the children the first day that they should consider themselves experts, not just in playgrounds but in learning, and I reinforced this idea by consulting with the children about lesson plans, their learning preferences, and the success of different teaching strategies. With respect to relevance, like all of us, the children were fascinated to learn more about themselves as I presented frequent reports about what I had noticed them doing. With respect to expectancy, we did not experience the same pressures on my learning for my thesis as we did on the children's learning for the playground project. Consequently, we were not bound by narrow definitions of success and failure and we could renew our motivation frequently with unexpected learning.

Important in the overall success of the playground project was the teacher's motivation. As a teacher, she had personal and professional reasons for wanting to see improvements to the playground. More importantly, she recognised the value for her students in becoming involved in community development and agreed with the philosophical tenure of Group Investigation. I think another important motivational factor for the teacher was the fact that our chats validated her values, aspirations and struggles with social constructivist ideals. Furthermore, her opportunity to play a mentor role to me may have been a source of esteem and recognition. Certainly her essential role as mediator, co-researcher, interpreter, coach, and sounding board highlighted her experience and virtuosity working with kids.

A large contributor to motivation is the sincere, open and sympathetic relationship that develops between the designer and the participants (teacher and students) when the person in charge takes an interest in each individual, listens and asks questions, probes, helps each person find a place that fits. And, therefore, interaction is another key component for building meaningful participation. In
keeping with a social constructivist perspective, the interpersonal effects upon
motivation are as important for me, the researcher, as for anyone else in the project.

Additional Considerations in Participatory Process

In addition to the considerations of the four components of Group
Investigation for creating a participatory and educative process, other conditions and
methodological factors affected the success of the Playground Project. General
guidelines for managing participatory design with children include: consider design of
the learning environment; acknowledge multiple levels of expertise; allow for
flexibility between teacher and learner, expert and novice roles; and build meaning
from multiple perspectives.

Design of the Learning Environment

During the pre-implementation for Group Investigation, as much planning
needs to go into the design and development of an information-rich, well-zoned, and
supportive learning environment as goes into the selection of instructional strategies
and materials. The existing classroom site was in many ways ideal, and the eventual
success of the Playground Project in no small way must be attributed to the climate
and organisation of the learning environment. Upon first entry into the classroom, I
was impressed with the richness of the learning environment, and sensed that its
features were compatible with the methods of Group Investigation.

The investigative and interpretive activities of Group Investigation were
supported by the distinct zoning of the classroom into a variety of workspaces. There
were several workstations, including a computer terminal, which offered the tools for
independent or group work, such as: clipboards, a resource library, a globe,
dictionaries, and reams of scrap paper. Many of the books contained in the resource shelves were self-published volumes from previous class projects. The classroom was full of printed materials that accorded with the values of Group Investigation, and in particular, the tenets of a constructivist view of learning. A large poster featured the words "Empowerment, Attitude, Knowledge, Responsibility," exemplifying a Deweyan value system in education. The teacher also clearly displayed her learning expectations and goals by posting a series of large-print charts and posters. These included a copy of the Common Curriculum's "Levels of Achievement" chart, and "Our Gym Program" under which were the objectives, "Fun, Fitness, Participation and Co-operation." These displays helped students to form their own expectations for success and to participate in the evaluation of learning. Finally, the room was well set up to support group learning. Students' desks were arranged in three's and four's, and in one corner of the room was a large ochre rug where the class gathered for "Plusses and Wishes" discussions or where groups were free to pull out benches and pillows to work on the floor.

A clear example of how the classroom environment supported Group Investigation came during the activities of Day Four, "New Ideas for Our Playground," Day Five, "Planning for Group Investigation," and Day Six, "Dream and Design." Each of these activities was characterised by inquiry and co-operative learning. Students moved about the classroom freely, interchanged with group members and other groups, and went to various stations to locate resources such as dictionaries, clipboards, or scrap paper. The quiet, class-wide sharing zone demarcated by the ochre rug became one of my favourite areas of the classroom where "Plusses and Wishes" took place, as well as a lot of personal exchange between the students and me.
Multiple Levels of Expertise in Planning

Participatory planning makes the most out of the different perspectives of an experienced teacher, one who has an intimate, everyday knowledge of her students, and an instructional designer, one who has a thorough theoretical knowledge of the learning domain and whose plans are based in theoretical models. In defining planning as a "situated action" that reflects prior experience, Suchman (1987) makes the point that the success of our planning is based on the similarity between a past experience and the present situation, and on the appropriateness of our explanations and justifications of past experiences. The classroom teacher, compared to the designer drawing from abstract models, relies upon a rich, complex set of experiences and expectations in order to plan.

Essential to the success of the Playground Project was the style of teacher-student interactions already established in the classroom, and the teacher's positive attitude toward the entire experience. The teacher shared with me a background in playground theory. She had begun her career in early childhood education where she had researched extensively the design requirements for pre-school play environments. She currently sat on a parent-teacher committee, Action 2001, which plans and fund-raises for improvements to the schoolyard. Since she already expressed an interest in developing the school playground, I found her to be supportive and sympathetic to the goal of involving children directly in the planning and developing of the school playground.

Group Investigation was unfamiliar to the teacher. Once I had summarised its main objectives and components, the teacher responded with a mixed forecast. The teacher reported that the components of interaction and motivation were already part of her classroom program and her students were already accustomed to working in groups.

However, the teacher was uncertain about the assignment of group roles according to
the Group Investigation method. She was concerned that the students would find the roles limiting and artificial. She was also sceptical about the extent to which her students would be mature enough to plan and manage their own investigations. She noted her own frustrations in trying to introduce more inquiry learning methods into the classroom. For the entire school year she had been pushing her class to take more initiative and work independently of her. "But students are still coming up to me to ask permission for things they shouldn't have to, and that makes me wonder if I am telling them one thing but in fact doing another" (personal communication, February 9, 1998).

The teacher's concerns echoed Sharan and Sharan's (1992) discussion about the importance yet difficulty of reducing teacher centrality in the classroom. Part of what makes the transition from teacher-centred learning to independent and interdependent learning difficult is that it must be a systematic change to the entire classroom culture. Both teacher and student must change accepted styles of interacting, as well as their underlying beliefs and attitudes about teaching and learning roles. They must be supported with emotional reinforcements as well as opportunities to practice the new skills needed for working in a co-operative classroom (Sharan & Sharan, 1992, p.21-44).

The teacher's collaboration with me in planning lessons was invaluable. At the outset, I lacked an accurate depiction of the nature of these grade four "enrichment" learners and their learning needs. This was a problem of insufficient learner analysis and a lack of realism in my design, common errors cited by Richard Boutwell (1979) in the application of instruction design models. By contrast, as an experienced teacher and as someone with daily contact with the learners, the teacher could more accurately project the amount of time and structure her students would need to accomplish some of the learning goals. Therefore, the teacher's input in the lesson planning was essential for the success of activities. An example of a failed
activity, "Planning for Group Investigation" (Day Five), may be explained in large part due to the fact that I had not consulted or collaborated in detail with the teacher in developing the lesson plans.

During the Playground Project, an expert-novice relationship developed between the teacher and me with respect to planning. This relationship was particularly important to my developing understanding of the particular strengths and limitations of ten-year old learners, and adapting Group Investigation appropriately. For example, the teacher encouraged me to plan activities that addressed the skills of inquiry learning one at a time, and to reduce and simplify the expectations for learning so that they are easily communicable to the children. Her observation notes taken during various Playground Project activities were often written for my viewing and directed toward the purpose of helping to hone my planning and use of instructional strategies:

[Day One, Designing the Classroom: A Problem-Based Approach]
too many mechanics — roles + problem solving model
trying out roles - do this more before proceeding
re. changing room — list up for suggestions
limit activities — too many decisions for them = slower
know more about roles - they need to know
clearer communication
Next: another activity to assess group improvement, review chart of skills, play a different roles (February 18, 1998).

The teacher's observation notes reveal how her lesson planning and evaluations were interwoven as she used observation notes to ensure continuity and integrity across lessons. For example, under the heading, "Next Day," she noted some of the resolutions the students and I had reached in our post-"Playground Observations" discussion: 1) share data processing; 2) evaluate our playground's performance; 3) how can we show what we've done. As well she recorded her own thoughts: "My idea -- each group plans what to present and how and invite Mrs. Arbour here to hear
presentations, maybe Mrs. Campeau too (or another rep. from 2001 Committee)" (personal communication, April 16, 1998). The teacher used her observation notes to record what had occurred, to identify misunderstandings and deviations in students' work, and to suggest learning needs. Typically, the planning for the next day's lesson developed from her close observations of that day.

The teacher called her practice a "mini-lesson approach." She admitted that the approach does not have the appeal of efficiency that pre-planned curriculum offers. She shared with me her own reluctance to use a mini-lesson approach until teaching experience displaced her common sense biases about time efficiency and effectiveness. "It [mini-lesson approach] didn't make sense to me because it just didn't seem efficient. I thought, why can't you just do a good job teaching the material once and then it will stick with them." One of the advantages of the mini-lesson approach is that it helps to avoid long discussion periods and expository lessons, where the teacher maintains her centrality and does most of the talking. The teacher suggested that she prefers to "give a few directions, then let them [students] jump into it and then see what happens" (personal communication, March 9, 1998). "It's okay," she assured me, "to stop the group work every once in a while and explain things then as they need it."

The teacher also suggested that investigation be limited to very concrete explorations and problems for her students. These nine and ten-year olds should be expected to reason mostly in the concrete and to struggle with abstraction. "We cannot cultivate a sense of responsibility for learning and for social living unless we give that responsibility to students in a manner commensurate with their age and ability" (Sharan & Sharan, 1992, p.4). In particular, the teacher found that the four-question problem-solving model of Day One ("Designing the Classroom") was too abstract for her students and they couldn't make use of its general framework to focus their own inquiries. In a note from Monday, March 9, the teacher recommended
instead "more structure [to the] questions" and "they're not using the four questions."

Other recommendations that the teacher provided me include:

- post written instructions and visual aids to reinforce verbal instructions;
- state expectations in concrete terms, such as the number of items completed, the number of choices students might opt for, or the amount of time available;
- however, avoid giving specific case examples which the students will be tempted to regurgitate or copy;
- limit the number of written instructions or questions because her grade four students tend to be literal-minded and assume that they have to respond to anything written;
- clearly demarcate between general discussion and instructions and expectations (personal communication, March 9, 1998).

All of this specificity seems to risk denying students the responsibility and freedom of choice that is an essential feature of a participatory design process.

However, a significant difference between the teacher's planning and planning for traditional didactic teaching is the openness with which learning goals and outcomes are communicated. The teacher diffused decision-making power and responsibility by providing the students with access to her reasoning processes and expectations, by negotiating certain aspects of the learning activities (such as time allowances, or the format of presentations), and by gearing her lesson plans to the students' stated and observed learning needs (Sharan & Sharan, 1992). Additional instructional strategies that would support a participatory design approach are also the strategies that support inquiry learning methods, such as Group Investigation (Collins & Stevens, 1983; Grennon-Brooks & Brooks, 1993).

_Flexibility of Expert and Novice Roles_
A social constructivist approach views communication and influence as two-way between the expert and the novice. In the terms of participatory design, this means that there is reciprocity of teaching and learning roles shared between the designer and the participants. In the Playground Project, I experienced this reciprocity as both the teacher and the students modified the ways in which I communicated, and the values and expectations that I placed in the project. For example, in comparing the succession of student handouts I had prepared at various points before and during the playground project, it is easy to see the gradual shaping of my work under the teacher's influence. My development toward more effective mediation for inquiry learning are marked by general trends related to statements of learning outcomes, the time spent in expository or direct teaching as a ratio to hands-on activities, and the nature of handouts. In "Planning for Group Investigations" (Day Five) the outcome statements were vague and nondescript. For example, the direction "use four-question model as guide for planning own investigations," failed to identify how the students would use the model or what criteria determined that the model was being used effectively. The lesson took forty-five minutes for me to cover and I distributed three separate handouts because I had not specified expectations. As I improved my outcome statements for later activities, such as for "Playground Observations" and "Planning Our Presentations," I found the lessons took less time to convey, the students had more time to participate in the activities, and consequently, the time spent in teacher-centred interactions was reduced.

The students themselves were mediators of learning as I learned about the specifics of their abilities and preferences for the Playground Project. The students were genuine participants in the negotiation of lesson content, the definition of desirable adult-child interactions, and the attribution of meaning and closure to the Playground Project. For example, during Day Six's "Plusses and Wishes" (in the aftermath of "Planning for Group Investigation"), I invited the students to reflect upon
the function a teacher should play in their learning. They deliberated for several minutes over the teacher’s inherent right and duty to be "bossy":

Karen: Part of my project is learning what's the right amount of bossiness. And that's why I watch your teacher because she seems to get the right amount. She gives you lots of choices but she also lets you know what she expects. I think part of what happened last day was that I didn't let tell you what I expected. I told you that you could do what you want, but that wasn't really true because I had in the back of my mind what I wanted you to do. So you kind of knew you were suppose to guess what I wanted, but you also had your own ideas and I was letting you follow through on them. I was trying to make you plan your research project, but most of you wanted to plan the playground itself and dream and design. How do you feel about my interpretation of what happened last day? It is accurate?

Nicholas: For the past five weeks, it was just planning and practising for planning. Now we want to just get the locations and everything right.

Meredith: I have to agree with Adrian because everybody wants to by-pass this planning stuff and get the playground done. Make their own creation. They don't want to go through the steps. So maybe you should be a little more clear about the steps?

Nicholas: Don't worry, Miss McRorie. We don't want to get rid of you.

Becky: I don't understand your point about helping you help us better. Because if we knew that, we could just help ourselves.

Karen: Well, according to this man named Vygotsky, the best way to help children learn and grow and get better is to give them just enough instruction. It's like we're in a maze and I am one or two turns ahead of you, so I tell you what the next turn is, but I wouldn't tell you what the whole maze is or I would spoil it for you. And I wouldn't give you all of the directions, or you wouldn't
learn anything, you would just follow my directions. So the trick is to give you just enough information about the steps so that you can do some of them, but so that you can also do your own thing.

Nicholas: But isn't giving you one direction at a time the same as giving you all the directions at once?

Ian: It wouldn't be the same thing, because you are giving one step at a time and it's not telling you what to do, or how to do it, or when to do it.

Liam: I think it would be different because if you told them all at once, you could get lost and forget them, but if you tell them one at a time, it would be easier.

Brent: I think if you give one instruction and you don't tell the kids everything to do, then they can focus on that instruction instead of piling up on them all the instructions.

Nicholas: I think it's not just good to tell you the exact direction at a time, but give a clue. . . If you gave us clues, then we would have to figure out those clues and that would actually help us and make something out of us moving to the end of the maze. Because if you just told us, we would just walk there. But if you gave us clues, we would have to figure out what the answer to the clue was.

At debate among the children was the art of teaching for inquiry and mediated learning: how should the teacher interpose between the learner and the phenomenal world? Theory suggests that mediated learning is optimal when: the teacher turns incidental learning into intentional learning (consciousness); the teacher builds bridges from immediate and context-specific to the general and possible abstractions; the teacher always makes certain that learning is meaningful through reflective feedback and real-world consequences of learning (Kozulin, p. 284-5).
Building Meaning from Multiple Perspectives

For the participatory designer, social interactions are necessary for cognitive growth because all learning is a social and cultural event. An essential feature of participatory planning, therefore, must be for the designer to try to discover and build meaning from the learners' many points of view. The planning, implementation, and evaluation of a participatory design project consist of a continual weave of social interaction with goal analysis and assessment (Grennon-Brooks & Brooks, 1993). For a social constructivist, planning and designing are part of everyday, lived experience (Suchman, 1987). This means that universal planning models are merely a starting point for participatory development, and no amount of theoretical foreknowledge can replace lived experience: "Mediation through another human being cannot be replaced by any technical or symbolic devices" (Feuerstein as cited in Kozulin, 1994, p.286).

During the implementation of the Playground Project, the teacher, students and I improvised learning activities around two objectives. In the first objective, all recognised that it was important that the students enjoyed real life outcomes from the Playground Project, and that the students' learning would be applied to the real life problem of improving their schoolyard. In the second objective, the teacher and I valued the spirit of Group Investigation in which the students were active learners, taking responsibility for their learning, sharing with the teacher decisions about content and significance of lessons, and practising independent and group learning skills. These objectives represented a slight shift in emphasis from the starting goals of the Playground Project. Consequently, lessons were created, dropped or changed on the spot in response to the students' learning needs and feedback to instruction.

Just before Day Four's activity ("New Ideas for Our Playground") was undertaken by the groups, there was class-wide discussion to confirm the expectations
for the day:

*Annie:* What are we really looking for in the investigation?

*Karen:* You get to decide.

*Meredith:* So do we record stuff we find, or just browse?

*Annie:* We are supposed to find ideas.

*[Later during their investigations that same day.]*

*Karen:* What kinds of questions do you have about the playground?

*Nicholas:* What's the downside.

*Ian:* We are wondering about playground injuries.

*Nicholas:* We are thinking that maybe the baseball field should be planned so that it is farther away from the playground so kids don't get hurt.

*Nicholas:* We have been looking at these different playgrounds, but we're wondering even though they look really cool and all if all these things are safe?

*Laura:* Also, how many people are going to play on it?

*Andy:* Who created it?

Of course, Andy's question lies at the crux of the participatory design. "Who created it?" — and who did not — is so important a question at the level of the small scale, community playground because in it are contained the important questions about the assumptions, traditions and ideologies of broader society. Similarly, "Who created it?" must be asked about the process and products of learning.

A playground project can be very successful in providing children with the opportunity to express their ideas regarding the school playground and their community, and this should be the foundation of playground design:

It is this poetics of design, the opportunity for self-expression, and through that expression of the human spirit, that motivates people to become designers and keeps them motivated through all the struggles required to bring a design project to fruition (Carr et al., 1992, p.254).
In keeping with this order, therefore, I would improve the playground project by increasing the expressive possibilities and the tangibility of outcomes for children. I think a good beginning would be a “Dream and Design” afternoon during which students could draw or write about their playground fantasies independently.

**Final Design Product and Real World Outcomes**

The final participatory design product consisted of group proposals delivered to the school principal and the chair of the Action 2001 committee. At the top of her reflections from this day, the teacher wrote, “Kids very poised. Spoke from the heart.” Nonetheless, an important issue in participatory design was whether or not the final design that the children recommend was feasible and of quality.

The areas of expertise required by a good playground designer include reasoning and communication skills that were too advanced for ten-year-olds to master. The virtuosity of playground design lies both in the designer’s grasp of basic design theory and in his or her cultural experiences and general knowledge:

Sensitive public space design and management requires an ability to discern the existence and extent of symbolic links between people and places. It involves an understanding of the meaning of places beyond the superficial. . . . However, environmental planners and managers must not only be sensitive to the need for preservation but also for evolution and change (Carr et al., 1992, p.222).

The children’s presentations to their principal lacked the interpretive depth or integrative solutions that a professional design should achieve. However, strands of playground theory and the basis for good environmental design could be found in the children’s proposals. The theory of Stephen Carr and his associates explicates how this is so. Carr, Francis Rivlin, and Stone identify three values in guiding the development of any public space: the space should be responsive, democratic and meaningful (Carr et al., 1992, p.19). While this theory was never taught to the
students, intuitively they hit upon similar values in their presentations.

The design value of responsive requires that a space serve the needs of the local community. Groups Five and Six who reported on "Playground Observations" applied the criteria of responsiveness in their proposals. As well, Group Two's presentation on "Dream and Design" was mainly concerned with this issue. One member of Group Two noted two common flaws in the groups' Dream and Designs. First, most of the children's designs over-emphasise physical development at the expense of meeting emotional, intellectual and spiritual needs: "There wasn't enough of one thing or too much of another so that kids could really enjoy the playground." Second, the designs fell under the categories of "mostly silly" and "fantasy," failing to treat existing problems with realistic solutions: "When we were done making our Dream and Design, we made a realism chart that had realistic, fantasy, and silly. But only one was at realistic, one or two were at fantasy, and all the rest were at silly. So we thought maybe next time we could make a realism chart with just real and fantasy and go on that data." Group Two's assessment of the weaknesses of the "Dream and Design" projects showed a precursory understanding that a good playground design must be grounded in the realities of the community.

The design value of democratic refers to the preservation of the rights of all users, including the rights of accessibility, freedom and common ownership over a public space. A member of Group Three invoked the value of democracy when he expressed concern for the interests of the developmentally challenged kids, as did other members of other groups when each considered the needs of children of different ages and interests than their own. One student from Group Six philosophised on the limited outcomes the Playground Project might have, "It wouldn't be fair if we made all of the decisions." The democratic principle of fairness was perhaps the greatest concern of the groups. In preparing for the final presentations, for example, the children debated over issues of fairness in deciding
who should have an opportunity to speak and present. This was also the reason for the final decision to allow each group to make a brief summary report. One student's obsession with the issues of fairness and rights in democracy inspired the students' conclusion to the presentations:

Liam: I was surprised to learn that...

All: Play is a right!

Chris: The United Nations Declaration of the Rights of the Child says...

Alex: The child shall have...

Kaitlyn: Full opportunity for play and recreation.

Liam: Which should be directed to the same purpose as education.

Alex: Society and public authorities shall endeavour to promote the enjoyment of this right.

The third design principle, meaningful spaces "grow out of an understanding of why people go to spaces, how they actually use them, and what they mean to their users over time" (Carr et al., p.20). In their presentations to the principal, the groups were not able to talk about the causal relationships between their personal knowledge of playgrounds, their Playground Project research, and their recommendations for changes to the school yard. However, when they were not feeling so nervous and constricted by formal presentations, and when they were simply allowed to discuss among themselves the relative merits of one playground feature over another, they showed much better logical reasoning. For example, quite a heated debate was engendered in the repeated suggestion that the school needed more blacktop. One girl in particular decried this utilitarian and spiritually void solution. She was also offended by the suggestion that animals could be housed in cages for feeding. She lobbied for the preference of creating natural homes for wild animals. In this conversation and others, the concept of meaningful space was being learned not through declarative knowledge statements, but through the students' own lived
experience and shared reflections.

*Real World Reinforcers*

One of the purposes of participatory design is to provide effective changes in the community, and in so doing, reinforce empowering sentiments of pride and confidence in the participants. The reactions of the adults who listened to the children as they presented the Playground Project promoted this purpose.

The audience listened to the students' proposals with seriousness and enthusiasm, and gave thoughtful feedback that reinforced the real world potential for the students' learning efforts. The principal was brief but gracious in thanking the students and accepting their proposals. Reading from notes she had made during the presentations, she commented upon the practicality of the suggestion for outdoor storage and acknowledged the seriousness of the complaint of overcrowding on blacktop recess days. The chair of the Action 2001 committee focussed her feedback on the students' innovative ideas, suggestions and solutions that she had not considered until that day. In particular, she was impressed with the children's arguments about the developmental needs for play. She commended the students for their ability to take the perspective of children from all age groups, to consider the needs and preferences of adults, and to remember the special needs of the developmentally challenged classes. She found a kindred spirit in one girl, who was an impassioned advocate for naturalisation and more landscaping of the school grounds: "It is something Action 2001 has thought about before. And I love the idea of a maze! But we must be careful of opening an area to people who might not care for it like we would." Evidence that the presentations had been provocative, the chair hatched plans for the students' continued collaboration with the efforts of Action 2001: "I would like you to help me take pictures of our school playground now, especially on a day like today when it's muddy and crowded. And then hopefully we can show different slides when 4R
graduates!" Finally, she reinforced the efficacy of the students' message: "You talked about what play is important and spoke so convincingly about the developments and why play is important for growth. You know, you need important words like development when you speak to important people at the board office. One night I would like you, maybe not all of the class, but a few of you, to come down to the board of education when they are having one of their big meetings and tell them why our school playground is such an important issue and it's not just me and [your principal] whining for nothing."

My advisor, who had been among the invited guests, offered the greatest reward for the students' hard work. He suggested that he could return to produce a video with the children that would record their work and ideas. The suggestion was overwhelmingly popular, and in fact a team of three returned two weeks later to record on video the children's presentations.

**Possibilities for Further Action**

One hope growing from my research is that the Playground Project will spawn similar projects in other schools. Toward that purpose, a revised program of lesson plans and instructional materials is included in the appendix (Appendix L). Additionally, I would like to suggest directions that the Playground Project didn't take but which could have been rich in learning potential.

Besides a video campaign, there are numerous real world possibilities for other Playground Projects. These could include publishing in a book or to a web site, since there is very little material written at a level directed for children about play and development or issues in playground design. Similarly, there are few local directories of information and resources for schools contemplating changes to their school playgrounds; one exemplary directory is published by the Evergreen Foundation (1999 [On-line]), but is national not local in scope. Another need is an electronic
directory for guiding students and teachers to useful world wide web sites, one that archives playground information according to categories such as safety, community-built and adventure playgrounds while filtering out the unrelated multimedia "playground" pages. In producing the video with the class, my advisor and I regretted that there was no time left for allowing the students to create their own visual essays, through photographs or video journals; different media offer expressive possibilities from written work, such as a pictorial comparison-contrast of good and bad playgrounds in action or a soundscape tour of a naturalised area. Yet another exciting possibility for hands-on involvement are the International School Peace Gardens. These are small, out of the way zones on a school yard that are used successfully for conflict resolution and quiet retreat as an alternative to detentions (Morton-Marr, 1996 [On-line]). Furthermore, but certainly not finally, a playground project could follow up on one student's suggestion that older children become involved in creating and running recess activities for younger or disabled schoolmates.

The Reciprocity of Participation and Care

One of the greatest appeals of participatory design is the central place given to care. At the end of the Playground Project, the children do build a playground with their own hands — at least, one of sorts. On our last day, they presented me with a popsicle stick playground. Crudely taped together bits of wood and string make up two swings, one slide, a teeter-totter, a rather obscure representation of a sandbox with torn paper showing the "loose parts," and an abstract pyramid structure, which when asked, one student reported, "is just a mistake but the glue dried." Such an honest and free gift deserves better than a mixed review. I suppose it was hard-hearted to have noticed that the playground was the worst kind of stereotype, without even so much as one possible daisy for spiritual respite, or a tiny, wheelchair ramp nod to universal accessibility. Nonetheless, I couldn't help but wonder, where were
the five play developments, the environmentalism, the creative problem solving that have emerged in the proposals to the principal and the chair of Action 2001? Where was the transfer and endurance of learning? Where were my outcomes?

With their gift, the children underscored the meaning of Playground Project for them and helped me to recall its greater aspirations. The children were not concerned with showing me how much they had mastered, so much as showing me how much they cared. With their gift they were reciprocating the care that I had felt not just for the project but for the classroom community and its individuals. According to the epistemology of social constructivism, it is in the demonstration of care that each of us is demonstrating our best learning:

Coming to know one's world is a function of caring about one's world. Caring about one's world is fostered by communities of learners involved in trying to answer similar, but not necessarily identical problems (Grennon-Brooks & Brooks, 1993, p. 30).

Realistically, the playground changes that the Action 2001 committee will implement in the year to follow might not include many of the children's suggestions. And realistically, a year hence, few of the children will be able to recite the "five developments" of play or the four questions of problem solving. However, beyond these passing benefits of the Playground Project, I hope that their experiences will empower the children with the knowledge and belief that they could participate meaningfully in their communities.

In this, the Playground Project has substantiated Heseltine and Holborn's postulate that, "The more children are involved in developing and therefore understanding their environment and their community, the greater their involvement and identification with it" (1987, p.28). There is a corollary that Playground Project has also shown. The greater her involvement and identification with it, the more a researcher is involved in understanding and, therefore, developing her environment
and her community.
Conclusions

Group Investigation and Participatory Process

In managing a participatory playground design project, I borrowed from Sharan and Sharan’s Group Investigation. I reasoned that the principles and techniques from an established method of social constructivist programming in one field, education, could be transferred to another field, that of community development and playground design. The four components of Group Investigation, investigation, interaction, interpretation, and intrinsic motivation, provided me with a working definition of meaningful participation as well as outcomes to measure it by.

While translating Group Investigation into the special task of participatory playground design, meaningful participation in the process is enhanced when the designer maximises:

- emotional and personal involvement, and creates the conditions for optimal levels of risk and personal stakes (for the designer and the participants);
- opportunities for interactive discussion among peers and across expert-novice divides;
- opportunities for the participants to interpret and investigate, to actively construct and test personal theories, to search effectively for answers to their own questions and to reflect upon their experiences.

In addition to these general prescriptions for meaningful participation, I would add special emphasis upon reflective discussion about the project and how it fits into a broad context of community development and participation. Further to that, the designers and leaders of any participatory project need social, emotional and theoretical support since they are also in the midst of learning and growing. Finally,
the most difficult resource to locate, but possibly the most important one for a participatory design process, is time because the success of meaningful participation is based in caring and trusting networks which unfurl slowly. As one student points out, "I believe working in groups was good once we gave it time, like two months, to form into the groups."

**Systematic Design within Participatory Process**

The challenge in participatory design is to balance the dichotomies of product versus process goals, systematic implementation versus intuitive, criteria-based goal assessment versus descriptive serendipity. In the Playground Project, I worked toward this balance by supplementing the holism of Group Investigation with systematic instructional design activities. Some principles to be derived from my experience are:

- begin planning with the traditional planning model of instructional design analysis: identifying goals, assessing the conditions of the learners and learning context, and selecting possible delivery strategies;
- group instructional goals in sets of related desirable outcomes;
- be ready and willing to add to, adapt, or completely drop these goal sets as the particularities of the situation reveal themselves;
- build theoretical models from the unique context and add to the models and theories being used in response to the situation;
- consider all factors, social, emotional, and intellectual, that impinge upon the learning environment.

To reinforce my own conclusions, I also add the suggestions from Wilson, Teslon & Osmon-Jouchoux for assimilating constructivist and post modern approaches with traditional instructional design. These include:

1) use holistic and systematic design together or alternatively;
2) cluster objectives around learning experiences;
3) recognise multiple stages of expertise;
4) design rich learning environments and experiences from which learners can pick out their own content;
5) emphasise problem-solving, meaning-construction learning goals;
6) allow for instructional and learning goals to emerge during instruction;
7) use-authentic, information-rich delivery materials and assessment tools;
8) define content in multiple ways;
9) distinguish between instructor's goals and learners' goals and allows for multiple goals at different levels of learning;
10) give guided control to the learner;
11) allow for teaching for the moment;
12) extend students' responsibility for their own learning;

Common Dilemmas and Critiques of Participatory Design

I have found participatory design with children is difficult due to several factors beyond the constraints of my collaborators' young age. Many of the problems I encountered are endemic to participatory research methods. Alary, Beausoleil, Guedon, Lariviere and Mayer (1999) identify four dilemmas that characterise almost all participatory research efforts and which have not yet been satisfactorily resolved. These are: 1) the dialectic between theory and practice (research and action); 2) the process of participation; 3) the representational problem of reporting on participatory research; 4) the question of validation in academic and scientific communities. The fourth dilemma is understood in consideration of the other three. Planning and writing about participatory design can feel like marginal work in the academic community.
because it draws from phenomenological and systems perspectives without wholly satisfying the rigorous criteria of either one (Heller, 1984).

Participatory design is academic research carried out with the aim of effecting real world changes, and in particular, social changes (Kirby & McKenna, 1989; Fals-Borda, 1992). For example, Johan Galtung (1978) links participatory design to the ideals of participatory democracy and suggests that all participatory design should attempt to promote consciousness-formation, mobilisation and common struggle for a cause (1978, p.78). As Frideres (1992) points out in criticism of participatory research, the dialectic between research and action embedded within can weaken its effectiveness on both fronts. There can be great confusion about the purpose of the research when a participatory project attempts to educate and promote change and at the same time contribute to the development of new knowledge. My experience in the Playground Project testifies to this confusion. In terms of real world action, the children were repeatedly frustrated by the slowness of our progress, which was retarded by my various research fascinations. Conversely, somewhere in the middle of the Playground Project, I decided to let the theories sort themselves out later and focussed my instructional efforts on supporting the children's research interests.

Arguing from the scientific perspective, Frideres notes that real world action is neither sufficient criterion of the truth-value nor test of validity of knowledge. Participatory design easily leads to a methodological quagmire of too many questions, methods and interpretations to draw meaningful conclusions and recommendations. Negotiations over each stage of research nulls the power of hypothesis testing, with non-rigorous, unsystematic methods of collecting and analysing data. In part, this is an attack on the entire interpretive paradigm. Arguing from the interpretive perspective, Forrester defends participatory design as "praxis," representing a "shift in emphasis to process and context and away from research conclusions or results" (1992, p.181).

Furthermore, the aim of participatory design is to prescribe strategic actions based on
the real life experiences of a group rather than the theories of one person or one perspective (Barnsley & Ellis, 1992, p.10). Consequently, participatory research relies on a "generative analysis" wherein the theory flexes to explicate the unique context and reciprocally the context explains the theory (Alary et al, 1990, p.210). Recognising that theory can never fully represent or explain situated actions and diverse perspectives, however, must never be confused with the rejection of theory or, specifically, the scientific paradigm. For me, participatory research is exciting because the contradictory necessity of scientific and intepretive truths is experienced in personal and tangible ways.

The process of participatory design is to integrate community members into all stages of the research process, including developing hypotheses, selecting methods, implementation and evaluation. Very practical problems result, such as the slowness of negotiations over each stage of research, and the additional time and costs required for training community members in theoretical perspectives and analysis (Alary et al, 1990). Against these practical criticisms, Fals-Borda invokes a higher criterion than efficiency:

Participatory action research, while emphasising a rigorous search for knowledge, is an open-ended process of life and work, or vivencia; a progressive evolution toward overall structural transformation of society and culture; a process that requires ever renewed commitment; an ethical stand, self-critique, and persistence at all levels (1992, p.18).

The dilemma for the participatory researcher is whether she can truly claim to have implemented an empowering process that will encourage participants to think and act for themselves, or whether she has simply hit upon an effective set of persuasion strategies. In the case of the latter scenario, once again the issues of efficiency over effectiveness are valid. In the educational context, the real disadvantage of a participatory process in curriculum development is that instruction is more costly and coverage of material is less extensive (Wilson, Teslow & Osson-Jouchoux, 1995
The problem with conceiving of the process of participatory design as progressive evolution is that this perspective assumes ideological infallibility. Frideres’ most powerful critique of participatory methodology reveals an ideological contradiction; in the goals of educating and empowering the community, participatory design actually seeks to change or co-opt diverse perspectives, rather than tolerate them as it sometimes claims (1992, p.9). A participatory research process, therefore, is not necessarily any more empowering or less intrusive than traditional research methods. In the worst light, participatory design can become a grand manipulation on the part of the designer to bring about community acceptance of change.

Meaningful participation is a set of attitudes, values and skills that are acquired over time. I chose to discuss participation in the terms of Group Investigation for the parallels between the issues of participatory design and social constructivist teaching. My readings consequent to the Playground Project have lead me to discover a model that may be better at bridging the two domains of school and community, the Fostering Communities of Learners (FCL) method used in environmental education (Brown, 1997). Similar to my use of Group Investigation for participatory design, FCL purports to use strategic interventions to teach children how to learn and explore real world problems. Based upon constructivist principles, "The idea is to understand children's emergent theories [...] and lead them gradually toward deep principles of the discipline" (Brown, 1997, p.408). Instead of intrinsic motivation, interaction, investigation and interpretation, the terms used in FCL are agency, reflection, collaboration and culture. Agency incorporates the ideas of investigation in referring to the active component of learning and knowing. Reflection corresponds with interpretation in identifying the importance of personal insights into the learning process. Collaboration is a more specific term than interaction for emphasising the interdependency among learners, as well it suggests a common goal in the
interactions; however, the terms are essentially interchangeable in their respective contexts. Of particular note, FCL places the fourth emphasis upon culture rather than motivation. Brown defines culture as referring to the shared behaviours, beliefs, and membership in an interpretive classroom community (Brown, 1997, p.411-12). The substitution of terms could push participatory design along the social science continuum toward cultural studies practices and away from social control research.

The representational problem of reporting on participation is one close to my heart. For months after the Playground Project concluded, I was plagued with the inadequacy of traditional writing forms. In particular, I was reluctant to imply a linearity from theory to practice that a case study report might imply. Characteristic of participatory research in general, problems in representation arise from the mobility of the object of research (in other words, the researcher can't make up her mind what is really at the crux of the investigation) and the instability of the analysis and findings (Alary et al, 1990). Another representational issue is the ideal of participation in all aspects of research, including analysis and reporting. In my case, I experimented with different ways of inflecting my personal observations and analysis of the Playground Project with the participants' voices, albeit mediated through my selectivity and arrangements. In participatory design projects that involve adult participants, this issue may be more easily resolved; although until academic writing becomes less of a technical domain, it seems unlikely that non-academic participants can contribute to intellectual forums.

In writing about participatory design, I also found it challenging to maintain a balance of views and emphases with respect to product-oriented versus process-oriented goals and with respect to holistic versus systematic design approaches. Binary oppositions seem intractable and insoluble because it is difficult to discuss the pairs in any other way. "It is easier to see the conditions in their separateness, to insist upon one at the expense of the other, to make antagonists of them, then to discover a
reality to which each belongs" (Dewey, 1956a, p.4).

The scientific validation of participatory research is problematic in large part because it hinges on the individuality of the researcher rather than the reliability of the research methods (Frideres, 1992). The centrality of the researcher and the convergence of subject and object in research is basic to interpretive research methods, however, and the participatory perspective treats planning and designing as part of everyday, lived experience (Suchman, 1987). To put it more elegantly, "The designer of a culture is not an interloper or meddler. He does not step in to disturb a natural process, he is part of a natural process" (Skinner, 1971, p.172). Therefore, an education of participatory designers would require to not only expertise in the traditional tasks of instructional and systems design, but also the cultivation of an ability to observe, interpret, and interact circumspectly within a community with a high degree of self-awareness. Participatory designers would also benefit from a set of personal traits, which may be innate rather than nurture. The first of these is tolerance for ambiguity and doubt. The second is the ability to find humour and interest in the process no matter where it may lead contrary to expectations. A third trait, which can be developed as a skill, is listening and related to this is a fourth trait, an attitude of openness for new and different ideas. It seems ironic that in promoting greater participation of communities in academic research, the method suggested is a focus on the subjectivity of the researcher. More perplexing philosophical debate over the individual and society must be left for future projects of participatory design.
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Appendix A

Play and Development Poster Series

Learning Goals
Children need to understand what play is and all the forms and activities that play encompasses in order to plan for play and design for playgrounds. Children will discuss the unique nature of play, identify its varieties and forms. They will also learn and use in their discussions the five ways in which play contributes to the overall development of a child.

Method
1. Teacher creates posters from selected quotations below and hangs them in classroom.
2. Each day of playground studies, teacher presents one poster and reviews content through class discussion.
3. Investigative and design activities of children should be informed by content of posters and specific content can be requested by teacher to be integrated into children's work or proposals.

Teaching Materials

Poster 1: What is play?
Play is not merely the passing of time.
Play is life.
It is instinctive.
It is voluntary.
It is spontaneous.
It is natural.
It is exploratory.
It is communication.
It is expression.
It combines action and thought.
It gives satisfaction and a feeling of achievement.
(Malta Declaration of the Child's Right to Play, 1978)

Poster Two: Why is Play Important?
Children are the foundation of the world's future.
Children have played at all times throughout history of all cultures.
Play, along with the basic needs of nutrition, health, shelter and education, is vital to develop the potential of all children.
Play is communication and expression, combining thought and action; it gives satisfaction and a feeling of achievement.
Play is instinctive, voluntary and spontaneous.
Play helps children develop physically, mentally, emotionally and socially.
Play is a means of learning to live, not a mere passing of time.
(From the IPA Declaration of the Child's Right to Play, November 1977, September
1982, September 1989)

Poster Four: Play is a Right!
The child shall have full opportunity for play and recreation which should be directed
to the same purpose as education; society and public authorities shall endeavour to
promote the enjoyment of this right.
(The United Nations Declaration of the Rights of the Child, November 20, 1959)

Poster Four: How do We Learn in Play?
Play is learning by doing.
Children learn by playing along with and alongside other children and adults:
games, sports, pretend play, dramatic play.
Children talk, cooperate, compete, imitate, obey, listen to, fight, share.
Children learn by playing with and alongside living things:
insects, birds, plants, small animals, pets.
Children collect, watch, care for, gather, arrange, imitate, identify, name
Children learn by playing in natural settings and different environments:
seasons, weather, temperature, gravity, landforms, vegetation.
Children feel, observe, experiment, adapt to, explore.
Children learn by playing in different kinds of spaces:
high places, low places, private spots, open fields, boundaries.
Children hide, climb, jump, run, follow, crawl, search, choose.
(Adapted from Rohane, 1981; Frost & Klein, 1979; Smilansky, 1968)

Poster Five: Play is Important for Growing and Development!
Physical Development: grow taller, stronger, faster, better
Social Development: learn to co-operate, rely on one another, work as a team
Emotional Development: feel important, unique, independent, in control
Intellectual Development: notice new things, ask questions, solve problems, explore
Spiritual Development: feel wonder, curiosity, beauty, desire, calm
(* adapted from Carole Dale-Shipley, 1993, Empowering Children: Play-Based
Curriculum for Lifelong Learning. Scarborough: Nelson, Canada)
Appendix B
Designing the Classroom: A Problem-Based Approach

Learning goals
Students will become familiar with a basic problem-solving script or model which can help them to generate and tailor questions for their own inquiries and develop their own problem solving strategies. Using the model, they will develop specific questions applied to the problem of finding out what they will be doing in group investigation, and proposing solution designs for their own classroom. They will sort the questions according to possible subtopics or sub-tasks and plan how they could find out answers.

Concepts & Skills
There are four questions which are the basis for every investigation. These are:

1. What do we know already?
2. What do we need to know or want to find out?
3. How will we go about finding out?
4. How will we know and show that we've got there?

Method
I. Introduction to Model
1. 5-10 minutes. Start by sharing a personal example of a problem you had to solve recently. This should be a short, easy to relate story, such as forgetting where you parked your car at the shopping mall. Talk about some of the strategies you used to solve your problem. Ask students to think of examples of problems they had and what were some of the solutions they tried.

2. 10 minutes. Introduce the four question problem-solving model. (Use overhead, Power Point presentation, blackboard or flipchart). Use your own example, as well as one offered by the students to show which questions were used in the intuitive problem-solving. Identify at least one example from intuitive problem solving for each step in model. Ask students to offer similar examples to test their comprehension of the model.

II. Introduction to Problem
1. 5 minutes. Introduce the problem students will now work on: You are thinking about redesigning the classroom for the next month. You think that the classroom could be set up better for Group Investigation activities and research into playgrounds. You explain that Group Investigation is a style of learning in which the students will decide what they want to study, and how they will study it. In Group Investigation the students will be responsible for helping each other out, and shouldn't go to the teacher every time they have a question. Obviously this means that the classroom design could be better for Group Investigation, but you are not sure how. The class can help the teacher plan the classroom by deciding what they will want and need in the class for the next month. The students should copy down the four questions as
headings into their notebooks, then working in groups, come up with some questions and ideas under each heading.

   How would you arrange the desks to keep people in their seats? Now what if you wanted them to move around freely?
   What kinds of information would be important for all students? How would you store it or display it in the class?
   Do we need to worry about making too much noise and disturbing the people around us? Is there anything we could do in the classroom set up to help with this problem?

III Group Planning and Discussion
1. 20-30 minutes. Divide class up (by seating order, for example) into small groups. The less experienced they are with group work, the smaller the group, with pairs being the smallest unit and 5 students being the absolute maximum. Suggest that roles be assigned: one person as a note-taker, one person as a chair who makes certain everyone gets a turn to speak, one or two be responsible to report back to class.

2. Role of teacher. Circulate from group to group to help students collaborate in a discussion group format. Watch for whether students are sharing in the talking and listening roles, equally. Direct students back to the model if they are confused or not sure about what they are doing. Encourage at least one person in the group to take notes. Ask students to report on one idea that they heard someone else present in their group.

3. Intervening. It may be necessary to give an example or two of ideas under each heading. If most of the groups are struggling, take a couple of minutes to review the assignment and ask for a few suggestions of ideas from groups to help the others. While the ideal of group investigation is NOT for the teacher to supply the answers, it is important that the teacher have in mind examples as well as an overall picture of what the groups MAY achieve in this exercise. (See appendix "Designing the Classroom: A Problem-Based Approach")

4. Strategies. Announce the time limit at beginning of planning activity and help groups practice good time management by announcing halfway point. Allow for time limit to be negotiated by groups if more time is needed. Set some concrete goals to help groups monitor their own success. For example, one goal should be related to discussion and collaboration skills, such as each group member contributes at least one idea. Concrete goals also help to break down task, such as, try to suggest a minimum of three different questions or ideas under each heading.

III Group Presentations and Classwide Reflection
1. 5 minutes. Identify some ground rules for discussion and criteria which will be
accepted as indicators of success. These might include:
* during the presentation of ideas, all ideas are accepted and written
down.
* it is okay to have repetition of ideas and this will be noted by starring
ideas that are suggested more than once
* look for relationships between other people's ideas and your own as
you listen
* try to be brief and to the point when you are talking
* don't interrupt
* right now we don't need consensus
* we will know we are successful if we can observe these rules and in
general show respect and acceptance for all ideas.

2. 15-20 minutes. Facilitate integration of ideas. After gathering all ideas, class should
nominate relationships and suggest groupings. These ideas can be symbolized
by drawing arrows, circles, equal signs between ideas. Note repeats, wonder
out loud if the most common and popular ideas are the best ones in all cases?
Ask students to suggest ways of breaking up the investigation into sub-topics
or sub-problems for different groups to check out. Ask students to discuss
ways in which they would enact the investigation from this point. Add own
suggestions, but only as more suggestions equal in status to students, or
suggestions from own experience but NOT as the right answers to problem.
Ask students to identify questions and sub-topics which they could also use
for investigating how to redesign the school playground.

3. 10 minutes. Facilitate reflection on process. Ask students to talk about their
experiences working in groups. Did everyone share the talking time and
listening time fairly? Did everyone take on a specific role in the group? Can
the identify ideas which were new and interesting which someone else
suggested that they wouldn't have thought of? How often did the group get off
topic? How did the group get back on topic when that happened?

4. Strategies. If students are shy about speaking out in class, or one or two students
dominate, then build up toward full class discussion. First have students work
in a Think-Pair-Share session, or return to their original groups, then ask them
to volunteer ideas from these discussions to classwide one. If you detect that
the group experiences were generally bad, then discussing group work will be
sensitive and discussion may contribute to further deterioration. You should
be able to determine whether group work generally failed as a result of lack of
trust, lack of self-discipline, poor communication skills from having circulated
during discussion time. Focus discussion away from these serious flaws for
now, and ask students to build upon what they did well. Ask them to
nominate things they would like to improve upon personally (they may do
private journal writing instead).
Teaching Materials
It may be necessary to give an example or two of ideas under each heading. While the idea of Group Investigation is NOT for the teacher to supply the answers, it is important that the teacher have in mind examples as well as an overall picture of what the groups MAY achieve in this exercise. Below are some possible sub-questions to organized an investigation and systematic solution to designing the classroom for group investigation.

1. What do we already know about the classroom?
   * How is it used?
   * What are its features? (What kinds of things make up a classroom?)
   * Who uses the classroom?
   * What topic will we be researching?
   * What activities do we use the classroom for?

2. What do we need/want to find out?
   * Who would be affected by any changes?
   * Whose permission do we need to make changes?
   * Why is the classroom set up the way it is?
   * Which things have to stay the same (constraints)? Which things could be changed (possibilities)?
   * How are other classrooms set up? Do these classrooms work better, worse, just differently?

3. How will we go about finding out?
   * Ask the teacher why s/he has designed her classroom this way.
   * Tour the school during recess and survey other classrooms.
   * Make a questionnaire for the teacher and class to fill out.
   * Find out from the custodian which things can be moved.
   * Find out from the principal if there are any safety and fire considerations.
   * Check with students with special needs what they would change.

4. How will we know and show when we've got there?
   **Know:** * Make sure all of our questions have (at least) two (three, etc.) answers.
     * Make a list of all the people affected. They should all be contacted before we are done.
     * Set a time limit and see how far we've got by then.
     * Have enough information to develop a solution or plan.
     * Every group makes their own plan and we vote on the best.
   **Show:** * Present our findings to the class in an oral report.
     * Make a poster with questions and answers.
     * Draw a blueprint of the classroom with proposed changes.
     * List the favourite ideas in rank order (most favourite to least favourite)
## Appendix C
### Role Nominations

<table>
<thead>
<tr>
<th>Role</th>
<th>My Definition</th>
<th>Students' Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recorder</td>
<td>Keep record of decisions and ideas. Summarize most important points. Make point form notes.</td>
<td>Able to focus. Print neatly and clearly. Clear spelling. Writing must be legible. Able to write quickly/ Fast writing. Able to understand what to write. Good listening. Good point form writing skill.</td>
</tr>
<tr>
<td>Chairperson</td>
<td>Open and close meetings. Help group reach consensus. Encourage others to contribute.</td>
<td>Good listening skills. Good people skills. Good group skills. Knows how to address meetings. Knows how to reach an agreement. Need to be able to focus on the conversation. Organized. Able to wait their turn. Small humour. Able to calm down.</td>
</tr>
<tr>
<td>Big Picture Tracker</td>
<td>Makes sure group has goals. Keeps track of time limits and progress. Reminds group to focus on goals.</td>
<td>Set goals for group. Knows what time it is. Keeps track of time limit and progress. Seriousness. Gets to work. Makes sure group is efficient.</td>
</tr>
</tbody>
</table>
### Table A2: Role Nominations: Number of Nominations for Student by Role  
(all names have been changed)

<table>
<thead>
<tr>
<th>Student</th>
<th>Recorder</th>
<th>Chairperson</th>
<th>Interpreter</th>
<th>Opinion/Idea Gatherer</th>
<th>Big Picture Tracker</th>
<th>Creative Resource Person</th>
<th>Total Nominations</th>
<th>Self-Nominations*</th>
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<tr>
<td>Kyle</td>
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<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>8</td>
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<td>Hannah</td>
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<td>1</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>1</td>
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<tr>
<td>Brandon</td>
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<td>2</td>
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<td>0</td>
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<td>0</td>
<td>5</td>
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</tr>
<tr>
<td>Chris</td>
<td>1</td>
<td>1</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
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<td>Nathan</td>
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<td>0</td>
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<td>0</td>
<td>3</td>
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<tr>
<td>Anick</td>
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<td>0</td>
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<td>3</td>
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<td>Anne</td>
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<td>4</td>
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<td>4</td>
<td>0</td>
<td>0</td>
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<td>Christy</td>
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<td>1</td>
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<td>0</td>
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<td>0</td>
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<td>3</td>
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<td>0</td>
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<td>1</td>
<td>4</td>
<td>2</td>
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<tr>
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<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>n/a</td>
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<tr>
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<td>4</td>
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<tr>
<td>Quentin</td>
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<td>1</td>
<td>0</td>
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<td>1</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Erin</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
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<td>0</td>
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<td>5</td>
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<td>Theresa</td>
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<td>0</td>
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<td>Wendy</td>
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<td>1</td>
<td>1</td>
<td>2</td>
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<td>0</td>
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<td>1</td>
</tr>
</tbody>
</table>

* Self-Nominations: Student or student's own group nominated him or herself.  
N/A indicates where this information is unknown. Names have been changed
Appendix D
Planning for Needs & Preferences*

Learning goals
Students will be able to differentiate between a need and a preference. They will
describe with some complexity the relationship between a designed space and
individual needs and preferences, emotions and behaviour. Students will recognize
that identifying personal needs and preferences is one style of investigation and one
strategy for developing a problem-solution for design problems.

Concepts & Skills
A place should be designed to meet as many different people's needs and preferences
as possible.

1. needs: some are basic and universal, such as food or sleep. others
are more personal and psychological, such as a need for belonging and
acceptance.
2. preferences: "likes" and "dislikes". these relate to needs, because
doing things we like help us to fulfil certain needs, such as self-esteem
and feelings of success. Another way of defining preferences is the
personal choices we make to help satisfy our needs.
3. both needs and preferences are individual, but they are also common
among people participating in certain kinds of activities and programs.

Implementation
1. 20-30 minutes. Ask students to take out a piece of lined paper and read instructions
(see Appendix). Repeat instructions as needed and pace them to give students
adequate time to follow them.
2. Role of teacher. Make certain that everyone understands each step of instructions,
and has sufficient time to complete each task. When not reading instructions,
circulate around class to help students stay on task, come up with ideas.
3. Strategies. Facilitate alternating between independent and shared learning. Have
desks already in an arrangement that supports both individual and small group
activities. Suggest a method for pairing-off, for example, "the person beside you."
Encourage students to help each other but NOT to tell right away everything they are
writing down.
4. Facilitate interactive discussion in order to integrate new concepts with problem
task. Ask students to relate their learning to the problem of redesigning the
playground. Remind them that they are responsible for planning changes for the
school playground. Ask them to imagine how different grade eight's and
kindergarten's needs and preferences must be. Ask students to identify some issues or
problems in planning a playground that fits everyone's needs and preferences.

(* The discovery activity is adapted from Simon, Howe & Kirshchentaun. (1972,
Strategies for Teachers and Students. New York: Dodd, Mead & Co.)
Teaching Materials

Read Aloud Instructions:
1. Take a lined sheet of paper, fold it in half lengthwise. Write the numbers 1 to 20 down the right hand side of the crease.
2. On the right hand side, list 20 things you like to do. Write them in any order as they occur to you. (Suggestions: They can be big things or little things. They can be things you do by yourself or with other people. Think in terms of the different seasons of the year. Think of things you do in different places.)
3. Once the list is done, choose your favourite activity and write "1" beside it on the left-hand side of the crease. Choose your next favourite, and write "2" beside it. Choose your next three favourites, and write "3", "4" and "5" beside them in the order of their importance to you.
4. Compare your favourites with the favourites of other people in your group. How many do you share? Which activities are only on your list? Which are the most popular activities?
5. Using your own list of 20 favourites, code activities in the following ways:
   * Write "A" beside those activities which you do alone.
   * Write "S" beside the things which you would NOT have enjoyed 5 years ago.
   * Write "GB" beside the things which in your opinion girls and boys could enjoy equally.
   * Write "R" beside activities which involve some kind of risk.
6. Discuss your list in pairs or small groups. (Suggestions: How many activities are coded "-S", "GB" (girls and boys)? Which activities do you consider to involve some risk? Does everyone agree with your coding? What do the codes reveal about the different kinds of people in your group? How many of these activities might be things you would like to do on your school's playground?
7. Finally, code your activities with an "N" for "need" and "P" for "prefer." What is the difference for you between a need and a preference?
### Table A3: Results of Analysis of Our Play Preferences

<table>
<thead>
<tr>
<th>Activity</th>
<th>Racing/Running</th>
<th>Playground Play (Sliding, Climbing, Swimming)</th>
<th>Tag</th>
<th>Relaxing/Delaydreaming</th>
<th>Skipping &amp; Hopscotch</th>
<th>Soccer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can you do it now on our playground?</td>
<td>Yes</td>
<td>Sometimes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Do Girls &amp; Boys Enjoy it?</td>
<td>Both</td>
<td>Both</td>
<td>Both</td>
<td>Both</td>
<td>Both</td>
<td>Both</td>
</tr>
<tr>
<td>(Girls/Boys/Both)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do it Alone or with Others?</td>
<td>Others</td>
<td>Both</td>
<td>Others</td>
<td>Alone</td>
<td>Both</td>
<td>Others</td>
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<tr>
<td>(Alone/Others)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Year-Round Activity?</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>(Yes/No)</td>
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<td></td>
<td></td>
<td></td>
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</table>
## Appendix F

### Table A4: Results of New Ideas for Our Playground

<table>
<thead>
<tr>
<th>Loose Materials</th>
<th>Installed Equipment</th>
<th>Conveniences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binoculars</td>
<td>balance beam</td>
<td>benches</td>
</tr>
<tr>
<td>Bookshelves</td>
<td>bridges — tire, chain</td>
<td>bike racks</td>
</tr>
<tr>
<td>Games</td>
<td>climbers</td>
<td>clock</td>
</tr>
<tr>
<td>Globe</td>
<td>crawl tubes</td>
<td>drinking fountain</td>
</tr>
<tr>
<td>Gong</td>
<td>fireman's pole</td>
<td>microphone</td>
</tr>
<tr>
<td>Mini ball pit</td>
<td>jungle gym</td>
<td>storage</td>
</tr>
<tr>
<td>Mirror</td>
<td>ladder</td>
<td>tool shed</td>
</tr>
<tr>
<td>Paint easels</td>
<td>merry-go-round</td>
<td>tables</td>
</tr>
<tr>
<td>Pulleys</td>
<td>monkey bars</td>
<td>talk tubes</td>
</tr>
<tr>
<td>Sandbox</td>
<td>pulley glide</td>
<td></td>
</tr>
<tr>
<td>Tent</td>
<td>ramps</td>
<td></td>
</tr>
<tr>
<td>Water centre</td>
<td>rings</td>
<td></td>
</tr>
<tr>
<td>Wheeled toys</td>
<td>slide built into hill</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stairs</td>
<td></td>
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<tr>
<td>Activity Zones</td>
<td>swings</td>
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</tr>
<tr>
<td>Baseball diamond</td>
<td>teeter totter</td>
<td></td>
</tr>
<tr>
<td>Basketball courts</td>
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<tr>
<td>Building area</td>
<td>trampoline</td>
<td></td>
</tr>
<tr>
<td>Digging centre</td>
<td>tube slide</td>
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</tr>
<tr>
<td>Garden</td>
<td>twisty slide</td>
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</tbody>
</table>

| Long jump pit             | Site Renovations               |                      |
| Obstacle course           | covered area                   |                      |
| Quiet reading area        | doors                           |                      |
| Sand & water centre       | running track                  |                      |
| Soccer field              | trails                          |                      |
| Storage                   |                                |                      |
| Track & field             | Landscaping                    |                      |
| Treehouse                  | border plants                  |                      |

|                              | butterfly garden               |                      |
|                              | flowers                         |                      |
|                              | garden                          |                      |
|                              | grass                            |                      |
|                              | hills & berms                   |                      |
|                              | pond                            |                      |
|                              | river                           |                      |
|                              | trees                           |                      |
Appendix G
Planning for Group Investigation

Learning goals
Children begin to plan their own investigations by choosing subtopics suggested by teacher. Planning activities incorporate the four-question model for problem solving and the six stages of investigation of Group Investigation. As well, new theory on the five planning considerations of good design is learned by the children and used to help plan their investigations.

Concepts & Skills

I. Six Stages of Group Investigation
1. Class determines topics and subtopics and forms groups.
2. Groups plan their investigations.
3. Groups carry out their investigations.
4. Groups plan their presentations.
5. Groups make their presentations.
6. Class reflects on work and learning.

II. The Four-Question Model for Problem Solving
1. What do we know already?
   What else do we know?
   Who hasn't said anything yet?
2. What do we need to know/want to find out?
   Is there another way of saying it?
   What do we want to do in the end?
3. How can we find out?
   Are there other choices?
   What are the plusses?
   What are the minuses?
4. How will we know and show when we get there?
   Is there anything we forgot?
   Is this enough information?
   Should we ask for another opinion?

III. Five Good Planning Considerations*
1. Program: What is the main purpose of the changes to the playground? What needs are being met? Whose preferences? What are the choices to be considered?
2. Materials: Safety, durability, appeal must all be considered in selection, as well as cost.
3. Site: Think about the effects of weather and climate on activities. What are the existing site conditions, such as plants & features, soil conditions, topography?
4. Budget: How much money and time is available?
5. Human Resources: Who are the experts in the community? Who are the decision-makers? Who are the stakeholders?
Teaching Materials [Posters]

Site: Your Questions
Where to put it?
Do we have enough room?
How big can our playground be?
How much space will it take up?
How will we face the consequences of weather?

Materials: Your Questions
Will the playground be safe?
Is there enough supervision for pools, etc.?

Budget: Your Questions
How much money do we need?
What will be the price of equipment?
How will we get the money?
How long will it take?

Program: Your Questions
What do kids want to do on the playground?
Will the kids enjoy the playground?
Is it appropriate, fun, popular?

Human Resources: My Questions
Who is affected by changes to the playground?
Who has decision-making power?
What are the problems that people report?
Who would benefit from changes?
Are the experts in the community?

More Questions... 
What alternative kinds of playgrounds exist?
Are there schools in Windsor that you could visit?
How could the playground be friendlier to the environment?
What changes to the playground would support play and development?
### Appendix H
**Results: Dream & Design**

#### Table A5: Comparison of Groups for Inclusion of Play & Development Considerations

<table>
<thead>
<tr>
<th>Group</th>
<th>Physical Development</th>
<th>Social Development</th>
<th>Emotional Development</th>
<th>Intellectual Development</th>
<th>Spiritual Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>xx</td>
<td>x</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>xx</td>
<td></td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
<td>xx</td>
<td>xx</td>
<td></td>
<td>xx</td>
</tr>
<tr>
<td>Group 4</td>
<td>xx</td>
<td></td>
<td>xx</td>
<td></td>
<td>xx</td>
</tr>
<tr>
<td>Group 5</td>
<td>xx</td>
<td>xx</td>
<td></td>
<td></td>
<td>xx</td>
</tr>
<tr>
<td>Group 6</td>
<td>xx</td>
<td>xx</td>
<td>xx</td>
<td></td>
<td>xx</td>
</tr>
</tbody>
</table>

Somewhat supports  
Very much supports  

#### Table A6: Scale of Realism

<table>
<thead>
<tr>
<th>Reasonable (possible or creative solution)</th>
<th>Fantasy (desirable but not likely)</th>
<th>Unreasonable (silly or impossible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>Group 3</td>
<td>Group 5</td>
</tr>
<tr>
<td>Groups 2 &amp; 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Table A7: Comparison of Groups for Play Appeal Considerations

<table>
<thead>
<tr>
<th>Group</th>
<th>Appeals to What Age Group?</th>
<th>What Kinds of Activities does Playground Support?</th>
<th>What is the Most Interesting Idea?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>All</td>
<td>Mall, cinema, money tree, jet ski, food court</td>
<td>Mall</td>
</tr>
<tr>
<td>Group 2</td>
<td>Grades 4 &amp; up</td>
<td>Bungee jumping, virtual reality, helicopter airport</td>
<td>Everything</td>
</tr>
<tr>
<td>Group 3</td>
<td>All</td>
<td>Slides, animals, pool</td>
<td>Wildlife</td>
</tr>
<tr>
<td>Group 4</td>
<td>All</td>
<td>Trampoline, Silver City, black holes, go-cart rentals</td>
<td>Silver City</td>
</tr>
<tr>
<td>Group 5</td>
<td>Grades 3 &amp; up</td>
<td>Pulley system, maze, pool, trampoline</td>
<td>Pulley system</td>
</tr>
<tr>
<td>Group 6</td>
<td>All</td>
<td>Snow forts, hopscotch, skipping, race track area</td>
<td>Tie fighter</td>
</tr>
</tbody>
</table>
Appendix I
Playground Presentations [hand-out]

Expectations:
Everyone in the group takes a turn talking during the presentation.
Your group decides together on the answers and writes them in the space provided
(point form is okay).
Your group stays on focus for planning your presentation for 20 minutes.

Choices:
If you don't like the questions, make up your own then answer them.
Decide how you will make your presentation interesting for others.
Make up one or two questions to ask other groups.

Questions:
1. Explain you design.

2. Which age group would use and enjoy your playground the most (Circle One)?
   Why?
   K-1  Grades 2-3  Grades 4-5  Grades 7-8

3. What are two play needs that your playground supports? How?

Our Questions for Other Groups:
1. 

2.
### Appendix J

**Table A8: Sample Results of Playground Observations**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Activity</th>
<th>Number of People</th>
<th>Girl/Boy</th>
<th>Age Group</th>
<th>Notes</th>
<th>Observers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Basketball</td>
<td>23</td>
<td>G/B</td>
<td>Primary</td>
<td>Mostly boys (only two girls).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fighting</td>
<td>20</td>
<td>Boys</td>
<td>Juniors</td>
<td>Boys fighting very hard. 3 boys were pushing each other down. 2 boys were fighting over court lines.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skipping</td>
<td>19</td>
<td>G/B</td>
<td>Primary</td>
<td>Girls and boys were cooperating.</td>
<td>Brandon, Quentin, Curtis, Kelly*</td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>6</td>
<td>G/B</td>
<td>Senior</td>
<td>2 Girls were chasing 1 boy.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hop Scotch</td>
<td>15</td>
<td>Girls</td>
<td>Primary</td>
<td>6 hopscotch games. Sometimes hard to take turns.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Basketball</td>
<td>33</td>
<td>G/B</td>
<td>Junior/Senior</td>
<td>Mostly senior boys. Soccer on court. Playing rough. 3 girls &amp; 1 boy playing four corners.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Talking/ socialising</td>
<td>24</td>
<td>Girls</td>
<td>Junior/Senior</td>
<td>Loud. Talking about suckers. Teacher talking to people in trouble</td>
<td></td>
</tr>
</tbody>
</table>

* names have been changed
Interpreting Results: Finding Patterns in Playground Observations [Hand-out A]

Expectations
• work so that everyone contributes ideas
• choose (or make up) 2 questions that you would like to answer
• record your answers
• stay on task and keep track of time
• You have 10 minutes to work

Decisions/Choices
• decide how your group will work together
• choose which questions are most interesting OR invent your own
• decide what is the best way to present your answers
• decide what you group thinks is the most interesting point about the playground observations

Some Suggestions for Finding Patterns
1. Compare the different charts for two main zones (Primary versus Blacktop, for example):
   Compare the number of different activities in each zone.
   Compare the age range of students in each zone.
   Compare the number of girls and boys for different activities.

2. Identify the most popular activities:
   Which seems to be the most popular activity in each zone?
   Which seems to be the most popular activity overall?
   Which seems to be the most popular activity with boys? Girls?
   Which seems to be the most popular activity for seniors? Juniors?

3. Comment on the Notes and the way observations were made:
   Are there some activities that are coded separately but that you think are really the same kind of activity?
   Are there some coding categories that seem too big because they show a lot of different kinds of activities?
   Did the notes help you understand better?
Interpreting Results: Deciding What Our Observations Mean [Hand-out B]

Brainstorming Expectations:
- everyone shares an idea
- all ideas are accepted
- it's ok to repeat ideas
- not everyone is going to agree
- record in point form

Brainstorming Decisions/Choices
- decide how to arrange your group and where to sit to make talking easier
- decide a fair way to make sure each person has a chance to speak
- decide who will be recorder
- take turns choosing questions to answer (or making up your own)

Suggestions for Brainstorming about What it All Means
1. Think about the way we made our observations:
   What made it hard to count activities?
   Does it matter that different people observed different things?
   What improvements would you suggest to the observation sheets?

2. Think about whether or not our results seem true and fair:
   If you had to guess, would have guessed the same patterns and activities
   would be observed?
   Did we observe all activities or only certain kinds?
   Do you think we would get the same results at another recess?

3. Think about what should happen next in the Playground Project:
   Do we have enough information?
   What are the most important things we have learned so far about playgrounds?
   How should we pull all our learning together?
Appendix K
Research Report on the Playground Project by 4R

April 27, 1998

Karen McRorie
507 Cameron Avenue
Windsor, Ontario
N9B 1Y9

Grade 4R & Mrs. *

Dear 4R and Mrs. *,

Thank you so much for all the time and effort you put into the Playground Project!

Every day you surprised me and taught me something about the way kids learn and communicate with each other. I collected over one hundred pages of observation notes that described what happened! I am now at the stage in my research that it is time for me to answer question four (How will I know and show what I found out?). I don't know how I am going to be able to talk about all the things that seem important to us.

I am very proud to think that your ideas will be used by Mrs. % and the Action 2001 Committee in their playground planning. I hope you are too.

I will be very interested to find out about any changes to the school yard that happen over the summer or next year. Good luck for the best kinds of changes!

Sincerely,
Karen McRorie
Think About Everything You Learned

You practised a lot of different skills in your groups. Some of these include co-operation with others, managing conflict and solving problems. I shared some new strategies with you, like group roles and the four-question approach to problem solving. In the process, you also learned about different research methods.

Here are just some of the skills you practised:

Communication Skills
- work in groups
- listen actively
- ask questions
- learn and use new vocabulary
- identify and present new ideas
- describe events
- negotiate
- give feedback
- present reports

Reading & Research Skills
- select resource materials
- review resource materials
- interpret charts
- read and create maps
- use coding and point form
- observe & report behaviours

Thinking Skills
- use a problem-solving model
- test possible solutions
- identify main ideas
- pull together information from different sources
- find patterns
- compare and evaluate plans
- plan
Group Skills

Co-operation with Others and Managing Conflict

You were practising co-operation everyday because each activity asked you to work in a group. I noticed that you developed different strategies for working together.

Here are some of the co-operative strategies I saw you use:
- used Recorder and Interpreter roles
- divided the work up for individuals and pairs
- put big decisions to a vote
- gave each person choices and responsibilities
- acted as Interpreters for each other
- took turns with the resources
- built upon each others' ideas

Some of the things I noticed that you could improve on are:
- Chairperson Role was not used very well. The Chairperson is not "the Man" and shouldn't make decisions alone. The Chairperson's most important job is to make sure everyone is participating by asking for their input.
- Girls and Boys didn't work together well. I noticed that in some groups, the girls ganged up together against the boys, and in other groups, the boys blocked out the girls. I wonder why this happened?
- You had trouble settling disagreements. Did you notice how often Mrs. Rivait or I had to step in and help you resolve conflicts? A goal should be to improve your conflict management skills.

Conditions for Co-operation

I discovered that a co-operative attitude was really put to the test when activities were open-ended (no easy answer or more than one answer).

Remember how hard it was during "Designing the Classroom"? You didn't know what to do with the four-question model. You got frustrated and got off topic. You also put each other down more.

It was difficult for you to co-operate when the stakes were high.

Remember how much time you spent debating what should go into your Dream & Design plans? In this activity, everyone wanted his or her ideas on paper but only one person could draw at a time, and there was only so much space for ideas.

I think your most successful day of co-operating was when we made our playground observations at recess.

Maybe this was because you worked in teams of two instead of four. You all listened actively when the teams presented their data after recess.
New Strategies and Models

Group Roles

By the end of the project, you all knew what a Chairperson was supposed to do and how that role is different from being the Recorder. We also talked a lot about the Interpreter role and the Big Picture Tracker. We didn't talk as much about the role of Creative Resource person, so I don't know whether you found it to be a useful role.

The hardest role seems to be the Chairperson role because I didn't see any groups use it. Whenever I came to visit your groups, you were all trying to talk at once and make the others listen to your ideas. This is why the classroom got so noisy! A Chairperson should act like a referee, making sure everyone is getting his or her turn to talk and that the group listens to everyone's ideas.

Recorders improved their skill at writing fast. I think you understand the difference between taking form notes and writing up "good" reports with perfect spelling and grammar. One thing to remember, the Recorder should write down ALL ideas, not just the ones that you find interesting.

Interpreters seemed to help to solve conflicts. I think most of you played this role at some point. The Interpreter was usually someone who wasn't part of the disagreement, but could explain the problem for the people that were. This helped to identify solutions to the arguments and conflict.

Big Picture Trackers sometimes reminded the group when it was getting off focus or was spending too much time on just one question — sometimes, but not often enough!

Who were the Creative Resource People? Everyone. I think maybe this can't really be called a role because everyone contributed ideas and was creative in some way. Something I learned from you is to change the description of this role next time.
Four-Question Model of Problem Solving

What do we know?
What do we need to know and/or want to find out?
How will we go about finding out?
How will we know and show when we get there?

You learned this model for problem solving. You can explain what each question represents in the order of problem solving. We talked about this model for everyday problems. We used it from time to time to see where we were in the Playground Project. I used it to talk to you about some of the things I was thinking about for my own research, too.

When I asked you to use this model to plan your investigations, it was hard. I learned from you that I should be more specific when I give directions. I should give more examples, and more chances to practise with the new model. I should let you know more often what I expect from you. I should check with you what you expect from yourselves.

Research Methods

You learned what a method is and we explored a lot of different methods of gathering information. We didn't get as far in our research as we wanted to, but we talked about the importance of reporting what we did learn. You are starting to understand the relationship between research methods and the quality of information.

Here are some of the things you said that showed me this:

- A method is how you go about finding out what you want to know.
- Kids fight more during afternoon recess than morning recess, so we should make our observations again at different times to see if they are still the same.
- We should switch zones and observe for smaller zones because it was hard to code everything that was going on.
- We should look in playground books.
- We should think about cost, safety and materials.
- We should think about whether there is enough space and where we should put the playground.
- We should present out ideas to Mrs. Arbour. How will we be sure the adults think our ideas are any good?
New Concepts & Theories

Concepts
We talked about the difference between opinions and facts. Then we talked about the value and quality of different information. You are also starting to think about the different values of reality and fantasy when you are planning. This is very sophisticated thinking.

Here are some of the things you said that showed me this:

- We should get other kids' opinions and not just our own.
- Maybe instead of being very realistic, our playground ideas should be somewhat realistic.
- We need to think about where to draw the line between reality and fantasy and silly.
- We want it to be realistic, but different. We could look at other playgrounds or books for ideas that are different but realistic.
- We should do another Dream & Design but make it more realistic but still fun.

Theory of Developmental Needs and Play
You learned a theory very early in the Playground Project. Then you began to apply it to your thinking and your playground plans. In learning about the five developments and play, you learned the difference between social and emotional development, and between intellectual and spiritual needs. That is amazing! Some adults still don’t know the difference.

Here are some of the things you said:

- Emotional development could be when you climb a tree and you feel really proud. It could also be if you don’t do as well as you thought you were going to and feel upset.
- Social development is getting along with your friends, using your people skills, and meeting new people.
- For spiritual development, it should be "you feel wonder" not "you wonder" because wonder is more intellectual development like "to think about."
- Spiritual development is like how I feel when I am at my parents' cottage and sitting on the dock just looking at the water.
- An example of spiritual development is when I am riding my bike and I feel the wind on my face.
- We noticed that there is a lot of physical development on our playground, but not much spiritual.
- There should be a balance of all the developments for the playground to be realistic and fun.
What Kinds of Learning Seemed to Suit you Best?

Here are a few interpretations about your learning preferences I made from watching you work:

- **You prefer working hands-on.** The most popular activities were Dream & Design and the Playground Observations.
- **You don't like planning activities and finding them difficult.** You didn't see the connection between planning your investigations, and doing the "real" Playground Project.
- **You prefer talking to writing about things.** When you had to stop to write, your ideas weren't as creative as when you just discussed.
- **There should be choices about how you report your ideas.** Some of you were much better at drawing out your ideas and some of you were better at writing them. Some of you are outstanding public speakers.
- **You can interpret a variety of print information.** When I gave you charts to fill out, you did a good job and the categories got you thinking in new ways. You could read information from charts very easily and find patterns going across and down.
- **Instructions and questions should be clear and specific.** When I gave you specific questions to answer, that was easier for you then when I asked you to come up with your own questions.
- **You work better in smaller groups and in groups that you pick.** The times that you could choose who you worked with, you worked better for the most part.
- **With a little structure, you can be pushed!** You usually came out with your most interesting ideas when we were all working as one big group, with an adult asking challenging questions. You listened to one another and built upon each other's ideas to create some really original and valuable suggestions.
Appendix L

Play and Playground Design Program Suggestions

Children should know more about play and playgrounds. Why? Children are the principal users of playgrounds, and therefore their ideas about building them count. Playgrounds are also one of the first public spaces which children encounter. The school playground can provide an informal and immediate case study of community issues and community participation. Expanding from their own immediate experiences, children can learn about the relationship between individual needs and community values, and the design of spaces and systems. Furthermore, children can become part of a meaningful debate about how a public space is used and participate in real ways in solving community issues.

A study of playgrounds can cover the curriculum extensively, and teachers are encouraged to incorporate language and visual arts, as well as maths and sciences. For example, the lesson, "Observing Our Playground," can support a math unit on tallying. However, the main emphasis here for curriculum development is social studies with communication and problem-solving skills being repeatedly reinforced through the suggested activities. The curriculum links suggested for each lesson correspond with the 1997-8 version of The Ontario Curriculum. More generally, the activities are supportive of a social constructivist approach to teaching and learning.

The set of lesson plans makes use alternately of direct teaching and inquiry/discovery methods. It is assumed that for inquiry learning, a variety of teaching methods should be used according to learning needs. The order of the lessons suggests one possible sequence for presenting students with information about playgrounds. It may not be necessary to present all or even any of the suggested lessons in a class-wide study of playground design and development.

The amount of time that a teacher should plan for a playground project should be generous. Start early in the year and set aside one or two hours each week for playground studies, rather than trying to cram the study into a couple of weeks. One practical reason for this is that most school libraries do not have a lot of resources for the study and so collecting materials takes time. The students should be part of the resource-development effort, writing and emailing away for commercial catalogues and other information. Included in this unit is a list of possible leads for acquiring resource material.

This set of program suggestions was developed from working hands-on with junior level children over several months. The lessons that follow have been developed in a junior level classroom and are probably most appropriate for that age. There are very few published resources on play and playground design aimed at a young audience. Hopefully, this set of lessons begins to address that gap.
### Play and Playground Design Activities

<table>
<thead>
<tr>
<th>Lesson Plans</th>
<th>Support Activities, Handouts &amp; Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why is Play Important?</td>
<td>What is Play?</td>
</tr>
<tr>
<td></td>
<td>Why is Play Important?</td>
</tr>
<tr>
<td></td>
<td>How do We Learn in Play?</td>
</tr>
<tr>
<td></td>
<td>Play is a Right!</td>
</tr>
</tbody>
</table>

#### Dream & Design

**Play & Development**

- Play is Important for Growing

**Evaluating Playgrounds**

- Age Groups & Development
- Scale of Realism
- Comparing Dream & Designs (Example)

**Needs & Preferences for Play**

- Preferences for Play
- Our Play Preferences (Example)

**Observing the Playground**

- Observation Sheet
- Results Chart (Example)

#### Site & Environment Concepts

**New Ideas for Our Playground**

- Some New Ideas (Example)
Assessment

Self-Assessment
Student tests own understanding of new ideas and concepts by being able to explain in own words, provide examples, suggest counter-examples, apply concepts and theories to new situations and experiences. Ability to follow instructions, stay on task and focus on observations will be reflected in the quality of student work. Students will get a sense of their relative efforts and performance when sharing and giving feedback to each other.

Peer Assessment & Feedback
Students working on similar assignments will naturally compare their work to others. The hope is that they do this in positive ways, by borrowing good ideas, or being motivated to put more effort and thought into their design. Students should have a chance to present their work to their peers, presenting to entire class or to small group. Students practise giving feedback to each other, rephrasing ideas, identifying main points, and suggesting improvements.

Teacher Assessment
During reflective class discussions and group work, the teacher is engaged in on-going observation and formative feedback. The teacher can easily assess how carefully students are listening and following directions by wandering through classroom and observing their work. Listen for students' ability to recall and repeat definitions and theories, to provide examples, to apply them to new situations. Listen and observe for students integrating knowledge with other problems and tasks that arise. Request children's explanations of own work, or justification of choices.

Communication Skills: Listen and observe for students co-operating on task, volunteering ideas, giving feedback, encouraging each other.

Lower- and Higher-Level Thinking Skills: Ask groups to report on what they talked about, listening for whether students are able to integrate concepts, relate concrete findings from exercise to big picture problem of planning playground.

Investigative & Research Skills: Observe students using materials strategically, for example, scanning table of contents and indexes. Listen and observe also for ability to translate visual information into verbal, to explain and ask questions. Assess facility to interpret and use maps, charts, catalogues, indexes, and diagrams.
Lesson

Why is Play Important?

Learning Goals
The main purpose of this activity is to generate interest and curiosity about the new unit on play and to start the class thinking about play in a social and developmental context.

Students discuss how play is important for children’s health and happiness. They share and compare how play is important for each of them. They learn about the right to play and the reasons why adults are so interested in promoting play. They reflect on cultural differences in play and different opportunities for play in different societies.

Concepts & Skills
1. Definitions of play may vary. Therefore students must distinguish between personal definitions of play and "what's fun" and broader, categorical distinctions. Some general characteristics of play include: it is fun, it is the opposite of work, we choose to do it, people of all ages can do it, can be alone or with others.
2. Play is a kind of learning by experiment. We discover new things and try to master new skills when we play. All young animals play in order to practice skills that are important for survival.
3. Play is a right. A right is something that all humans should be able to do or have no matter what.

Curriculum Links
1. Health & Physical Education: Healthy Living, Active Participation
2. The Arts: Creative Work, Critical Thinking
3. Language Arts: Oral & Visual Communication
4. Social Studies: Heritage & Citizenship

Time & Materials
1/2 hour.
Teacher-made and commercial posters for visual aids.
Overhead transparencies, chart paper & markers, or chalk & blackboard for recording brainstorming ideas.
Pens & paper for small group discussion.

Implementation
1. Begin discussion with a question or series of open-ended questions that are intended to generate ideas about play (these can also be written down for visual learners). For example: What is play? Who plays? Why is play important? What do we learn when we play? How do we learn when we play?
2. Class-wide discussion occurs on each question. The important thing is not to get through all of the questions or material, but to shift students' thinking so that they are valuing play and questioning why they play, what they play, how, where, when.
3. If class-wide discussions usually result in the same students answering questions,
then the teacher might want to break class up into Think-Share-Pairs or small discussion groups.

4. For older classes, more specific questions can be assigned to each group to develop some ideas to report back to the rest of the class. This helps the class cover a broader scope of ideas and issues in a short period of time.

Additional Activity Suggestions

Students may:
1. interview different ages of students in the school for their answers to the same questions that the class has considered. Keep a collection of these answers in a project journal.
2. write reflectively about why play is important and what they choose to do in their free time.
3. get on the internet and survey other schools—especially those in very different climates or cultures and find out about how children play there.
4. ask adults in the community (principal, local politicians, moms and dads of toddlers) for their thoughts on play.

Teaching Materials:
What is play?

Play is not merely the passing of time.
Play is life.
It is instinctive.
It is voluntary.
It is spontaneous.
It is natural.
It is exploratory.
It is communication.
It is expression.
It combines action and thought.
It gives satisfaction and a feeling of achievement.

(Malta Declaration of the Child’s Right to Play, 1978)
Why is Play Important?

Children are the foundation of the world’s future.
Children have played at all times throughout history of all cultures.
Play, along with the basic needs of nutrition, health, shelter and education, is vital to develop the potential of all children.
Play is communication and expression, combining thought and action; it gives satisfaction and a feeling of achievement.
Play is instinctive, voluntary and spontaneous.
Play helps children develop physically, mentally, emotionally and socially.
Play is a means of learning to live, not a mere passing of time.

(From the IPA Declaration of the Child’s Right to Play, November 1977, September 1982, September 1989)
How do We Learn in Play?

Play is learning by doing.

Children learn by playing along with and alongside other children and adults:
games, sports, pretend play, dramatic play.
Children talk, cooperate, compete, imitate, obey, listen to, fight, share.

Children learn by playing with and alongside living things:
insects, birds, plants, small animals, pets.
Children collect, watch, care for, gather, arrange, imitate, identify, name

Children learn by playing in natural settings and different environments:
seasons, weather, temperature, gravity, landforms, vegetation.
Children feel, observe, experiment, adapt to, explore.

Children learn by playing in different kinds of spaces:
high places, low places, private spots, open fields, boundaries.
Children hide, climb, jump, run, follow, crawl, search, choose.

(Adapted from Rohane, 1981; Frost & Klein, 1979; Smilansky, 1968)
Play is a Right!

The child shall have full opportunity for play and recreation which should be directed to the same purpose as education; society and public authorities shall endeavour to promote the enjoyment of this right.

(The United Nations Declaration of the Rights of the Child, November 20, 1959)
Lesson

Dream & Design

Learning Goals
An added value of this activity is that students love it and so it is a great introductory activity. Students express their own ideas and preferences for a fantasy playground through drawing and diagramming on maps, plot plans, elevations or in essay form. While the complexity and integrity of the design is up to the individual student, there is opportunity for problem-solving social and space issues through the designs. (Unless the students are older or very advanced, this is not likely to be an outcome during a first run).

Concepts & Skills
1. Design concepts & techniques (Emphasis is on giving students ideas and techniques for drawing ideas rather than on mastering terminology): plot plan, elevation, cross-section, bird’s-eye view, scale, label, key or legend, compass, colour-coding, texture-coding.
2. Planning skills include brainstorming and discussion, point-form notes, researching for ideas, and bubble diagrams.

Curriculum Links
1. Social Studies: Understanding Concepts
2. Social Studies: Developing Inquiry & Research Skills
3. Health & Physical Education: Active Participation
4. Science: Developing Skills of Inquiry, Design and Communication

Time & Materials
At least 1-1/2 to 2 hours to satisfy junior-aged students. The activity may not hold the attention of younger as long.
Scrap paper and pencils for planning.
Large poster board for maps and plot plans, paper for side elevations, lined paper for writing.
Writing, drawing and colouring tools (pencils, markers, crayons, rulers, French curves, etc.).
Optional: Pre-drawn plot plans of the schoolyard. This changes the activity and grounds it somewhat in the limitations of reality.
Not recommended: Commercial manufacturers’ catalogues for cutting out (great to look at, but really limits creativity and intellectual effort). Also, students start to compete for materials. However, as reference sources these can help students lost for ideas.

Implementation
1. If students don't have any map-making experience, this activity might fit best in the context of a social studies lesson. The teacher may introduce a variety of the visual communication tools, such as keys and legends, titles, labels, compass directions. Architectural concepts of plot plan versus side elevation, and cross-
section diagrams can also be shown by example in a quick introductory lesson. Emphasis should be placed on showing students different tools and techniques, rather than mastering terminology.

2. Invite students to brainstorm on what kinds of elements they could include. This encourages planning before drawing, and improves the overall quality of thinking that goes into the Dream & Designs.

3. Encourage students to plan and/or make a rough draft before spending a lot of time drawing in details. Provide scrap paper and pencils. Have resources available for ideas.

4. A Think-aloud demonstration helps the students to link playground design choices to previous discussion about play. Model a simple playground design and explaining the reasoning behind it. A teacher’s model shouldn’t be too impressive to discourage students.

Additional Activities
1. "Dream & Design" may become a three-dimensional model, thereby presenting challenges in using different materials.

2. "Dream & Design" offers a great base to return to in talking about new concepts. Depending upon how comfortable students feel with more objective forms of assessment, their Dream & Designs can be evaluated according to criteria for good playgrounds (see "Evaluating Playgrounds"). Self-assessment rather than peer or teacher assessment is more appropriate in this case.

3. "Dream & Design" can be repeated at the end of the unit, if there is time. Invite the students to reflectively write or present on how their second design differed from their first and why they made those changes, as well as what components remained the same.

4. It also works as a group activity, with each group working in large scale on a plot plan of the playground or on a model. The group work is challenging, however, because students are excited by the activity and fiercely competitive over whose ideas are used. This covers a whole new set of social and co-operative skills.
Lesson

Play and Development

Learning Goals
Students are always fascinated to learn that play is essential for human (as well as animal development). They learn about five areas of development and provide examples and illustrations, and describe them in their own words or distinguish it from the others.
Students also practise map reading and map making skills.

Concepts & Skills
1. Play is important because it supports development or growth, especially during childhood. Play can support growth in five areas of development. Each of these areas is essential for overall growth. Children should play in different ways and in different activities so that they experience a balance of development. The five areas of development are:
   - Physical development: growing stronger, faster, better, able to do more things.
   - Social development: learning to co-operate, to be a team player, to play fairly.
   - Emotional development: feeling confident and successful, taking risks, and feeling proud.
   - Intellectual development: being curious, asking questions, solving problems, exploring.
   - Spiritual development: Feeling wonder, being close to nature & beauty, feeling calm.

2. Reading charts with columns and rows.

Curriculum Links
1. Health & Physical Education: Healthy Living, Fundamental Movement Skills
2. Social Studies: Heritage & Citizenship
3. Social Studies: Developing Inquiry & Research Skills

Time & Materials
Up to 3/4 hour (this is an enjoyable, interactive discussion for everyone that can easily be extended but the main lesson content can be conveyed in less than half an hour).
Large map or plot plan of the entire school yard, including playground.
Colour-coded key assigning one colour for each development.
Five differently coloured markers corresponding with key.
List and brief description of each developmental area written out on chart paper or blackboard for visual aid (these can be done colour code).

Implementation
1. Present the basic theory that play supports development and explanations of the five areas of development, using visual aids and giving one or two examples to
clarify each area.

2. Referring to the giant map of the school playground, the teacher quickly makes certain that the students recognise it and can read it. Point out the colour-coded key and review the relationship between the colour codes and the developmental areas.

3. Discussion now focuses on applying the theory to concrete experiences. Begin by identifying a play activity that has taken place on the playground. Ask students to suggest which of the five areas of development this activity supports. If more than one suggestion seems appropriate, ask the students to decide which development is the most supported.

4. Next, point to an area on the map that corresponds with the area of the school yard where the activity takes place. Choose the right colour of marker according to the key and mark an X on the map.

5. If necessary, repeat with more examples.

6. Students take turns describing a play activity they have enjoyed or seen on the playground, identifying one area of development it supports, and marking the map with the appropriate colour in the appropriate area.

Additional Activities

1. The basic key using colour-codes can be elaborated. Leave a lined piece of paper beside the large map with "Key" written on top. Let the students invent symbols that are personal to them with which to mark the map. Have them write their name and symbol in the key next to the map.

2. See next lesson.


Teaching Materials:
Play is Important for Growing and Development!

**Physical Development:** grow taller, stronger, faster, better

**Social Development:** learn to co-operate, rely on one another, work as a team

**Emotional Development:** feel important, unique, independent, in control

**Intellectual Development:** notice new things, ask questions, solve problems, explore

**Spiritual Development:** feel wonder, curiosity, beauty, desire, calm

Evaluating Playgrounds

Learning Goals
Students think critically about what makes a playground good. The purpose of this activity is to move students away from the Dream & Design, mostly fantasy pleasures of playground design. They are now asked to think about playground design as meeting needs and solving problems. To do so, they review the five developmental areas of play and discuss each area as criteria for good playground design. Students learn terms associated with community ownership and use of a public space, and volunteer examples from their community of how different people's needs come into conflict.

Concepts & Skills
1. Play and developmental needs (review).
2. Community use of a space.
   **Stakeholders:** all the people who have something to gain or lose depending on how the space is used. Children, parents, principal & teachers, custodians, neighbours, School Board members are all stakeholders in changing a school playground.
   **Users:** people for whom the space is developed and designed. Children are the users of a school playground.
   **Interest groups:** people with the same needs and wishes. Different age groups of children have different needs and wishes for their school playground. Boys may be a separate interest group than girls because they may have different play preferences.
3. Reading and using charts with columns and rows.

Curriculum Links
1. Social Studies: Heritage & Citizenship
2. Social Studies: Developing Inquiry & Research Skills

Time & Materials
1/2 hour to 40 minutes.
Colour markers and sets of colour markers or pencils for student use.
Giant map of school, marked with colour-codings.
Students' Dream & Design projects.
Charts or diagrams for new concepts (see examples).

Implementation
1. The teacher begins with a review of play and development theory. Refer to the map of the playground used for the previous lesson. In this lesson, as in previous, ask students to choose main area of development since many areas address more than one area.
2. When the map is quite full of colour-coded markings, it shows a lot about the nature of the existing school playground. The teacher can lead student interpretations by asking questions:
   Which colour is used most often?
   Which development does that represent?
   Why do you think that colour was used the most?
   What area of the map is most crowded?
   Why do you think that is?
   What colours don't appear on the map?
   Which development(s) do they represent?
   Can you think of a play activity that would support that kind of development?
   What would have to change on the playground so that you could do that?
   Looking at the map, what do you think could be improved or changed?

3. Follow-up by asking students to colour-code their Dream & Designs, giving them about ten minutes to do so. They could place colour-coded X's or plastic markers on each element of their designs. Once they have had opportunity to do this, ask them to talk about their Dream & Designs in relation to supporting a balance of development. Ask the same questions as listed above.

4. Present the new concepts of users, special interest groups and stakeholders. Explain with diagrams and examples.

5. Referring to the map, show where one of interest groups uses the school playground. For example, Kindergarten children use primary play equipment. Ask students to suggest which areas of development are being supported.

6. Referring to the chart (see below), mark with a check all of the areas of development that are supported in the column for Kindergarten.

7. Repeat with more examples as necessary and ask students to pick a special interest group and describe ways in which the areas of development are supported.

8. Assign students into small groups of two's and three's. Ask them to share their Dream & Designs and decide which interest groups can find something for them on the imaginary playgrounds. The teacher may give students copies of the "Comparing Dream & Designs" (see below) charts or let them create their own to record their evaluations.

Additional Activities
1. Another criteria of assessment for plans and ideas, rather than actual playgrounds, is realism. Realism (or more specifically, functionality) is the likelihood that an idea or design could actually take place in a given playground setting. It should be physically possible, as well as financially possible. It should also be appropriate for the social setting and likely uses of the playground.
### Age Groups & Development

<table>
<thead>
<tr>
<th></th>
<th>Physical Development</th>
<th>Social Development</th>
<th>Emotional Development</th>
<th>Intellectual Development</th>
<th>Spiritual Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td></td>
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<tr>
<td>Grades 1-3</td>
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<td>Grades 4-6</td>
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<td>Grades 7-8</td>
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<tr>
<td>Teachers</td>
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<tr>
<td>Other</td>
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</tbody>
</table>

### Scale of Realism

Where does your Dream & Design fit into the Scale of Realism? Think about whether it is physically possible in this world. Is it affordable? Is it safe? Would all adults and decision-makers approve? Would kids like it and use it?

<table>
<thead>
<tr>
<th>Very Realistic</th>
<th>Possible but with some Problems</th>
<th>Impossible</th>
</tr>
</thead>
<tbody>
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</table>
Comparing Dreams & Designs

<table>
<thead>
<tr>
<th>Group Name</th>
<th>What Age Group is Playground Designed For?</th>
<th>What Kinds of Activities does Playground Support?</th>
<th>What is the Most Interesting Idea?</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
Lesson Needs & Preferences for Play*

Learning Goals
This follow-the-directions activity helps to refine previous learning from "Play and Development" and "Evaluating" playgrounds. The main purpose is to help students differentiate between their own personal choices or preferences in play and the needs and requirements of children in general. Students follow step-by-step oral directions. They list their personal preferences for play, and then code and categorize them in a variety of ways. They compare lists of preferences through small group discussion and through some simple tallying procedures.

Concepts & Skills
There is a difference between a need and a preference. Needs are basic and universal (everyone has the same needs). For example, everyone needs food and sleep. Developmental needs are also basic and universal. Preferences are "likes" and "dislikes". Preferences are related to needs, because doing things we like helps us to fulfill certain needs, such as self-esteem and feelings of success. Another way of defining preferences is the personal choices we make to help satisfy our needs.

Curriculum Links
1. Language Arts: Writing
2. Language Arts: Oral & Visual Communication

Time & Materials
1-1/4 hour.
Visual aids prepare ahead with step-by-step instructions and with an example of how to fold and fill out exercise (see Teaching Materials).
Lined paper and pencils.

Implementation
1. Encourage students to help each other by arranging desks in small groups of three or four. Allow them to talk to each other when receiving instructions. Discourage too much off-topic chatter by giving the students time limits.
2. Read step-by-step instructions out-loud to students, pausing in order to make sure students know what they are supposed to do and to give students enough time to complete each step.
3. For younger students, adjust the length of the list they should write down, as well the number of coding categories they use.
4. After everyone has written their list, begin instructing students to code their lists. Encourage them to discuss with their group any questions they have about coding.
5. Allow for lots of time for discussion and students' suggestion for other ways of comparing and coding their lists.
6. After the follow-the-directions portion of the class is done, then introduce a mini-lesson on the difference between needs and preferences. Ask the students to provide examples of a personal preference and to identify one of the five developmental needs that this preference is related to.

Additional Activities
1. A follow-up class can make use of math concepts and learning how to read charts, columns and rows, as well as the statistical concept of frequency (see below). Older students will be able to report the findings from their group in chart form. Younger students are able to read teacher-made charts that report the findings from the entire class. Different column headings are possible besides the ones in the example provided.

2. The instructions can be used to as a model for gathering more information about play preferences among the student body. For example, the students may decide to gather information by interviewing different age groups and then comparing their answers.

Teaching Materials:

Preferences for Play

Read-Aloud Instructions:

1. Take a lined sheet of paper, fold it in half lengthwise. Write the numbers 1 to 20 down the right hand side of the crease.

2. On the right hand side, list 20 things you like to do. Write them in any order as they occur to you. (They can be big things or little things. They can be things you do by yourself or with other people. Think in terms of the different seasons of the year. Think of things you do in different places).

3. Once the list is done, choose your favourite activity and write "1" beside it on the left-hand side of the crease. Choose your next favourite, and write "2" beside it. Choose your next three favourites, and write "3", "4" and "5" beside them in the order of their importance to you.

4. Compare your favourites with the favourites of other people in your group. How many do you share? Which activities are only on your list? Which are the most popular activities?

5. Using your own list of 20 favourites, code activities in the following ways:

* Write "A" beside those activities which you do alone.
* Write "-5" beside the things which you would NOT have enjoyed 5 years ago.
* Write "GB" beside the things which in your opinion girls and boys could enjoy equally.
* Write "S" beside things which can be done only one season out of the year.
* Write "R" beside activities that involve some kind of risk.

6. Discuss your list in pairs or small groups. (How many activities are coded "-5", "GB"? Which activities do you consider to involve some risk? Does everyone agree with your coding? What do the codes reveal about the different kinds of people in your group? How many of these activities might be things you would like to do on your school’s playground?)

7. Finally, code your activities with an "N" for "need" and "P" for "prefer." What is the difference for you between a need and a preference?
### Our Play Preferences

<table>
<thead>
<tr>
<th>Activity</th>
<th>Votes</th>
<th>A Year-Round Activity? (Yes/No)</th>
<th>Do it Alone or with Others? (Alone/Others)</th>
<th>Do Girls &amp; Boys Enjoy It? (Girls/Boys/Both)</th>
<th>Where can you do it now?</th>
</tr>
</thead>
</table>
Lesson

Observing the Playground

Learning Goals
The purpose of this activity is to identify what really goes on during recess on the playground. Children will record and tally behaviours of all types as they observe them, and use field-notes to fill in the missing details later, then report and summarise their observations.

Concepts & Skills
Observations are records of things in real life that you see or hear or smell or feel or taste. They are things which one of your five senses tells you. They are not a record of what you think about something, how you feel or what you wonder. Those are interpretations.
1. A code is something that represents something else. It is usually a simple drawing, a word, or a short form just two- or three-letters long. It doesn't give all the information, but gets done the most important part of it.
2. Field-notes are used to explain what you see. They can be written while you are still "in the field" or soon after, before your forget. They should clear up any questions that the simple codes can't answer.

Curriculum Links
1. Mathematics: Data Management
2. Social Studies: Developing Inquiry & Research Skills

Time & Materials
1 hour (15 minutes before recess, 15 minute recess, 30 minutes following).
Map of playground.
Enlarged sample of observation form for filling out.
Class set of clipboards (or substitutes) & pencils.
Several copies of observation forms per clipboard.
Copy of map of playground with zones marked out per clipboard.

Implementation
1. Begin by describing the students' task to make observations of playground behaviours.
2. Explain the difference between observation and interpretation, demonstrate the difference between coding, which is fast and on-the-spot, and writing detailed notes, which is done soon after recess before forget what codes mean.
3. Present sample codes for the kinds of behaviour that are typical on the playground. Ask the students to suggest other useful codes or shorthand and write those on the sample observation sheet below the key. Remind the students that when they record, they can make up their own codes and later add them to the key when they are writing up their field notes.
4. Review the term "zone" and how it is used. Referring to the giant map, and using bubble diagram method, divide the playground into observation zones. There
should be enough zones so that each team of two students will have their own. Assign pairs of students to each zone, showing them on the map. Hand out clipboards and pencils.

5. Go outside 5 to 10 minutes before the recess bell so there is enough time to ensure every team knows exactly where their zone is. Have the teams walk around the boundaries of their zone and make certain they understand they are to record only behaviour in that area. Remind teams that they will have time after recess to make field notes about what they saw.

6. Student teams observe and record behaviours for the entire recess.

7. After recess, student teams return to class and immediately take 10 to 15 minutes to fill in field notes and add new codes to key. The class reconvenes for observation teams to report on some of their most interesting findings and to note any general similarities and differences in their findings.

Additional Activities

1. Consolidate the findings by recording them into charts (see example below). Ask students to interpret the charts.
   
   Compare two zones:
   
   Which one has more different kinds of activities going on? (Why do you suppose?)
   
   Does one zone have only girls or only boys? (Why?)
   
   Does one zone have only younger grades or only older grades? (Why?)

   
   For the entire playground:
   
   What is the most popular activity?
   
   What is the most popular activity for girls? for boys?
   
   What is the most popular activity for younger students? for older?

2. Repeat the observations for another recess at a different time of day and compare results to see if they are different.

Teaching Materials:
Observation Sheet

ZONE Observed: ___________________________  Date: ________________

Time (circle one):  morning  lunch  afternoon  recess  recess  recess

Observation Team: ____________________________________________

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of People</th>
<th>Girl/ Boy</th>
<th>Age Group</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>run = running</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>skip = skipping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bb = basketball</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>arg = arguing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Coding Suggestions

run = running  G = girl  K = kindergarten
skip = skipping B = boy  P = Primary
bb = basketball G/B = J = Junior
arg = arguing  both  S = Senior
## Results from Observations (Sample)

<table>
<thead>
<tr>
<th>Zone</th>
<th>Activity</th>
<th>Number of People</th>
<th>Girl/Boy</th>
<th>Age Group</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Court</td>
<td>Basketball</td>
<td>23</td>
<td>G/B</td>
<td>Primary</td>
<td>Mostly boys (only two girls).</td>
</tr>
<tr>
<td></td>
<td>Fighting</td>
<td>20</td>
<td>Boys</td>
<td>Juniors</td>
<td>Boys fighting very hard. 3 boys were pushing each other down. 2 boys were fighting over court lines.</td>
</tr>
<tr>
<td></td>
<td>Skipping</td>
<td>19</td>
<td>G/B</td>
<td>Primary</td>
<td>Girls and boys were cooperating.</td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>6</td>
<td>G/B</td>
<td>Senior</td>
<td>2 Girls were chasing 1 boy.</td>
</tr>
<tr>
<td></td>
<td>Hop Scotch</td>
<td>15</td>
<td>Girls</td>
<td>Primary</td>
<td>6 hopscotch games. Sometimes hard to take turns.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Laura, Erica, Jodi, Ken, Anne</td>
</tr>
</tbody>
</table>
Lesson

Site & Environment Concepts*

Learning Goals
This activity is designed to help students expand their vocabulary and their understanding of issues in design. Students learn design terminology and techniques. They apply previous learning about play and development and evaluating playgrounds to the discussion of new concepts of environment, site, zones, features, boundaries, and flow.

Concepts & Skills
1. An environment is more than just a place. A whole environment is made up of:
   - **zones**: areas which are designated for specific kinds of activities.
   - **features**: cultural and human features such as items, equipment or structures with special uses or purposes or effects; natural features such as vegetation, topography, climate.
   - **boundaries**: place where two zones touch; may be marked or invisible.
   - **circulation and flow**: describes where and how people move from one zone to another.
   - **aesthetics**: aspects of the environment which appeal to the person.

2. Bubble Diagram: a fast way of representing space, space use and relationships between spaces.

Curriculum Links
1. Language Arts: Reasoning & Organisation of Ideas
2. Language Arts: Communication

Time & Materials
1/2 hour to 40 minutes.
Markers and chart paper.
Pencils, pens, coloured pencils.
Large paper for group work.

Implementation
1. Begin with introduction to new concepts, explaining through brief examples.

2. Using the classroom as an example, make a bubble diagram to show the different zones and features. For example, the teacher's drawing might include:
   - **zones**: activity centres, cloakroom, teacher's work area, etc.
   - **features**: a.v. equipment, bulletin board, clock, blackboard, windows, doors, desks.
   - **boundaries**: physical walls of classroom, teacher's private cupboards.
   - **circulation and flow**: the paths people follow to come and go from classroom, sharpen pencils, talk with the teacher, etc.
aesthetics: colour of the room, plants, posters, content themes on bulletin board, music and noise, material and shape of desks and chairs.

The purpose of a bubble diagram is to show as many things as possible as quickly as possible. Things should be in approximately the right place, but it's not important to be exact. Labels and/or simple key can be used to help explain the drawing. The real purpose of the bubble drawing is to get ideas down fast.

3. Divide the class into small groups of two or three. Distribute large pieces of paper and drawing materials to each group. Tell the groups that their task is to make a bubble diagram of the playground and include as much information as possible about its zones, features, boundaries, circulation and aesthetics. Give the groups a time limit (15 to 20 minutes) so that they know they must work fast, reminding them that neatness and exact proportions are not important.

Additional Activities

1. Create a chart as a class to check how many groups included all of the considerations of environment (zones, features, aesthetics, etc.). Put the five considerations across the columns at the top and create a row for each group. After checking for each group, compare to see which column is most complete (which consideration is most popular), and which one is nearly empty (which consideration is overlooked).

2. Give students time to recreate their Dream & Designs by using bubble diagrams. Once again give them a time limit and remind them frequently of it to encourage them to get their ideas down quickly rather than focus on details.

Lesson

New Ideas for Our Playground

Learning Goals
The purpose of this activity is to stimulate students' imagination as well as dispell the stereotypes of what a playground has to be. Students will use at hand resources as well as find their own to develop a list of new and interesting ideas about playgrounds.

Concepts & Skills
There are many different kinds of playgrounds and some of them don't even have climbers and monkey bars at all.

Adventure playground: is a place where children of all ages build forts, walls, huts, tree houses, light campfires and cook fires, climb trees, dig, keep animals and gardens, put on plays and fairs, run cafes. An adult play leader supervises to help out and make sure everyone stays safe, but the children decide what to do.

Creative playground: is designed usually by adults. The landscape and equipment are designed to be used in many different ways, in many different activities. The idea is to incorporate a wide variety of activities and to support a balance of physical, social, emotional, intellectual and spiritual development.

Naturalised playground: is a place where children and adults work together to transform the traditional playground of asphalt and climbers back to nature. Trees, shrubs, wildflowers and grasses are planted and meadows and ponds are created. Gradually, the birds, bugs and animals native to the area will find their way on the playground too.

Curriculum Links
1. Language Arts: Reading, Writing, Oral & Visual Communication
2. Language Arts: Reasoning, Organisation of Ideas

Time & Materials
1 hour minimum.
Variety of playground resources from local library and classroom collection (see reference list below): video tapes, books, Internet access, trade magazines, manufacturer's catalogues.

Implementation
1. Teacher begins inquiry activities by introducing examples of unusual playgrounds and playground features, drawing from videos, books, magazines or examples of other local schools.
2. Students work in small groups of three or four, perusing materials and recording new and interesting ideas.
3. Groups summarise and present a few of their most interesting ideas to the rest of the class.

Additional Activities
1. Categorise new ideas according to five considerations of environment: new zones, new features, aesthetics, boundaries, and circulation.

2. Once class has created a set of favourite ideas, evaluate these for a balance of developmental areas, and for appeal to different interest groups.

3. Post a complete list of all the class ideas on bulletin board where students can refer to it for additional work.
Loose Materials
binoculars
bookshelves
games
globe
gong
mini ball pit
mirror
paint cases
pulleys
sandbox
tent
water centre
wheeled toys

Activity Zones
baseball diamond
basketball courts
building area
digging centre
garden
hopscotch
long jump pit
obstacle course
quiet reading area
sand & water centre
soccer field
storage
track & field
tree house

Installed Equipment
balance beam
bridges — tire, chain climbers
crawl tubes
fireman's pole
jungle gym
ladder
merry-go-round
monkey bars
pulley glide
ramps
rings
slide built into hill
stairs
swings
teepee
fire
trampoline
tube slide
twisty slide

Conveniences
benches
bike racks
clock
drinking fountain
microphone
storage
tool shed
tables
talk tubes

Themes
fantasy space
maze
play castle
playhouse
sculpture park
spider web

Site Renovations
covered area
doors
running track
trails

Landscaping
border plants
butterfly garden
flowers
garden
grass
hills & berms
pond
river
trees
Vita Auctoris

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