

The Perceived Nature and Function of Planning
by Domain-Related Experts:
Academic, Business, Lay, and Teacher

by

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ABSTRACT

It is disturbing to know that today's students are not applying their knowledge of planning processes to either their school work or to their extra-curricular activities. Deficiencies in planning and execution have also been identified in underachieving adults. Planning is used in a multitude of situations for anticipation of the future, for problem solving, and for goal attainment. It is used in varying degrees, with varying levels of proficiency, to manage our thinking, our responsibilities, and our dreams. Planning has been shown to enhance a sense of control over both self and the environment. The literature is convincing in regard to the benefits of planning for managing uncertainty in a rapidly changing world.

The cognitive processes of planning operationalize many of the metacognitive abilities which facilitate transfer of knowledge from one context to another. The literature on metacognitive processes and planning in particular is, however, fraught with definitional difficulties. There is persistent controversy about the meaning of both the concepts and terms used. A cognitive-developmental conceptual framework reveals that planning encompasses two dimensions. The internal dimension involves the nature of planning, the nature of the planner, the nature of planning beliefs, the nature of the problem, planning processes, and cognitive regulation. The external dimension includes both contextual and social variables. This complex ability, by its very pervasiveness in society, and by its intricacy of processing, has efficacy for assisting learners of all ages to manage their thinking for productive goal attainment.

It is the underlying postulate of the present research that planning is a skill which enjoys a common mental representation and vocabulary across groups in society. Should this be the case, it may be beneficial to focus instruction on planning, as a vehicle for teaching and operationalizing metacognitive skills. Exploration of this postulate necessitates a fuller understanding of how both the nature and the function of planning are perceived by various representative groups. A deeper awareness of planning knowledge held by domain-related experts has potential to reveal similarities and dissimilarities of mental representations of planning. Toward this end, four groups of experts in academics from cognitive science, business, everyday life-planning, and teaching were provided with input from a telephone survey of the general public through a Delphi Methodology. The reiterative, three round process was undertaken by the participants to explore what is meant by the term planning, how it is done, and where and when it is used. This self-correcting technique permitted each group to generate an excellent and precise definition of planning, to clearly define the terminology used, and to articulate the functions of planning and their contextual applications. The Delphi Method achieved unusually high degrees of agreement both within and across cells as to the nature and function of planning. Additional comments from respondents brought elaboration of their perceptions to light for the purposes of understanding and comparison. There was a remarkable correspondence between the most recent literature on planning and the knowledge base of the respondents.

The data confirm that there is a striking convergence, within and across the sampled groups about what planning is and the purposes for which it is used. For all cells, definitions of planning achieved a solid consensus and an impressive 97% agreement on all components of the definition and their descriptors, 89% on the function statements, and 95% for the 159 function descriptors. The analysis of data highlighted areas of similarity and dissimilarity of perceptions on aspects of planning. Cell differences between the Academic, Business, Lay, and Teacher cells were observed and reported.

The findings substantiate the proposed use of planning and its vocabulary to assist learners to discuss, comprehend, and employ the underlying metacognitive thinking skills involved for problem solving in school and in real life situations throughout the life span. This valuable connector between ages and contexts has been under-utilized to date. The results of the present study justify planning as an umbrella process for instruction in metacognition.

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Consider how an ordinary day is put together. You awaken, and as you lie in bed, or perhaps as you move slowly about in a protective shell of morning habits, you think about what the day will be like - it will be hot; it will be cold; there is too much to do, there is nothing to fill the time; you promise to see him, she may be there again today. If you are compulsive, you may worry about filling it all in, you may make a list of all the things you have to do. Or you may launch yourself into the day with no clear notion of what you are going to do or how long it will take. But, whether it is crowded or empty, novel or routine, uniform or varied, your day has a structure of its own - it fits into the texture of your life. And as you think what your day will hold, you construct a plan to meet it. What you expect to happen foreshadows what you expect to do.

Miller, Galanter, & Pribram, 1960

CHAPTER 1

Introduction

Planning guides decision making by anticipating possible or probable future events. As we mature, the time and energy spent on planning increases, as does its prominence in our thinking. In fact, to most of us, it is inconceivable how we would manage our lives without the aid of planning. We plan for grand happenings - career, marriage, financial security, as well as for mundane details - coordination of an outfit, arriving at an appointment on time. Modern families spend much of their shared time in the contemplation, creation, and revision of plans for itself and its members. Planning is one of the tools we use to aid in the management, not only of our thinking but also our responsibilities and the actualization of our dreams. It is indeed one of the most valuable resources of cognitive processing.

Planning is fundamentally a voluntary mental activity. People engage in planning whether they are good at it or not. The proliferation of current best sellers about 'how to' improve business operation (management strategy books), weight loss (diet books), personal health (exercise books), financial investment (money management books), savings (retirement planning books) are resplendent with procedures to formulate and execute plans for future benefit. The success of this genre of self-improvement aids confirms society's commitment to the advantages of planning for goal achievement. The media is permeated with reportings of plans by government, financial institutions, education etc. for dealing with current problems and anticipated requirements. Even a cursory perusal of today's culture indicates beyond doubt the pervasiveness of planning, to the point where increasingly larger numbers of the work force receive remuneration for assisting others in their planning needs.

Increasing attention has been paid in the literature on cognitive psychology to the place of planning as a life skill, with a focus on the processes involved for successful problem solving. The underpinnings of the need for such attention to planning may rest in the evidence that motivation, conviction about personal and general benefits of planning, and

Careful implementation cannot, in themselves, guarantee success without the requisite cognitive abilities for constructing an adequate plan. Empirical research tells us that such proficiency necessitates well-developed notions of sequential ordering, hierarchical integration, temporal, spatial, causal, and consequential conceptions, to mention a few (De Lisi, 1987). Factors of beliefs, motivations, social and environments contingencies, and individual differences confound the processes to reveal planning as a multi-faceted, highly complex human endeavor, operating simultaneously on three planes at once, thought, action, and self-monitoring. Das, Naglieri, and Murphy (1995) propose planfulness as a unique personality trait enabling an individual to function as a holistic system.

Individual Differences in Planners

The activity of planning traverses the life span. At one end of the age spectrum, even young children plan their activities. When queried, they appear to understand what planning is and how plans are made (Pea, 1982; Pea & Hawkins, 1987; Kreitler & Kreitler, 1987; Oppenheimer, 1987). At the other end, seniors often use planning strategies (i.e. external memory aids) as a spontaneous compensation for diminishing competencies in some areas of their everyday lives (Lachman & Burack, 1993). These older adults may do well in their planning by drawing on their accumulated practical experience, wisdom, or metapanning skills (Smith, Dixon, & Baltes, 1989). This same population, however, displays less flexibility in adapting plans to new situations or abandoning ineffective strategies than younger planners (Berg & Sternberg, 1985). Chalmers and Lawrence (1993) compared planning performance of adolescents, working adults, and retired adults. Despite the current experience of working adults in planning and organizing their personal and professional lives, the researchers were surprised to find that they did not plan more efficiently than the other two groups.

Those who feel they have substantial control over their lives tend to plan; those who plan feel they have more control over their lives. This reciprocity is the making of the planner. Hayes (1989) reports that creative artists do more planning than non-artists. Women are apparently more likely than men to plan future activities, to spend more time in

the planning stage, make more detailed plans, and to make more contingency plans (Cohen, 1989). Women support their planning with more external memory aids and mechanical planning strategies (i.e., making lists, diaries, notes etc.) than do men. Men, on the other hand, are more prone to rely on others (i.e., wives, secretaries) to produce plans or schedules (Burack & Lachman, 1992). In both genders, active anticipation of future possibilities tends to reduce uncertainty, motivate behavior, and enhance well-being (Smith, in press). "A planful person, therefore, is necessarily a dynamic person, responding to change" (Das et al., 1995).

Individual differences are a distinctive characteristic of cognitive processes and personality variables. Das et al. (1995) go so far as to regard individual differences in planful behavior as a personality trait. For example, individuals vary greatly in memory capacity - both to recall relevant plans from previous experience and to remember the planned sequences during execution. Individuals also respond differently to their anticipation of future events. For some, seeking information and preparing for difficulties is the most adaptive means of enhancing control, while for others, coping is best achieved by repressing or denying information and responding ad hoc. In general, preparing in advance (for financial or emotional losses) indicates better adjustment than for those who do not plan (Lachman & Burack, 1993). Similarly, there is a difference in the level of personal awareness of the planning processes. This is highlighted by the discrepancy between having a 'planful' procedure stored within one's behavioral repertoire and being conscious that a repertoire exists which contains such a procedure (De Lisi, 1987). Individuals may engage in 'implicit planning', even when unaware that they are doing so. Planning is often not present at both extremes of problem situations (Scholnick & Friedman, 1987). The solution path for some problems may be so routine as to skip the planning stage altogether, allowing the individual to respond without much expenditure of either effort or attention (i.e., habitual actions such as sports activity or driving to a familiar destination). Conversely, some problem situations may be so complex, ill-defined, or onerous as to render planning too difficult or energy intensive (i.e., solving marital problems).

The Need for Research in Planning

Despite the recent upsurge of interest in managerial and planning processes, relatively little is known about them, and about their relationship to successful problem solving, and even less about how to encourage such planfulness through direct instruction. Yet there can be little doubt about the pressing need for instruction, given the pervasive evidence of planning deficits at all age levels (Covington, 1987, p.470).

The Ontario Common Curriculum (1993) affirms that by the end of grade nine, contemporary students will be able to apply their understanding “in planning for the future” and be able to “develop relevant, well-prepared plans for entering the work force or continuing their education” (p.11). An analysis of the learning outcomes relating to planning reveals several interesting points. Despite the important role of planning in text comprehension and writing and the substantial, supportive research on the subject (e.g., Flower & Hayes, 1981), there are no explicit references to planning in the sections on writing under Language, not even when referring to the understanding of ‘the role of prewriting activities’ (p.45). The outcomes for Self and Society, do explicitly state that students will be able ‘to use knowledge of their strengths, interests, and aspirations to set goals and undertake educational and career planning’ (p.68). Although Mathematics, Science, and Technology objectives are that students must learn to solve everyday problems, to understand and use a variety of problem-solving strategies, nowhere is planning mentioned as a problem solving strategy. It would appear that planning is viewed as a product rather than a process. The only area explicit in addressing the process at all is in the Arts. Will these young people indeed develop the facility to create plans (i.e., career plans, artistic plans) without learning a broader understanding of the process and its personal benefits, i.e., what planning is and what it is used for?

Covington’s (1987) research with children reveals strategic deficiencies and a lack of understanding of even the rudiments of achievement planning, especially the ability to distinguish between quality and quantity of effort. Interviewing 8- to 12- year olds, Pea (1982) found that none of the children reported that they engaged in planning when doing school work, despite their knowledge of planning and knowledge of situations in which

plans could be important. Even after years of schooling, 15 and 16 year olds reported to Lawrence and Volet (1991) that they consistently do not plan their activities, preferring to respond habitually or impulsively. Das et al. (1995) have found that defective problem solving may originate “in defective planning, and incompetence in problem solving can be attributed to the relative inability of the children to initiate and execute a plan of action” (p. 368). In their discussion of the relationship of planning to underachievement, Borkowski and Thorpe (1994) report that high school underachievers thought less about their future careers than student academic achievers of similar ability. Given that planning requirements may vary greatly between such activities as writing an essay and organizing a chemistry experiment, students must be sensitized to the nuances of domain and contextual demands (Lawrence, 1991). Lawrence (1991) emphatically states that “if effective independent learning is part of what children are taught at school, planning is not an optional extra” (p. 91). She hypothesizes that while some experienced teachers may be cognizant of the paucity of adolescent planning, many other teachers make tacit assumptions that students indulge in more planning for their school assignments than is actually the case.

The research on adults is equally disconcerting. Hayes-Roth (1980) found her subjects to be unrealistic, particularly in underestimating task completion time. When they were required to realign their inflated expectations, they placed their focus on the least important goals! She reported that these subjects sacrificed both quality and quantity as the planning task increased in difficulty. Likewise, Borkowski and Thorpe (1994) hypothesized that the use of skills required in planning and execution are deficient in adult underachievers. Despite all the research into cognitive skills, educators still “lack even the most rudimentary empirical basis for deciding what skills are most central to overall planning behavior by reason of their robustness for transfer” (Covington, 1987, p. 503-504). The lack of concordance between training situation and the contexts in which real life thinking skills are operationalized continues to be disquieting (Nickerson, Perkins, & Smith, 1985).

Problems in Studying Planning

The gap from knowledge to action is often bridged by the activity of planning. The study of planning has been given emphasis in the vast corpus of literature on problem solving. It is an important variable in the detection and analysis of metacognitive abilities, such as in composition (e.g., Hayes & Flower, 1981), in memory development (e.g., Brown, Bransford, Ferrara, & Campion, 1983), in cognitive development (e.g., Yussen, 1985), in wisdom (Smith & Baltes, 1990; Sternberg, 1990), and strategy acquisition (Pressley, Borkowski, & O'Sullivan, 1985), to suggest a few.

The plethora of references to planning development and implementation from such a wide range of theoretical perspectives has rendered the term somewhat ambiguous. This confusion is understandable given the breadth and complexity of the cognitive and metacognitive activities necessary to anticipate and regulate behavior. Schoenick and Friedman (1987) propose five reasons for the definitional confusion: 1) Planning involves operation on three levels simultaneously: "in the reality of a problem, in accordance with an imagined scheme, and in the role of mediator between the scheme and the behavior" (p.3). They hypothesize that the numerous definitions of planning may be a result of a particular focus on one of these three levels, and that a lack of specification of the relevant level and its inter-relationships with the other two levels have been responsible for some of the definitional 'vagueness'; 2) Confusion may have resulted from two distinct points of view of planning; that of a general cognitive ability and that of a context-specific activity. The differences in discussion from these two vantages may make it harder to arrive at coherent definition; 3) A third difficulty arises from the separation of motivation from planning. Some theories consider planning to be compulsory to certain problem solving activities at the exclusion of the reasons one decides to plan in the first place. Other theories may concentrate on the motivational aspects, at the expense of the planning processes themselves; 4) Research methods vary in the exploration of quantitative and qualitative individual differences in planning performance. Some theories measure activity in terms of number of components present, speed of processing or execution, while other theories explain these differences in terms of personal style, beliefs, etc.; and finally, 5) The

complexity of the goal-oriented activities involved in planning may lead to quite different emphases by theorists. Highlighting one process (i.e., representation, goal identification, strategy repertoire, choice, and repair, plan evaluation etc.) may influence a given model of planning and result in confusion. These convolutions also extend to ambiguities in the literature between the notions of planning and problem solving, and between planning and action.

Distinctions Between Planning and Problem Solving

Lawrence (1991) attributes part of the delay in translating planning research into educational practice to confusion about whether planning is a general problem solving strategy or an organizational skill needed to bring complex tasks into order. The former conceives of planning as a self-management strategy. The latter conceives of planning as overall conceptual organization. These are two general approaches to the study of planning. From the first vantage, much of the research draws upon the investigation of solutions to intellectual problems. In this body of work, planning is envisioned as either an important part or the embodiment of the entire problem solving sequence. Medland (1990) represents this view well in his statement: “because most planning starts with a problem and ends with a solution that did not exist before, it represents what many call the problem-solving process” (p. 175). It becomes difficult to distinguish between problem solving and planning in literature promoting this view point. Cognitive science falls into this category, obscuring the demarcation between problem solving and planning. The problem solving literature refers to the development of planning capacities as approximation toward expertise. Less than optimal performance is termed as inadequacy or failure, i.e., in monitoring, representation, strategy selection etc.

The second approach, conceptualizes planning as goal-directed behavior not limited to intellectual problems. Proponents of this view study planning activity in relation to problems which are contextually laden, taken from everyday living, and may be solved at different levels of proficiency. While much of the research for the first approach is gathered from adults, often college students, the population studied by the second approach is often children, analyzed from a developmental perspective. This latter focus of research deals

explicitly with children's solution processes which may fall far short of the adult ideal emphasized by cognitive science (Friedman, Scholnick, & Cocking, 1987).

Irrespective of theoretical differences, the intent of cognitive models of planning remains constant: to describe the mental processes involved in problem solving from the inception of a goal to the solution or abandonment of efforts to reach the desired goal. Because planning is a component of problem solving, the piece is often confused with the whole pie. Many writings on these subjects fail to make an adequate distinction between the two, leading to considerable confusion. Newell and Simon (1972) in particular, defined planning as one problem solving heuristic. Hoc (1988) suggests that heuristics are generated when the individual has sufficient access to knowledge, but when the heuristics fail, it can lead to the activity of problem solving, and so to planning. Likewise, Dreher and Oerter (1987) and Oppenheimer (1987) consider planning as a special case of problem solving. Such elements as problem definitions vary across and with age groupings depending upon both contextual and individual differences (Sansone & Berg, 1993). Hayes and Nash (unpublished manuscript) distinguish planning from other kinds of problem solving by differentiating the environment in which the planning takes place from the environment in which the task takes place. The activity of planning is seen by Goodnow (1987) to enter the problem solving process "when the problem calls for the anticipation of a series of moves and their probable outcomes, and for the advanced formulation of some principle, guiding rule, or 'blueprint' that will cover more than a single move and perhaps cover all possible moves" (p.183). Covington (1987) contends that the essential point in considering planning in the context of problem solving is that different kinds of problem solving require different plans for goal-attainment, contingent upon the degree of explicitness of the initial problem state or upon whether the solution states may be pre-determined.

Kreitler and Kreitler (1987) postulate that despite many commonalities, that planning differs from problem solving in three ways. Firstly, they conceive of planning as a cognitive construction and problem solving as a cognitive execution. Secondly, while planning is future oriented, problem solving may deal with issues unrelated to either action or the future. Thirdly, they define planning as fundamentally procedural, while problem solving may deal with non-procedural issues such as causation, results, purposes, etc. Their research

has confirmed that children gradually distinguish planning from problem solving, and also from fanciful daydreaming. The children also note that planning may include both problem solving and daydreaming.

Friedman, Scholnick, & Cocking (1987) remind us that the notion of problem solving conjures difficult or urgent situations which require immediate remediation to attain normative or optimal levels. Planning, in their view, conjures a more leisurely attitude toward hopes and dreams of possible realities. Conceding the overlap between problem solving and planning, there is a growing consensus that these processes are not isometric. Planning can occur even when there is no problem to be solved. Notwithstanding these nuances, all elements of the literature concur that planning is a challenging activity requiring the integration of all the component parts and is therefore the avenue through which human beings integrate problem solving.

Distinctions Between Planning and Action

Some theories of planning make a clear distinction between planning and action, while other theories hold an expanded view to include all process from the goal inception to the solution state. Hoc (1988) alleges that “standard definitions limit planning to procedure elaboration, without feedback from execution” (p. 231). Planning, particularly higher-order planning, may serve the purposes of decision-making (i.e., to provide a rationale for selection among options) and may never be intended to be operational. The goal may be the plan itself, rather than its implementation. There are various examples of the lines drawn between planning and action by some and the lack of division by others. The information processing notion that the process of problem solving is a kind of search implies a division between the initial stage of planning for a solution and its actual implementation (Holyoak, 1990). Kreidler and Kreidler (1987) also emphasize a distinction between planning and action. They suggest that although planning often comes before action, may result in action, or be derived from action, these two processes are not inseparable. Execution depends not only on the plan but on other processes not involved in planning.

Meyer and Rebok (1985) and Rebok (1989) are of the opinion that one cannot separate planning from action, and have developed their theory of transactional planning around the notion of planning-in-action. Rogoff, Gauvain, and Gardner (1987) distinguish between plans devised previous to action and planning which is organized during action. Action theorists (i.e., Oppenheimer, 1987) suggest that planning refers to the intermediary stage between a motivation to act and the intention to act. Each of these distinctions is an exemplar of the varying placements of planning on a continuum from conceptual activity to action. However, exploration of theoretical distinctiveness between planning and problem solving and planning and action tend to further confound rather than inform us about what planning really is.

What is Planning? : Definitional Difficulties

“In psychology, as in any number of other fields, the fuzzier the concept, the more readily it seems to be used. The fact that these terms are employed so frequently is a good indication that they indeed fill a need, a need which would be better served if the term were more clearly delineated, broken down, and its connections with related concepts made more explicit”
Hoc, 1988 (p.ix)

Influences on the processes of planning are fraught with variation, whether social, psychological, intellectual, experiential, developmental, cultural, etc. The term planning has frequently been used in describing many activities: e.g., problem solving, business management, cognitive processes, psychology, architecture, economics, artificial intelligence, language production, and memory. These diverse theoretical perspectives have failed to adequately address themselves to the task of defining exactly what planning is. Perhaps this deficiency is a result of the fact that planning does cut across so many traditional frontiers of inquiry. The literature on planning appears controversial about many aspects of planning behavior, partly due to these definitional difficulties. The choice of definition guides which questions will be asked and which answers will be offered.

The term plan may be used as a noun or a verb, and is seen alternatively in the literature as: a psychological construct, a sequencing of actions, a guide for behavior, and as

a descriptive 'entity' (e.g., drawing, map, program, model, etc.). One type of definition highlights the representational-entity aspect of a plan which is available to be communicated from person to person. This view itself may be plagued with a two-fold meaning, referring to representation either as a mental construct or a physical object. The second type of definition emphasizes the functional-behavioral aspect of a plan intended to organize and control behavior. Implicit within these two types of definitions is the notion of both a goal and goal-attainment. Planning as a goal-directed behavior is given full consensus in the literature and in tacit knowledge regardless of whether the representational or functional meaning is implied (De Lisi, 1987). Some recent empirical investigations of planning have attempted to merge these two vantages for a more complete understanding of the processes involved. The division remains, however, constrained by definitional controversies and the complexity of researching mental activity.

There is a smorgasbord of definitions proposed in the literature on planning. Miller, Galanter, and Pribram's (1960) definition of planning as 'a hierarchical process controlling the performance order of a sequence of operations' has proven to be too limiting. The use of the terms 'hierarchical' and 'sequencing' as criteria, exclude abstract plans which are not so structured. On the other hand, Hayes-Roth and Hayes-Roth's (1979) definition, "the predetermination of a course of action aimed at achieving some goal" (p.276) turns out to be too broad, as it includes any strategy or sequencing activity. More comprehensively, Pea (1982, p.6) defines planning as "a complex form of symbolic action that consists of consciously preconceiving a sequence of actions that will be sufficient for achieving a goal". Pea emphasizes the anticipatory, representative nature of planning, which includes some degree of conscious awareness. Kreidler and Kreidler (1987, p.207) suggest that "planning is a complex cognitive activity that occurs when no program able to regulate action is available". This interpretation assumes that "every act of behavior is regulated by programs, i.e., hierarchical systems of instructions on different levels of inclusion". In a broader light, Rogoff, Gauvain, and Gardner (1987) define planning as "deliberate organization of actions oriented toward a goal" (p.303). Their definition of planning stresses its relationship to context, indicating that the degree of elaboration and specificity of a plan vary according to the circumstances in which planning occurs, the context in which actions occurs, the actual

action themselves, and the skill of the planner. Scholnick and Freidman (1993) emphasize the use of knowledge in their definition. The list goes on.

Research Problem

The research literature stresses the importance of metacognitive abilities for successful learning and transfer. There is little evidence to date that cognitive instruction is successful in the problem solving of ‘messy’, ill-defined real life problems outside the parameters of structured academic contexts (Covington, 1987). Despite efforts to date, students are not practicing the activity of planning and are not transferring the thinking processes involved into the extra-curricular world. Pea (1982) advocates that planning skills should be studied in relation to specific domains in an effort to address the serious problems of non-transfer to other domains.

In the present study, it is hypothesized that the process of planning is one in which individuals engage throughout the life-span in a more conscious sense than many of the other metacognitive processes, such as monitoring, self-correcting, assessment of what one does not know, etc. Metacognitive awareness of the appropriateness of planning and the need to plan may be learned from instruction in critical thinking skills (Scholnick & Friedman, 1987). An understanding of the underlying managerial thinking processes involved in planning may enhance learners’ metacognitive awareness. Because effective planning operationalizes executive control processes, planning may be a viable connector between educational settings and real-world application for transfer. Since planning is a skill widely used in real-life contexts, there may already be an available vocabulary enjoying common usage and definition. Should this be the case, it is important to understand how planning is mentally represented by members of society who hold responsibility for the knowledge, execution, and / or instruction in this ability. A demonstrated general consensus of what comprises this cognitive process may establish its efficacy as a vehicle through which to focus discussion of higher-order thinking processes between educators and learners of all ages and abilities.

Given the aforementioned definitional confusions, the research undertaken here intends to squarely address the need to define planning and its components. The research also accepts the challenge of exploring the similarity or dissimilarity of planning definitions between education domains, the general public, and work-related domains. The research provides a catalyst for uncovering and comparing domain-related perceptions about what planning is, how it is used, and for what purposes.

A Plan Unfolding

The aim of the research was to make as explicit as possible the mental representation of four domain-related groups about **the nature and function of planning**. Chapter two provides a review of the literature on the nature and function of planning, from various theoretical points of view. The cognitive and metacognitive processes involved in this activity are discussed at length, as are the types of knowledge involved. The chapter provides the conceptual framework underpinning the research, as well as the rationale for investigating domain-related perspectives of planning. The chapter concludes with an elaboration of the research problem and objectives. Chapter three explores the methodology used in the research, specifically the telephone survey and Delphi Method, the samples, data collection, preparation, and means of analysis. Chapters four and five are devoted to presentation of data analysis and interpretation of results. Chapter four concentrates on the telephone survey and the Delphi results pertaining to the nature of planning, while chapter five deals with the Delphi results relating to the function of planning. The final chapter six, primarily contains an overview and discussion of results, linking findings to the current literature on both the nature and function of planning.

CHAPTER 2

Focused Review of the Literature

As previously mentioned in chapter one, there are various theoretical approaches to planning found in the literature. One framework, proposed by the cognitive science is predicated on the view of planning as an information processing phenomenon in which the individual organizes his or her cognitive operations and abilities in a planful manner. Although planning is a process applied to non-problematic as well as problematic activities, it is given focused attention in the literature on problem solving. This approach emphasizes the metacognitive aspects which allow the thinker to effectively orchestrate various component skills, general and content-specific knowledge, and personality variables into a cohesive structure for problem solving. Other approaches focus on the general structure and procedures of planning as the individual operationalizes a mental representation of the problem environment into specific procedural steps in a given context for goal attainment.

The ensuing review of the literature situates planning in a historical and developmental context. The cognitive and metacognitive processes employed in planning are highlighted from the cognitive science perspective and as they relate to the types of knowledge required for effective planning. Planning as goal-directed behavior is discussed, giving attendant conditions for the decision to plan and its relationship to beliefs about control. The chapter describes how plans are constructed, with specific mention of types of plans. Research on planning is drawn from the literature as it pertains to the present study. Domain expertise in planning situates this ability in various contexts, both educational and real-world. Areas of limitation in the literature are considered as they provide rationale for the research undertaken. The conceptual framework underlying the present study draws from the various approaches reviewed in the chapter. The chapter concludes with an elaboration of the research objectives, introduced in chapter one.

Roots of Planning in the Literature

Planning was initially highlighted in Polya's (1957) work on planning heuristics. He postulated that:

we have a plan when we know, or at least know in outline, which calculations, computations, or constructions we have to perform in order to obtain the unknown. The way from understanding the problem to conceiving a plan may be long and tortuous. In fact, the main achievement in the solution of a problem is to conceive the idea of a plan. This idea may emerge gradually. Or after apparently unsuccessful trials and period of hesitation, it may suddenly come, in a flash, as a 'bright idea' (p.8).

Despite this endorsement, it wasn't until Miller, Galanter, and Pribram's influential book, *Plans and the Structure of Behavior*, was published in 1960, that the importance of plans as components of higher-order thinking began to hold greater significance for problem solving. Miller et al. not only proposed the cognitive landscape of planning activity but delved courageously into the psychological characteristics of the planner.

In their attempt to understand human problem solving through computer simulation, Newell and Simon (1972) identified planning as a major element to simplify the search for a problem solution. They suggested that individuals develop a planning knowledge based on problem representation and an ability to distinguish essential problem features from non-essential. During plan construction, the essential features are then structured into a sequencing of subgoals for execution. Execution also involves dealing in some way with the non-essential features of the solution. This type of *anticipatory* planning model is most suited to situations in which the goal is well-defined, familiar, and simple. Tasks which are less-defined or those confronted by less mature or experienced planners require a more flexible and interactive model.

Endeavoring to address situations where top-down, serial processing was inappropriate, Hayes-Roth and Hayes-Roth (1979) studied adults planning a day's errands. The development of their *opportunistic* approach conceptualized planning as a multi-directional, opportunistic process as opposed to the hierarchical, uni-directional process originally suggested by Newell and Simon. They reported that individuals did not tend to

pre-plan, but rather to plan in the course of action. The planner perceives new associations, triggered by unexpected possibilities or constraints. Their research attempted to blend problem representation, goal definition, anticipation, action, and evaluation in a broader, more flexible model. Opportunistic models of planning include execution and regulation of the planning process in addition to the anticipation of a course of action.

The opportunistic approach of Hayes-Roth and Hayes-Roth (1979) has been expanded by Meyer and Rebok (1985) and Rebok (1989) to include problem solving as a dynamic relationship between plans and actions. Their *transactional* approach is primarily concerned with the changing relationships between plans and actions, with an emphasis on the effects of actions on subsequent plans. Plans are viewed as "internalized actions which both direct and are derived from problem solving activities" (Meyer & Rebok, 1985, p.50). Their approach views planning in a developmental life-span context, termed *planning-in-action*, as the individual becomes increasingly able to both project actions into the future and to abstract relevant actions from the past. This transactional opportunistic approach is concerned with the degree to which plans have been elaborated, the quality and quantity of changes made to plans during the process, and the utilization of information for plan construction and modification. Meyer and Rebok (1985) maintain that plans are formed by both top-down and bottom-up processes and are being continually modified through interaction with the environment during the process of problem solving.

Researchers in cognition and educators have been struggling with the dilemma of how to adapt theories and research paradigms from laboratory work on these processes to everyday problem solving (Cavanaugh, Kramer, Sinnott, Camp, & Markley, 1985). There has been a heightened attention within the literature in regard to the significant differences between the problem solving processes, determined by the degree to which the problem situation is 'defined'. The genre of everyday or personal problem solving differs from those found in formal settings by virtue of the ill-defined nature of the problems. Hayes (1989) differentiates ill-defined problems as those requiring the individual to contribute to the problem definition from his or her own resources. Sternberg (1985) delineates the differences between problems which are posed in critical thinking instruction and real life problems. In everyday problems and problem solving: 1) The first and sometimes most

difficult step is the recognition that a problem exists; 2) It is often harder to figure out what the problem is than to figure out how to solve it; 3) The problems tend to be ill-structured; 4) It is not usually clear just what information will be needed to solve a given problem, nor is it always clear where the requisite information can be found; 5) The solutions tend to depend on and interact with the contexts in which the problems are presented; 6) There are generally not 'right' solutions, and even the criteria for what constitutes a 'best' solution are often not clear; 7) The solutions depend at least as much on informal knowledge as on formal knowledge; 8) These solutions have consequences that matter; 9) Often these problems occur in groups; and 10) The problems can be complicated, messy, and stubbornly persistent.

More recently, Scholnick and Friedman's (1993) research was designed to move beyond the conception of planning as a monolithic skill by addressing the richness and complexity of planning. Their analysis of planning components included problem representation, goal selection, decision to plan, strategy choice, strategy execution, and monitoring. They studied which planning components and which developmental changes were stimulated or revealed during different genres of planning tasks. They chose three types of tasks typically used in planning research: the Tower of Hanoi, errand scheduling, and story comprehension. Their findings indicated that a hallmark of planning is that it "requires the integration of processes and content, belief and desire, and intention and choice at different points in the life span" (p. 165). Performance on the Tower of Hanoi emphasizes representational and monitoring demands. Story comprehension draws heavily on social comprehension and monitoring. The choice of goals, decision to plan, and strategy choice emphasis found in making plans of errand running was attributed to the availability of prepackaged components in such tasks taking place in less controllable environments. The affective and attributional components evoked in such everyday tasks strongly affected the planning component demands.

Roots of Planning in the Individual

The wisdom of such developmental psychologists as Piaget, Flavell, and Vygotsky leads us to assume that planning enjoys qualitative changes through psychological and cognitive ontogenesis. An important theme in understanding this progression is the attempt to account for behavior from the organism's perspective. In their treatment of goal-directed activity, both Piaget (1960) and Vygotsky (1978) distinguish between practical, overt behaviors and symbolic, internal behaviors. Despite their divergent approaches to the development of human representational capacities, they are of accord with the contention that these abilities are not a cognitive given, but rather a cognitive construction (De Lisi, 1987).

Piaget (1978) has traced the development of the ability to plan throughout childhood. His term 'reflected abstraction' refers to cognitive understanding about the coordination of actions, allowing the youth to finally reflect on his or her thinking for purposeful planning. His theory incorporates the role of experience in conceptual development, providing a link between thought and experience, i.e., the projection of knowledge from a lower to a higher level, and the subsequent reorganization or reconstruction of knowledge at the higher-order (Piaget, 1977; Cocking and Copple, 1987). The child moves from the ability to anticipate solutions in the concrete operational stage to the ability to plan hypothetical solutions systematically in the formal operational stage. The view of reflected abstraction also incorporates the notion of the construction of a representation of states passed through during implementation, as well as a representation of the action (Hoc, 1988). Rogoff et al. (1987) contest the view of planning as a general ability which naturally develops, irrespective of the type of problem (see p.305). Vygotsky's work (1978) on higher-order thinking processes articulates the development of the individual's increasing ability to be aware of and regulate his or her own cognitive processes through social interaction with the environment and through the internalization of speech. This internal dialogue allows the individual to identify, monitor, and plan thought and action. Development of the necessary cognitive and metacognitive abilities required for

planning are well accounted for in the literature. The above brief overview is more fully explored in the section on metacognitive processes.

The Processes of Planning

A synthesis of the current thinking about planning from an information processing paradigm may be constructed from Pea (1982), Anderson (1983), Meyer and Rebok (1985), Heppner and Krauskopf (1987) and Rebok (1989). The articulation of their findings supports the contention that planning may be seen as encompassing many of the most significant components of metacognition and problem solving. The processing can be broken into six distinct and progressive components, each essential for successful planning:

- 1) *Problem representation* refers to the activity of adequate psychological imaging of a problem based on problem acknowledgment, identification, and goal definition;
- 2) *Encoding* demands the processing and structuring of relevant information required for the identification and assimilation of problem components and their relationships. This process also includes an appraisal of the significance of the problem and its element;
- 3) *Pattern matching* permits relevant information to be retrieved from long-term memory, allowing encoded information to be matched with information from prior knowledge and experience;
- 4) *Plan construction* requires the generation and exploration of alternatives, accommodation of problem constraints, and the selection of a sequence of actions. The problem solver goes through a plan simulation and exploration of possible outcomes, which may lead to redefinition of the goal or changes in the plan. Cycles of proposal, simulation, evaluation, and revision occur as the plan is consciously constructed. Strategy selection and strategy flexibility are key factors in this dynamic activity as plans are implemented and modified;
- 5) *Plan execution* involves remembering the plan and the processes and is another indicator of the importance of memory in planning. Strategy deployment, planning sequence administration, commitment to goal attainment, and self-regulation are all seen as significant at this stage in the planning process. Feedback from the environment may lead to further modification during implementation; and,
- 6) *Plan evaluation* necessitates a follow-through of planning sequence and reflection on the completed process. Significant learning

and metacognitive awareness is possible at this stage to ensure continual improvement in the conceptualization and administration of the ability to effectively plan. The role of memory is particularly integral to encoding, pattern matching, and plan execution. The subject of memory, as it affects the accumulation and processing of knowledge, is discussed later in the chapter as it pertains to the representation of knowledge.

Metacognitive Processes

Success in planning involves both the capacity for self-control and self-regulation. There is an extensive theoretical and empirical body of literature on the individual differences and developmental changes necessary for self-mastery over the impulsive tendency to act before reflection. Similar to other psychological constructs, higher-order thinking skills have been subject to definitional difficulties. Despite the attention given to the processes involved, the definition of metacognition remains a nettlesome issue. This may explain why Flavell, Brown, and others chose to use prototypical examples of the process to explain metacognition, rather than perhaps more confining operational definitions (Paris & Winograd, 1990). There even lacks a consensus in the literature regarding the term for such managerial processes. Referring to literature on self-regulation, Zimmerman (1994) argues that the process is further complicated by the numerous, conceptually overlapping constructs such as metacognition, volition, and planning. He attributes this problem to be partially derived from the different theoretical paradigms employed by researchers' to describe and explain their results; "theories as diverse as operant, phenomenological, social cognition, Vygotskian, volitional, attributional, information processing, and constructivist" (p.6). The processes are described in the literature as part of a group of abilities commonly referred to under such various umbrellas as strategic thinking (Brown, 1978), executive control processes (Pressley, Symons, Snyder & Cariglia-Bull, 1989; Kluwe & Friedrichsen, 1985; Taylor, 1992), metacomponents (Sternberg, 1984), reflective thinking (Baron, 1981), post-formal operational thinking (Cavanaugh, Kramer, Sinnott, Camp, & Markley, 1985), higher-order psychological processes (Vygotsky, 1978), metacognition

(Flavell, 1979), wisdom (Smith, Dixon, & Baltes, 1990), and higher level thinking (Kagan, 1987). Flavell (1987) lists the concepts related to metacognition as being those of executive control, formal operations, consciousness, social cognition, self-efficacy, self-regulation, reflective self-awareness, and the concept of psychological self. He hastens to include "developmental conceptions of and about thinking, learning, and other cognitive processes" (p.25). It is no wonder that metacognition is difficult to precisely define.

The group of metacognitive abilities which enable the effective management of information and resources necessary for the achievement of a targeted goal include predicting, checking, monitoring, planning, reality testing, coordination, and control of deliberate attempts to learn or solve problems. Metacognitive knowledge is essentially knowledge or beliefs about what factors act or interact to affect the course and outcome of cognitive endeavor. Whether intentionally or unintentionally activated, metacognitive knowledge has an influence on cognitive processes in problem solving without it necessarily entering consciousness (Flavell, 1979). Metacognitive knowledge is not qualitatively different from other types of knowledge; some is declarative, some procedural, and some conditional. It grows in a slow, gradual fashion, can be activated automatically, and can be flawed (Garner, 1987). Flavell (1987) maintains that there are three categories of metacognitive knowledge: knowledge of person variables, task variables, and strategy variables. He emphasizes that these three groups of variables are dynamic, always interacting and that individuals acquire intuitions about their interaction. Sustained problem solving activity requires these skills for success in many areas of professional and private life. This facility requires the workable formulation of a problem, the establishment of priorities (goals and sub-goals), construction and implementation of plans, strategy selection and deployment, flexible accommodation of new or changing variables, and the constant evaluation of progress until the desired goal is achieved (de Bono, 1985). Judging the difficulty of a given task and how much planning it requires are also metacognitive abilities (Cocking & Copple, 1987). Brown (1987) refers to another component of metacognitive knowledge, which is an awareness of what one does not know. She argues that self-awareness of one's intellectual behavior is a crucial component of self-regulation and a prerequisite for change.

The self-management of one's thinking is "reflected in the plans that learners make before tackling a task, in the adjustments they make as they work, and in the revisions they make afterwards" (Paris & Winograd, 1990, p.18). Good planners, regardless of age, engage in cycles of plan revision as they consider potentially better alternatives. Scholnick and Friedman (1993) note that "some very reflective planners not only rejoice in goal attainment but they step back to evaluate what they have learned about their goals, strategies, plans, and the environment of implementation" (p.147). The irony remains that the circumstances which require the most monitoring are precisely those complex tasks in which monitoring is most difficult. Much of the burden incurred in planning comes from resource management and allocation of attention between the competing demands of planning, acting, and monitoring. As the processes involved gain practice, less effort is required, thus allowing resources utilized for action to be available for planning and regulation (Scholnick & Friedman, 1987).

As indicated in the developmental literature, metacognitive skills and awarenesses do increase with age and experience (Garner & Alexander, 1989). Flavell (1979) states that metacognitive knowledge is similar to other types of knowledge in that it is extracted from years of experience in the 'domain' of thinking. Childhood is a time of acquiring these cognitive skills through cognitive development, experience, formal or informal learning, and knowledge acquisition. In contrast, adulthood is a time of application of these abilities to varying domains with numerous types of expertise (Yussen, 1985).

Vygotsky (1978) contends that the major influences on self-regulation are verbalization and social control. The acquisition of language begins with external verbalization and slowly matures as the child internalizes this dialogue. The formulation of increasingly more abstract thought goes hand in hand with the internalization of speech, allowing the child to self-question and begin the activity of self-monitoring. In this manner, the development of language facilitates planning. Linguistic information generalizes more rapidly than learned actions, allowing the child to increasingly anticipate actions and outcomes as an alternative to simple trial and error problem solving (Blanck, 1990; Braten, 1991). Vygotsky (1978) acknowledges that children may be poor planners because the difficulties of combining problem definition, plan construction, and execution may prove too

onerous in novel situations. Parents therefore act as scaffolds to mediate the processes, supplying some or most of the necessary procedures for success. This allows the child to concentrate on the aspect(s) of problem solving which he/she can manage effectively, increasingly moving toward mastery. The adult aids in abstracting the global structure of the task at hand, permitting the child to engage in partial planning, while at the same time providing a model for learning the relevant skills to increase competence. The child then slowly moves through self-regulation to planfulness. As behavior becomes increasingly more intentional, goal-directed behavior is supported by the development of plans (Hedegaard, 1990; Moll, 1990). Some of these plans are instinctual, some are learned, and others are constructed consciously through inferential processes. As the child matures, there is a progression through these three stages, culminating with greatest reliance on creatively constructed plans (Scholnick & Friedman, 1987).

In contrast to cognitive scientists, Vygotsky (1978) and others (e.g., Rogoff, Gauvain, & Gardner, 1987) place the development of planning in a distinctly social context. Scholnick and Friedman (1987) maintain that:

although the process of acquiring standards and acting upon them through planned behavior is in part biologically driven, it is also mediated by social agents who encourage or discourage specific behaviors and who serve as role models with whom the growing child identifies (p.30).

This is confirmed by Goodnow's (1987) findings of the frequency to which children refer to other people's involvement in their plans. Children are often taught to plan explicitly in areas or tasks where there is social recognition of the need for advanced planning. While much of children's planning may be done in isolation, expectations are higher for adults to plan both with and for others, in a multitude of social contexts (family, work, community). Engaging others in assisting in one's planning, whether to generate support, delegate responsibility, or collaborate, is a particular strategy for management (Rogoff et al., 1990). Successful planning requires a common general organization of social knowledge, both interpersonal and about the world-at-large (Smith, in press). Antonucci and Jackson (1987) report that individuals with a high sense of self-mastery are more likely to have supportive social networks.

Planning is a contextually specific activity. People learn to plan in particular situations. The stimuli to plan may be invoked by internal concerns, hopes, and wishes or by externally presented problems. The need to plan is usually a response to a situation of sufficient complexity and novelty that the means to goal-attainment are not self-evident. Rogoff et al. (1987) suggest that children may enhance their ability to adapt their planning to specific situations and to remain focused on the goal throughout their coordination of actions by practicing planning collaboratively or under the tutelage of others. The argument for the role of social factors in the development of planning is convincing, although it is not a necessary condition for the emergence of representational awareness (Cocking & Copple, 1987).

Types of Knowledge

Cognitive science maintains that a rich structured knowledge base is a prerequisite for successful planning. Scholnick and Friedman (1993) place this at the center of their definition, attesting that “planning is the use of knowledge for a purpose, the construction of an effective way to meet some future goal” (p. 145). They suggest that the initial step in planning requires the use of past knowledge to construct an adequate representation of the situation to provide relevant information for action. Types of planning tasks vary in the type of knowledge required, as do the constraints or supports for the use of the knowledge. Whenever a required response is not already stored in the form of a rule, the processes of planning are activated to solve the problem, usually with the assistance of previously acquired knowledge (Hoc, 1988). The activity of planning, therefore, provides a vehicle for organizing one’s knowledge to deal with new or challenging situations.

Individual differences are evident in the degree to which the knowledge involved is implicit, tacit, explicit, or structured and may be acquired formally or informally. Tacit knowledge is that gained from experience in the actual context and is a vital component to competence in any domain (Wagner & Sternberg, 1986). Developmental differences in planning skill often reflect differences in the knowledge base of the planner. Planning requires three general types of knowledge: *declarative* knowledge, i.e., the ‘what’ of required factual information, *procedural* knowledge, i.e., the ‘how’ to perform the task or

implement the solution (Anderson, 1983), and *conditional* knowledge, i.e., the 'when' and 'where' to apply which procedure (Marzano, Brandt, Hughes, Jones, Presseissen, Rankin, & Suhor, 1988).

Declarative Knowledge

Of the three types of knowledge, declarative is static. Declarative knowledge refers to "cognizance or awareness of some object, event, or idea", a *knowing that* (Jonassen, Beissner, & Yacci, 1993, p.3). This *knowing that* means the individual is able to define or describe the object of knowing but does not necessarily imply understanding. Smith et al. (1989) propose that the declarative knowledge underlying such activities as life planning is associated with an individual's implicit theories and knowledge about the course, variations, and conditions of a life-span context. Relevant declarative knowledge may be both knowledge about planning in general and knowledge of the domain in which planning occurs. Planning does not exist in a vacuum but rather in a context, albeit even a symbolic one. The case for the primacy of adequate subject-specific knowledge is incontestable. Learners must acquire subject-matter knowledge simultaneously with instruction in procedural knowledge for problem solving (Covington, 1987).

With exposure, a novice learns concepts and facts related to a given domain. The separate pieces of declarative knowledge are stored in an increasingly rich semantic network of nodes linked together by relationships. Initially skeletal and rudimentary, these networks begin as loose connections, limited in strength and organization. Growth of these networks is contingent upon the amount of use to which this knowledge is put and the quantity and quality of new input. As the knowledge base expands, the information is increasingly indexed in memory in rich and meaningful ways. These units of meaning gradually chunk into recognizable patterns, eventually available for pattern matching through analogical reasoning. Hierarchies of knowledge are conceptualized into schemas, readily accessible for knowledge representation. As the knowledge base undergoes continual refinement through re-structuring, ever more useful and complex associations are formed. There is a progressive integration of declarative knowledge with both procedural and conditional

knowledge, available to the expert through the rich indices and cross-referenced associations. The cognitive load on short-term memory is lessened by an efficient storage and retrieval mechanism. This important element of reduction of cognitive load is achieved in two ways: both in regard to the amount of information to be stored in memory and in regard to the amount of processing necessary for execution of a given task (Hoc, 1988). Repeated encounters with similar problems serves to strengthen the links between and among pieces of information. With practice and time, these relationships define the organization of declarative knowledge about the domain. This evolution of sophisticated chunks into schemas increasingly approximates the efficient, integrated network of expert knowledge (Anderson, 1987; Rumelhart & Norman, 1985).

The planner must have a sufficiently rich knowledge base in the task domain to anticipate probable consequences of specific actions within a plan. Failure to adequately consider consequences is a cardinal and commonplace mistake in the planning of actions (Dorner, 1985). Smith et al. (1989) investigated the import of domain-specific and age-relevant knowledge in planning. Age-relevant childcare and career scenarios were presented to young, middle-aged and older adults. Results indicated that each age group was equally skilled in life-planning tasks, when tasks were age-appropriate. Each group was at a disadvantage when the dilemma exceeded their personal experience.

Procedural Knowledge

Procedural knowledge relies on declarative knowledge for its conceptual basis and refers to how the individual uses or applies his/her declarative knowledge (Jonassen et al., 1993). Procedural knowledge refers to know-how and is dynamic. The distinction between declarative and procedural knowledge corresponds to the difference between knowledge and skill (Hoc, 1988). It is possible to have declarative knowledge of something without knowing how to apply it (i.e., knowing how a house is constructed but not being able to do so). Conversely, one can have procedural knowledge without the declarative knowledge to support it (i.e., knowing how to use a computer without understanding the computational processes underlying the operations). Procedural knowledge is dependent upon goal

specifications, while declarative knowledge is causal and rational (Hoc, 1988). Wagner and Sternberg (1986) have proposed that practical *know-how* is an integral component of practical intelligence.

Procedural thinking is a crucial component of planning, involving specific strategies for implementation of a plan. The execution of strategies under the guidance of a scheme was considered by Miller, Galanter, and Pribram (1960) to be the most essential aspect of planning. A term in common usage, 'strategy' does not hold a common meaning, even in the literature on problem solving, and may refer to procedures as specific as a single heuristic all the way through to global executive control processes. The term may relate to the concrete operations of procedural knowledge or the more abstracted components of conditional knowledge. The former are task-specific, while the latter are context-specific. The term has been applied to a wide range of activities, both simple and complex, those imposed on learners or spontaneously selected, whether routinized or consciously and creatively constructed (Garner, 1987). Alexander and Langer (1990) define strategies to mean "goal-directed procedures that are planfully or intentionally evoked either prior to, during, or after performance of a task" which "can exist in varying degrees of generality or separation from specific domains" (p.376). The breadth of such a definition attests to the fact that planning itself may be global or local in structure. Global planning refers to macrostrategies applied to a set of problems unrestricted by the idiosyncrasies of a particular problem within the set. Local planning refers to microstrategies applied to a particular problem (Sternberg, 1985). In a study of planning behavior in problem solving, Sternberg (1985) found that intelligent persons showed a tendency to allocate more time to global (higher-order) planning than to local (lower-order) planning, which was the reverse with individuals classified as less intelligent.

Procedural knowledge is comprised of varying levels of strategies for action. Rogoff et al. (1987) maintain that older children do not simply plan more than younger children, but also adapt planning strategies flexibly to the circumstances of particular problems. Regulating or monitoring of the execution of a plan attempts to ensure that a strategy accomplishes its intended purpose. Each time a strategy is reused it requires less effort. Irrespective of age, people do not always use the best strategies, being satisfied with less

than full effort and strategic performance (Chalmers & Lawrence, 1993). The use of planning strategies has been seen to increase an individual's degree of efficiency and life satisfaction (Burack & Lachman, 1992), and may serve as a coping strategy to deal with stressful situations (Lachman & Burack, 1993). Planning strategies are more likely to be employed as a coping mechanism by people who are optimistic, have a sense of control over external factors, have high self-esteem, and a Type A behavior pattern (Carver, Scheier, & Weintraub, 1989).

Anderson (1987) represents strategic procedural knowledge as a series of productions, i.e., rules or contingency statements of the IF-Then variety. The IF component contains one or more conditions for satisfaction before the cognitive or overt action(s) are executed as the THEN component. The cognitive system builds strategic knowledge slowly and carefully. This is the main rationale for the extensive practice required to construct new procedural knowledge. In this manner, the learner gradually builds up domain-specific procedures. Initially, a small number of simple production sets develop and with repetition combine into larger, more powerful production sets. Proficiency accumulates through fine-tuning, making available productions of appropriate degrees of generality or specificity. The strategic knowledge gains are dependent upon the declarative knowledge base for its relevance and depth. With extensive use, successful strategies may become automated, requiring little or no conscious attention and freeing memory for new learning. In this fashion, the learner gains in confidence, flexibility, and expertise. Without extensive application and development of procedural knowledge, declarative knowledge may remain inert and unavailable for successful problem solving. Unlike declarative knowledge, procedural knowledge tends to be inaccessible, having utility for guiding behavior but often difficult to explicit and examine (Rumelhart & Norman, 1985).

Two types of strategic knowledge are required, knowledge of how to plan and knowledge of how to operationalize the planning sequences. Strategies for regulating one's planning processes are pervasive throughout (Sansone & Berg, 1993). Cognitive self-regulation requires the planner to monitor his/her thinking. Behavioral self-regulation supervises the concordance between the actions and the plan. Regulation or inclusion of

others involves attempts to gain social support for the plan. Regulation of the physical environment requires strategies to arrange the physical elements for maximum efficiency.

Conditional Knowledge

De Lisi (1987) suggests that understanding the need to plan characterizes one of the most mature forms of planning. This conditional knowledge, knowing when to plan, involves an understanding of what types of situations would benefit by planning. Significant also is the knowledge of how much planning is appropriate in a given situation. At one extreme, too much planning may be maladaptive, leading to a near compulsive preoccupation with details or alternatives, or even with the planning process itself. At the other extreme, too little planning may be symptomatic of disorganization, denial, or procrastination. Knowing the suitable degree of planning allows for adequate preparation, while retaining a flexible approach, open to changing events (Lachnian & Burack, 1993).

An important factor in planning expertise is the knowledge of alternative executive strategies and the ability to use them appropriately (Hayes-Roth, 1980). Pressley, Borkowski, and colleagues have classified required conditional strategy knowledge into four components: specific strategy knowledge, general strategy knowledge, relational strategy knowledge, and metamemory acquisition procedures (Pressley, Borkowski, and O'Sullivan (1985). *Specific strategy knowledge* involves understanding of the strategy's goals and purposes, appropriate tasks for application, the range of its suitability, the gains associated with its use, the amount of effort required, and the degree of enjoyment its use entails (Borkowski, Carr, & Pressley, 1987). *General strategy knowledge* is an understanding of the effort required to employ the strategy in relation to the possible benefits. One aspect of this type of knowledge is the understanding that it is beneficial to construct elementary strategic plans prior to attempting to execute a given task. This type of knowledge increases the probability that appropriate strategies will be searched for, modified, and applied. Knowledge that well-chosen strategies produce best results is an important component, as is awareness that some level of planning is beneficial before executing a procedure and that the plan may need to be modified or even abandoned (Borkowski, Carr, Rellinger, & Pressley,

1990). *Relational strategy knowledge* provides the planner with a classification system for understanding the comparative advantages and disadvantages of given strategies in relation to each other. As task demands change or increase, this type of knowledge is essential for strategy selection for a particular application. *Metamemory acquisition procedures* are important in the self-regulation of planning activities, allowing the individual to remember the plan and its sequences, and to use prior knowledge and experience to contribute from his/her own resources in problem solving, particularly in ill-defined situations. These procedures facilitate transfer of learning from other contexts to reach a given goal (Borkowski, Johnson, & Reid, 1987).

Conditional knowledge acts as the connector between procedural and declarative knowledge. The literature on metacognition has explored this type of knowledge and found that although individuals may know 'what' planning is (declarative) and 'how' to plan (procedural), they often lack the awareness that they need to step back from the situation and formulate a planning strategy. Rather than stress the external properties of a problem, Kreitler & Kreitler (1987) contend that attention should be paid to the beliefs about planning, such as whether people usually plan in a given situation, whether one ought to plan, ownership of the plan (i.e., should self or another person plan? etc.). In considerations of the appropriateness of planning, one must distinguish between situations where planning is more advantageous than spontaneous or passionate responses. Goodnow (1987) suggests that these decisions may be influenced by the constraint of having to husband resources for action. Such decisions are also affected by the perception of the 'movability' of certain environmental or social 'pieces' for the purposes of planning.

Traditional laboratory problem solving tasks show how people plan when asked to. They provide little information however, about the acquisition and substance of people's knowledge about the norms for planning and the kinds of situations which warrant planning. Research on metacognitive knowledge reveals that children who know how to plan, may not understand what kinds of situations would benefit from planning (Brown, Bransford, Ferre, & Campione, 1983). Much of this type of knowledge appears to be learned informally from experience, giving older individuals the advantage of their greater practical wisdom (Smith et al., 1989). Goodnow (1987) postulates that much of this type of

knowledge of when to plan is gained from exposure to social norms about planning. This has led Sansone and Berg (1993) to caution that when considering an individual's planning appropriateness, adaptive or maladaptive behavior can only be assessed in relation to the immediate phenomenal and socio-cultural context in which the action occurs.

Representation of Knowledge

The three types of knowledge lead to how the individual mentally represents a goal-oriented situation. The notion of knowledge representation may be one of the most 'muddled' concepts in cognitive psychology (Rumelhart & Norman, 1985). A representation is rather a kind of model of the thing it represents. Its essential quality is that it permits reflections and conclusions by virtue of the model alone. Cocking and Copple (1987) observe that the central role of representational activity in explaining intellectual growth remains uncontested by all theories of learning. This uniquely human ability to gain access to the features of an object or event in its absence is of foundational importance in understanding cognition. Most commonly, planning is conceptualized as "a fully internalized symbolic process that requires mental, symbolic representation, and mental operation upon the symbols" (Pea & Hawkins, 1987, p.277). Planning fundamentally deals with the hypothetical, what has not yet happened. In order to plan, individuals create mental images or representations of both their understanding of the salient variables for goal-attainment and of the environment in which the action is to take place. Without this ability to form mental representations, and without the representational capacity to anticipate the outcomes of actions, planning would not be possible (Cocking & Copple, 1987).

In addition to procedural planning, Wilensky (1981) proposes meta-planning as a driving principle, i.e., the ability to construct knowledge about how to plan with abstract plans and goals, and how to use this knowledge to solve problems. De Lisi (1987) found that the capacity for decontextualization facilitates development of the representational abilities which support planning. Hayes-Roth (1980) discovered that the higher the level of planning abstraction, the more likely individuals were to overestimate what they could

accomplish. When their thinking was confined to only these more general considerations, they often failed to consider time expenditures of the planned actions. It is apparent that despite the obvious benefits of maintaining a more global view of a problem situation, an exclusive preoccupation with abstract representations can be counter-productive. The most advantageous becomes the balance between the representational and functional aspects of planning. People not only plan by abstraction but also by analogy and by modeling, each differing in the way they represent the task in the planning environment (Hayes and Nash, unpublished manuscript).

Demands upon short-term memory capacity by the representational process may be considerable. Analogous situations and their plans must be retrieved from long-term memory to be considered as candidates. Elements relevant to the problem situation and goals must be held in memory while plans are constructed. Sequencing and plan execution exert additional demands. Mature planners must mentally simulate (running the plan) in order to anticipate consequences, errors in the representation, flaws in sequencing, etc. External planning aids are helpful in reducing cognitive load (see Chalmers & Lawrence, 1993), but it is the consistency of monitoring which ensures sub-goals are achieved, sequences carried out, errors detected, distractions avoided, and feedback incorporated. This supervision taxes already burdened memory and representational capacities. (Scholnick & Friedman, 1993).

There are varying degrees to which the representation is faithful to the objective elements of the problem and solution path. Across the life span, individuals of different ages have been found to show systematic differences in how they represent and define their everyday activities. Scholnick and Friedman (1978) attribute failures in problem solving to distortions in representations, rather than omissions, and that these distortions are most evident in open-ended solutions. Unlike Newell and Simon's (1972) focus on the representation of the initial problem state, current theories acknowledge the more pervasive nature of these representations to include the goal, knowledge of the processes involved to reach the desired end, implicit theories or conceptions of the social and physical environment, beliefs about planning, and appropriateness. The complex nature of mental representation is well documented in the literature. Understanding of this component of the

planning process is an underpinning of the present study. Representational abilities, however, are essential but not sufficient for planning to take place (Cocking and Copple, 1987).

Planning as Goal-Directed Behavior

It is a striking characteristic of human beings that they persist in setting out goals for themselves and struggling toward their attainment. Heppner and Krauskopf (1987) suggest that the primary function of goals is to make behavior organized and purposeful. They suggest that "perhaps one of the most critical judgments in personal problem solving involves the decision to set one's goals to change either the situation or oneself" (p.399). The literature is in complete accord that planning is goal-oriented behavior. The acknowledgment of a problem or setting of a goal, no matter how vague, is the precursor to planning. Goals differ in whether they are real or perceived, prescribed or actual, initial or final, internally or externally generated, rational or emotionally laden. Lawrence and Volet (1991) conclude that goal structures are inherently complex cognitive entities in both structure and utility for infusing meaning and direction to actions. They speak of goals as living aspects of people's representations, capable of adaptation and evolution, whether resistant or responsive to the environment. Also pertinent is the resistant quality of individuals' goals, sustaining both power and plasticity.

Planning may refer to the means to achieve a goal or the goal itself (Hayes & Nash, unpublished manuscript). The term 'goal' refers to both the end state of a task and the motivation for undertaking it (Scholnick and Friedman, 1993). There are numerous factors affecting the establishment and implementation of goals. A successful planner must be able to infer his/her own goals as well as be able to generate plans for these goals (Wilensky, 1981). The degree of definition of the goal is a determinant of how the planning process will proceed. The anticipatory span varies depending on how remote the goal is. The more remote the goal, the fewer options to anticipate and the more subgoals are required to proceed (Hoc, 1988). When faced with potential difficulties, the learner must often choose between altering the strategies for goal achievement or altering the goals themselves to be more realistic or adaptive.

Individuals often hold competing goals and must resolve the inherent conflicts prior to choosing a course of action. The complexity of planning may be partly attributed to the complicated ways in which numerous goals interact in most situations. A significant portion of planning involves detection of these interacting goals, anticipating their implications, and making decisions among competing alternatives in order to proceed. When dealing with multiple goals, values must be placed on elements in order to prioritize sub-goals and to establish criteria for goal satisfaction, substitution, or abandonment. Problems arising from this process may constitute goals or meta-goals in themselves (Wilensky, 1981). In certain circumstances, it may be more adaptive to 'piggy-back' goals onto one another to satisfy a multiplicity of personal and external objectives (Lawrence & Volet, 1991). Decisions must be made to determine the probability that a goal can be achieved in the given context, how much information is required, and how much compromise the original goal can sustain under the existing constraints. The fine-tuning necessary to achieve compatibility between representations and goals is a fundamental task of successful planning. Proficient learners are those who choose goals compatible with task criteria, course material, and personal learning characteristics (Brown, Campione, & Day, 1981). The salient choice of goals helps give meaning to complex and seemingly disparate activities (Randall, 1987). Smith (in press) argues that goals shared with others enhances the complexity and uncertainty of planning and that some poor planning may result from the setting of unrealistic goals due to the desire to gain approval from others.

In some instances, well-defined goals allow the planner to know the 'final state' in advance and serve to consistently guide behavior throughout the solution path (Newell & Simon, 1972). When the goal is defined by an experimenter and understood by the planner, the rapidity with which the individual moves to plan sequencing may largely by-pass the goal exploration stage. In other cases of initially ill-defined goals, goal identification becomes a distinct problem solving activity (e.g., Flower & Hayes, 1981). Hayes and Nash (unpublished manuscript) suggest that in many ill-defined tasks the specification of the goal may be the most important function of planning. Often, even when goals are evident, individuals may prefer to respond opportunistically, to refine or redefine goals on the basis of new knowledge and feedback during plan execution (e.g., Hayes-Roth & Hayes-Roth,

1979). Individuals may even decide to forgo extensive goal analysis as inefficient, preferring to expend energy on action (Hayes-Roth, 1980). Goal monitoring may lead to error-detection, affecting goal definition, goal substitution, goal conflict, or goal abandonment during the process of problem solving. Lawrence and Volet (1991) studied the significance and function of academic goals of university students and how their goals influenced their ability to monitor learning activities over time. Their findings indicated that students' initial representations were constructed from various and conflicting perspectives rather than from the sequential, integrated goals proposed by well-intentioned instructors.

Deciding to Plan

Following the construction of a mental representation and the selection of goals, comes a decision regarding whether it is realistic and advantageous to formulate a plan in advance of action. A set of cultural beliefs, personal assessments, and personality variables are instrumental in deciding whether to engage or disengage in planning (Scholnick & Friedman, 1993). Lawrence (1991) postulates that the most difficult obstacle may be to discover the means to motivate students to plan, i.e., convincing students that the self-mastery and satisfaction derived from effective planning is well-worth the time and effort involved.

The intellectual or 'brain-teaser' type of laboratory tasks may provide the ideal conditions for planning, in that all necessary information is available and the necessity for planning is either implicit or explicit. In such instances, the decision to plan requires little attention. On occasions which do not provide these 'ideal' conditions, the decision to plan is contingent upon the ability to recognize the configuration of internal and external conditions that constitute an occasion for planning (Brown, 1978). The degree to which a person is 'planful' is subject to a myriad of individual differences. Although many cognitive science theorists make the assumption that planning follows automatically once a goal is chosen, many developmental and personality theorists suggest that planfulness is invoked to different degrees, depending on context and individuals differences. For example, often young children, adolescents, impulsive people, hyperactive, or distractible people tend not

to plan. Deficiencies in planning may be caused by the degree of planning chosen. Too little planning may prevent adequate elaboration for successful execution. Too much planning may result in an excess of detail, causing inefficiency and inflexibility. Overplanning is often driven by insecurity and feelings of lack of control (Dorner, 1985).

Scholnick & Friedman (1987, p.13) propose four underlying components affecting a decision to plan: a set of beliefs about self and the task; sensitivity to situations that warrant planning; the relationship of the strategy to the situations needing to be planned; and most importantly the level of the person's self-control. In their study on beliefs about planning in children, Kreitler and Kreitler (1987) found that those who maintain beliefs, whether direct or indirect, about the efficacy of planning were more likely to engage in planning than those who did not. Goodnow (1987) reminds us that:

the virtue of planning is linked to conditions of living where the number of uncontrollable events is manageable and where there is sufficient control over resources to make the exercise worthwhile. Without some degree of access to resources and some control of the movable pieces, one might do better to bend with the wind or flow with the tide, engaging in opportunistic leaps or in short-term plans with multiple options left open (p.194).

When resources are plentiful, individuals may decide not to plan, preferring a more spontaneous approach. Conversely, when there is a perception that resources are scarce or of high value, planning may become a more effortful, highly regarded activity (Goodnow, 1987). She contends that there is not an equal distribution among people as to who has the right or the obligation to plan in a particular situation.

The motivation to plan undergoes several shifts as the individual matures. Research indicates that extrinsically motivated children plan more poorly than those children with either an intrinsic or intermediate level of motivation (Das et al., 1995). Young children appear to plan for a routine goal (often set by an adult), in familiar surroundings, with accessible resources, and simple plan evaluation. An adult often monitors the plan for the child, acts as a resource, and there is a social consensus for the need to plan (Kreitler & Kreitler, 1987). As the child matures many factors remain constant, (i.e., goal is set, social consensus, adult support), with the addition of new challenging, and less well-defined elements. By preadolescence the parameters for planning broaden, with the decision to plan

often based on achieving personal, meaningful goals, and avoiding risks. Their plans involve increasingly more ambiguous elements and increasingly more social contexts. Emphases shift from implementation to the decision to plan and plan construction. The decision to plan is underscored by an appreciation of the need for contingency arrangements to accommodate possibilities. In addition, there is a heightened awareness as the individual ages that certain environmental and causal factors are beyond one's control.

Planning and Control

Perhaps most important in the decision to plan and to sustain effort during plan execution lies in the individual's concept of control (Scholnick & Friedman, 1987). Understanding of notions of control can be acquired through consideration of the concurrent perceptions of control, the desire for control, and the implementation of actual control behaviors (Blank, Levesque, & Winter, 1993). The perception of control refers to a belief or feeling that one can significantly influence or take charge of what happens in one's life. This notion includes evaluations, beliefs, expectations etc. of the extent of control possible, predictability of events, causality etc. Unfortunately, research into the effects of perceived control on planning with children is often examined in isolation from that done with adults (Lachman & Burack, 1993). Also, a sense of control may often be domain-specific and therefore not readily generalized (Blank et al., 1993). Scholnick and Friedman (1993) suggest that the relationship between planning and control may be curvilinear. A low sense of control may lead individuals not to plan, due to a lack of conviction that they can influence outcomes. A high sense of control may render a false sense of security, resulting in a lack of planning. Individuals with a moderate sense of control may be most likely to plan, in an effort to compensate for weaknesses and increase their sense of control. An adaptive sense of control recognizes that there are events beyond individual influence, while maintaining a sense of responsibility and meaning in coping with what comes.

The degree of consciousness implicated in planning is noted by Rogoff et al. (1987), that although the planful organization of action may not necessarily be fully conscious, the

deliberate control of activity is. This includes both beliefs about subjective control (real or perceived) over one's operations and beliefs about control (real or perceived) over environmental factors affecting goal attainment (Heppner & Krauskopf, 1987). The subjective perception of control has varying degrees of correspondence with the objective factors of control. Yet, regardless of the accuracy of one's beliefs about control, they do influence behavior (Lachman & Burack, 1993).

The self-regulatory, metacognitive aspect of self-control has been discussed above. Self-control relies on both the individual's capacity to delay gratification and his or her ability to divert attention to other areas of productive endeavor until gratification is possible. Delaying gratification requires the belief that the reward of doing so is worth the effort and the belief that the reward will still be there after the delay (Michel, 1984). Teachers report that children who are successful in delaying gratification are "more planful, reflective, and more able to concentrate" (Scholnick & Friedman, 1987, p.18). Individuals exhibiting self-control are those who are able to step back and reflect on proposed actions rather than impulsively respond without this intermediary step.

European action theory (e.g., Oppenheimer, 1987; Dreher & Oerter, 1987; Hoc, 1988) has given substantial attention to beliefs about planning and control. Their findings agree with similar factors found in American theories of locus of control and social attribution. One's beliefs about the causal relationships of success to such factors as fate, luck, forces of nature, unknown factors, effort, ability, or external agents (government, bosses, teachers, parents, etc.) have a significant impact on both the decision to plan and the persistence during planning. Das et al. (1995) have substantiated the linkages of individual differences in planning to locus of control, self-concept, and intrinsic motivation and concluded that the higher-order thinking involved in planning has influence over non-intellectual aspects of personality. As attribution of success or failure to unknown factors diminishes, children initiate planning as a means of influencing outcomes (Scholnick & Friedman, 1993). A belief in effort as a significant variable in success encourages planning. Those lacking confidence in their abilities are much less likely to take on a task, let alone the planning of the task. It has been found that the elderly or impoverished may fail to plan, believing they are at the mercy of external forces beyond their control (Scholnick &

Friedman, 1987). It is important to note that the degree of change in beliefs about control varies depending on the domain of functioning (Lachman, 1993). Although anticipating outcomes tends to enhance a feeling of control, this can also be achieved by the ability to respond effectively to unplanned situations (Lachman & Burack, 1993).

Gatz and Karel (1993) examined changes in perceptions in the sense of personal control using multiple cohort, longitudinal design. The twenty year study (1971-1991), including 1267 subjects, revealed that general control beliefs appear to be relatively stable individual differences, with generational variations. In their review of the developmental literature on the evolution of beliefs about control, Lachman and Burack (1993) report that external control beliefs remain fairly stable during childhood, while beliefs of the degree of control held by powerful others (e.g. parents, teachers) decreased during the 8-14 year period. Beliefs in internal control increase from adolescence to middle age (Nurmi, 1993; Gatz & Karel, 1993), whereas in later life, internal beliefs remain generally stable, while beliefs in external sources of control increase with age (Lachman, 1986). Although older adults become more sensitive to external influences, their beliefs in internal control do not generally decline (Lachman, 1986). In a study of 19-71 year old adults, Nurmi, Pulliainen, and Salmela-Aro (1992) noted that interest in planning for areas of life over which individuals feel little control (i.e., health) increased with age, while interest waned for planning aspects over which there was a feeling of substantial control.

Miller, Galanter, and Pribram (1960) describe plans as 'control structures', i.e., structures which convey information to control some other process. Their conception refers to control as being 'tight' or 'loose'. As most plans are 'loose' rather than tight control structures, Hayes and Nash (unpublished manuscript) contend that in most instances, plans serve to guide action rather than control it.

Plan Construction

"In motivated, reflective individuals who are aware of the value of thinking before acting and who lack a ready-made strategy, the course of a goal will be followed by the

formulation and execution of a course of action” (Scholnick & Friedman, 1987, p. 19). This phase is described by Hayes-Roth and Hayes-Roth (1979) as “the predetermination of a course of action aimed at achieving some goal” (p. 275). As mentioned at the beginning of the chapter, a plan is termed anticipatory when the planner thinks through the entire procedure before acting. Early accounts of planning (i.e., Newell & Simon, 1972) emphasized this aspect of determining an often hierarchical sequencing of actions, based on and constrained by the problem solver’s initial understanding of the problem. These actions are commonly planning heuristics or algorithms. Other theories of planning highlight the dynamic, transactional aspects of planning-in-action as the problem solver responds to feedback during the process (i.e., Meyers & Rebok, 1985).

A plan may be viewed as a ‘gestalt’, i.e., a whole which presides over the organization of its parts (Hoc, 1988). Whenever there are multiple sub-tasks or parts, the plan must respond to the constraints imposed on each separate segment, while at the same time keeping the overall picture in perspective. Made up of component parts, it serves a multitude of functions. Initially a plan is constructed purely for goal attainment. As experience grows, the criteria broaden to include efficiency and eventually the elegance of the plan (Scholnick & Friedman, 1993). Adults have a greater tendency than children to reorganize a given task to integrate with a self-constructed overall plan (i.e., metaplan), and are more likely to cluster individual components into meaningful chunks (Hayes-Roth & Hayes-Roth, 1979; Meyer & Rebok, 1985). Smith and colleagues (Smith, in press; Smith & Baltes, 1990; Smith, Dixon, & Baltes, 1989) have written extensively regarding how specific plans are guided by an overarching life plan constructed to address hopes and needs in areas of personal, interpersonal, professional, aesthetic, and educational satisfaction. The underlying meaning of metaplans provides coherence between past events and future projections.

Hayes and Nash (unpublished manuscript) explore the way in which the environment is changed by the very act of planning. They suggest that the initial part of a plan, i.e., information gathered during the early stages, may influence both the thinking of the planner and the subsequent stages of planning. Likewise, decisions made for preliminary plan construction may constrain later stages of planning. Initial plan construction can lead to re-

organization of the knowledge of the planner, awareness of new relationships and inconsistencies, and alteration of the entire plan abstraction.

Pea (1982) has identified that successful plan construction is partly determined by the extent to which components are relevant to the execution of the plan once action has commenced and by the extent to which planned activities optimize an economy of actions. To this, he adds the notions of the extent to which plan construction maximizes values held in the metaplan and the extent to which the components are flexible for adaptation. The decision making involved in the formulation of a plan also includes assessments of probability of stability of the environment. A low assessment requires a more general, flexible plan. A high assessment allows a more specific sequence of events.

Not every plan must be constructed from scratch. Plans may be created by borrowing and adapting old strategies by analogy from similar problems in one's past experience (Anderson, 1987). One hallmark of an expert planner is his/her awareness that it is often more efficient to modify familiar strategies than to create new ones. Novice planners have less of a repertoire from which to draw. Their plans may be skeletal, less detailed, and contain untested strategies. More detailed plans become possible with the accumulation of knowledge and experience. A proficient planner may also need less detail, requiring only reminders. As expertise in a domain is developed, retrieval is often more efficient than detailed creation of a new plan. Decisions must also be made about the amount of effort which should be expended. The devising and implementing of a plan does not, however, require the planner to be aware of all factors. In a situation in which pre-packaged components or plans are available, the planner may need only supply the missing elements for current goal-attainment. The everyday planner must ultimately make compromises between the desires for a fully elaborated, detailed plan for probable contingencies and inherent constraints, and the need for flexibility.

The construction of a plan may be either prospective (i.e., steps required to reach a goal from the initial state), or retrospective (i.e., from the goal state to the initial state by working backwards) (Hoc, 1988). A plan can be generated in a deductive, top-down, hierarchically fashion from consideration of the problem situation as a whole or from the inductive, bottom-up, or on-the-fly, so to speak. However constructed, many plans are

never put into action at all. Plans provide suggestions for action, constructed with a given number of components, any of which may be conceived, utilized, or revised at any point in the construction or execution. These alterations may be made at any time to either the desired goals or to the structure of the plan itself. Situations in which a plan is revised are of two types, either the environment may be altered by the intervention of the planner, or factors independent of the planner may operate to modify the situation (Hoc, 1988).

Plans are constructed for specific situations. Some require specialized knowledge in highly defined contexts. Others are fraught with imaginings and magical solutions. Still others require practical wisdom for everyday, meaningful dilemmas. Plans constructed for solving laboratory problems, such as the Tower of Hanoi, make demands on computational skills, often emphasizing speed and accuracy. The initial state and the end state are known entities. The planner is required to understand the rules. In story comprehension, one must understand the intent of the author, the context of the story, and the possible direction in which the plot can progress. At its simplest, this type of task merely requires recognizing that a plan exists. In solving problems with personal meaning, many elements are familiar. There are often numerous combinations of sequencing which are suitable. Most everyday planning does not require extensive plan construction, merely retrieving and adapting an appropriate analogous plan. Daily experience continually confronts individuals with obstacles to compensate for and overcome. These repair strategies are incorporated into plans for further benefit (Scholnick & Friedman, 1993).

As mentioned previously, Goodnow (1987) refers to the components within the problem solving environment as movable pieces. The perception of degrees of movability is a prime directive of the allowable components within a plan. The failure to 'see' a given piece as either includable, alterable, or movable leads to what Duncker (1945) referred to as functional fixedness, a core difficulty in finding solutions to problems. This fixedness seriously limits plan construction and flexibility. Experiences with others and with tasks modify the perception of what may be included as a component leading to more effective planning. This holds true for the perception of other people as potential pieces of a plan, as resources, as movable pieces, or as co-planners. Goodnow (1987) cites examples from her

research where parents are reluctant to delegate certain chores to children and where children were unable to see that a re-allocation of chores was to their advantage.

Types of Plans

Plans themselves may be implicit or unspecified, explicit or specified, ranging from a mental checklist to a complex, multi-functional critical path diagram (Plunkett & Hale, 1982; Heppner & Krauskopf, 1987). Plans may also be distinguished by their degree of appropriateness to a given situation or the degree of social approval rendered in a particular context. These variations may affect the monitoring required. Plans vary in levels of abstraction, from routine and automatic to highly complex and elaborated. In skill acquisition, plans tend to become more specific, thus requiring less effort for execution and less feedback from the environment to guide the plan, relegating the procedure to that of routine implementation with little monitoring. This reduced effort and monitoring is beneficial to the planner. As the level of abstraction becomes increasingly more general, strategies gain in flexibility and accessibility. These more general skills are then available to the problem solver for a variety of situations.

Categories of plans have been differentiated by De Lisi (1987) on the basis of four relationships: 1) the relationship between the functional and representational components employed, 2) the relation of plan to context, 3) the degree of elaboration of the representational component of a plan, and 4) the degree of differentiation of planning phases. De Lisi has proposed a typology of four types of plans based on these four criteria to explain qualitative differences. The behavioral, procedural Type 1, called 'plan-in-action' is one in which planning occurs in one undifferentiated entity initiated by immediate, externally generated goals. Type 2, 'plan of action', are those containing deliberate sequencing of represented behaviors oriented to real (not hypothetical) goals and are often initiated or supported by another. Type 3, 'plan as a strategic representation' involves deliberate, strategic representations of future states and hypothetical goals. The need to plan is accompanied by an awareness of the now fully differentiated stages of planning. The final Type 4, 'plan as an end unto itself' describes fully deliberate effort, accompanied by

awareness of the necessity to plan and the possibility that execution may never occur. Plan formation is the goal, the process is purely representative and metacognitive. Type 4 plans may be collaborative or societal in some way (i.e., a government disaster contingency plan). A progression through the four types shows an increase in abstraction, a decrease in attachment to context, and an increase in conscious awareness of the processes involved. In lower-order types of plans, functional components take precedence over representational components, which is the reverse in higher-order plans.

Research on Planning Processes

Vygotsky regards conscious awareness as the core of metacognition. Brown (1987) contends that metacognition refers to "an understanding of knowledge, an understanding that can be reflected in either use or overt description of the knowledge in question" (p.65). She suggests that this conscious access is "the highest form of human intelligence". Miller et al. (1960, p.111) suggest that "consciousness is in some essential way the capacity to make one's own Plans and that volition is the capacity to execute them". Planning knowledge should serve not only for planning, but for understanding as well (Wilensky, 1981). Various studies have been undertaken to attempt to uncover the substance of this 'consciousness' about cognitive processes in general, and planning in particular. There are several studies relating to the mental representations of planning.

Lawrence and colleagues have made numerous investigations of conceptions of planning. Lawrence, Chalmers, and Pears (1988) compared students in the later years of high school and adults on their conceptions of the nature of planning. They asked participants what it meant 'to plan' and 'not to plan'. They found existing individual differences unrelated to age. Students did understand the organizational and effortful components of planning, 'but they said it was simply something they did not often do' (Lawrence, 1991, p.92). In light of the age-related findings of Kreidler and Kreidler (1987), it appears that by secondary school, there is a fairly stable, realistic notion of planning held by students who do not perceive themselves as planners. Lawrence (1991) reports that in a modified replication of the Hayes-Roths' errand-running experiment, adolescents failed to

impose order and organization on the list of things to do. They showed a tendency not to invoke a metapanning conception but rather attacked component tasks individually. In a second study, boys, who were prompted to plan and given two trials, still failed to engage in meaningful levels of meta- or opportunistic planning. In another study, men were found to make more planning errors in total than did women, boys, or girls. The men's poor planning were related to their unwillingness to meet the task constraints and their reluctance to engage in the effort of thinking through what the instructions involved. In one sense, the men's plans were like those the adolescents had produced in earlier studies. In their investigation of the role of external aids in planning, Chalmers and Lawrence (1993) asked participants to render a retrospective analysis of the plan they made to give an unexpected party. The researchers concluded that the subjects were indeed aware of what they were doing.

Wolters (1990) attempted to develop an effective instrument to measure metacognition and its development in normal and learning disabled students. Assessment of ability in planning was used as a measure of metacognitive skill. In testing the developmental level of metacognitive thinking of 189 six to twelve year olds, Wolters compared results from elementary schools, schools with minority ethnic populations, and schools for special education, specifically learning disabled. It was found that the differences between the groups could be measured by differences in planning behavior. A three stage developmental process of planning behavior was identified: haphazard non-planning, inductive stepwise planning, and deductive planning. The classification of Wolter's stages of planning behavior closely resemble Brown's (1987) three stages: no planning, planning-in-action, and pre-planning. Both studies make inferences of the level of metacognition from the stage of planning behavior. The pertinence of these studies to the present research is to confirm planning as a manifestation of metacognitive skill.

Pea (1982) used a clinical interview method to investigate children's conceptions of the planning process, to explore how children define planning, planning occasions, procedures, and the qualities of planners. His study used verbal protocol analysis to compare responses of younger children's (n=13, eight and nine year olds) and older (n=13, ten and eleven year olds) metacognitive reflections about the nature and function of

planning. The findings revealed that this awareness does increase with age. School-aged children displayed developed opinions of situations appropriate to planning. They understood the consequences of not-planning, the factors which influenced planning difficulties, and various means of aiding planning. Pea noted that few children mentioned the flexible and revisionary nature of the planning processes which distinguish advanced planning. Similarly, metapanning principles underlying revision of goal definition, plan construction, and plan execution were mentioned by only a few children. He concludes that "it is very striking that the problem solving settings of schoolwork were virtually absent from children's accounts of planning occasions" (p.23).

In a much larger study, Kreitler and Kreitler (1987) investigated the metapanning beliefs 5-11 year old children held about planning. They sought to understand the matrix of determinants guiding the development and performance of planning by querying ideas the children had about what constitutes planning, its antecedents, consequences, importance, difficulties, range of application etc. They assumed that the ideas held would affect the children's manifestations of planning. They also sought to determine what is relevant to planning and what is not, i.e., the use of tasks relevant to planning from the point of view of the children. The first (n=200) of two studies attempted to gain information about metapanning and dealt with several aspects of the content and structure of children's conceptions about planning, noting changes in development within the 5-11 year span. The children were randomly sampled from five schools and interviewed individually. The interview questions were descriptively and age-appropriately worded to inquire about What planning was ? / What kinds of things are planned? / Who plans, children or grown ups?/ How is planning done? / Is planning difficult? etc. The results produced 22 general categories of beliefs in accordance to the authors formerly defined 'meanings dimensions'.

The second study (n=240) was designed to investigate the actual planning skills of the children. The results from the first study were used to construct 10 Planning Situations. These brief tasks were presented as games during individual interviews and were subsequently evaluated on three variables; general planning skills, plan adequacy, and techniques and procedures of planning. Each child was administered the Peabody Picture Vocabulary Test for measurement of IQ. Their findings showed that the correlations of

planning variables with IQ are irregular in terms of age groups and in terms of specific variables, concluding that the relation of planning to IQ is moderate and that this relationship is dependent upon particular aspects of planning. Their research concluded that from the age of 5 onward, there was an increasing similarity in the meaning of planning for different children, especially in relation to domains of application, causes, purposes, and results of planning. Accompanying this development, is an increasing familiarity with how planning happens, its duration, frequency, difficulties, possible positive and later also negative ramifications. They found that with age, personal errands and interpersonal relations (with peers or adults) emerged as the two focal domains of planning, confirming Goodnow's contentions. In support of the literature on planning and control, they found that after age 5 children increasingly conceive of planning as a means of control over both self and the environment. Finally, as the child develops, the function of planning is increasingly applied for the attainment of important personal and social goals. In essence, the studies by Kreitler and Kreitler (1987) and Pea (1982) are similar to the present research in the attempt to uncover the perceptions of the nature and function of planning of a given population(s).

The studies cited above attest to the fact that individuals are conscious to some degree of the processes involved in planning and are able to articulate this awareness. The studies mentioned here are with populations of children. We still do not know if adults have similar views or whether their views are domain-related. Over a decade ago, Pea raised the hope that future research "could reveal specific interrelationships among various fronts on which planning activities may develop as well as encourage a deeper, process-oriented understanding of social and individual conditions that can help or hinder the development of planning activities " ... and that planning skills "be studied, as well as taught, in relation to specific contents" (p.24).

Domains of Planning Expertise

Domains are distinguished in terms of vocabulary, task requirements, theoretical parameters, materials, methodologies, knowledge relevant skills and abilities, properties,

and operations. Individuals who exhibit mastery in a given domain are assumed to have the necessary well-developed metacognitive skills for proficiency in that area (Royer, Cisero, & Carlo, 1993). Ericsson and Smith (1991) suggest that research on expertise may be one of the areas of most rapid growth in cognitive psychology and cognitive science. The term *expertise* as used in the literature, most commonly refers to the accumulation of an extensive, highly organized, and integrated knowledge base accompanied by a high-level of performance (Sternberg, 1985; Clark & Taylor, 1992). These complex cognitive abilities can be acquired, practiced, refined, and transformed throughout the life-span (Smith, Dixon, & Baltes, 1989). Expertise is assumed to be outstanding behavior attributed to 'relatively stable characteristics' of the individuals in question (Ericsson & Smith, 1991). In their discussion of the ability to plan, Ericsson and Smith (1991) report that the study of domain expertise reveals that experts employ various complex mental operations for analysis which depend on mental models and internal representations. They propose that access to accumulated past experience may possibly be the most significant consideration explaining the development of expertise. It is generally accepted that the development of this type of outstanding behavior takes at least ten years of continual practice in the related domain or area of specialty (Hayes, 1989; Sternberg & Wagner, 1986; Ericsson & Smith, 1991).

The ability to represent and integrate large amounts of knowledge is a common factor in varying types of expertise (Ericsson & Smith, 1991). All research on expertise confirms that these individuals possess an extensive body of specific knowledge upon which their efficient performance consistently depends (Olson & Biolsi, 1991). The greater facility of the expert results partially from experience in a given domain, domain-specific knowledge, and a coherent organization of the knowledge base. Anderson (1983) proposes that this acquisition and transformation process consists of three general stages: firstly, the learning of a body of facts of declarative knowledge pertinent to a given domain; secondly, the learning about strategic application of this knowledge; and thirdly, the development of a procedural knowledge base for efficient functioning within the requirements of the domain in question. The increasing refinement in developing expertise allows for greater speed and efficiency in strategy access and search, combined with an enhanced degree of flexibility for adaptation to the changing demands of the task and its context. Research has identified

(e.g., Jonassen et al., 1993) that experts represent problems in terms of abstract principles; novices represent their problems in terms of its literal characteristics. Experts also differ from novices in that their knowledge organization is more hierarchical, more abstract, more elaborated, but less complex (Bransford, Sherwood, Vye, & Rieser, 1986).

Glaser and Chi (1988) have isolated seven key characteristics of expert performance found to be 'robust and generalizable' across different domains: 1) experts excel mainly in their own domains; 2) experts perceive large meaningful patterns in their domain; 3) experts are faster than novices at performing the skills of their domain and they quickly solve problems with little error; 4) experts have superior short-term and long-term memory; 5) experts see and represent a problem in their domain at a deeper (more principled) level than novices who tend to represent a problem at a more superficial level; 6) experts spend a great deal of time analyzing a problem qualitatively; and 7) experts have strong self-monitoring skills. For example, unlike novices, experts are more conscious when they make errors and ask more questions. Compared to novices, experts have a greater repertoire of plans at their disposal, which may be retrieved in an apparently almost automatic fashion. They also possess evaluative criteria for preliminary testing for heuristic value. Experts are able to compare various plans simultaneously against these criteria (Hoc, 1988). These authors argue that the experts' superior monitoring and self-knowledge reflect both their more extensive domain knowledge and their different representation of that knowledge.

There are possibly an indeterminate number of domains in which planning plays a vital role and which might claim expertise in this area. Each domain has its own inherent concepts and methodologies which distinguish it. There is also a wide variation in the scope of particular domains. Some are relatively generic in scope and are easily adapted to other domains, i.e., mathematics, physics, and mechanical engineering. Others are less generalizable in their knowledge base. Hoc (1988) attests that "these hierarchical relations across and within task domains have their counterparts in relations across and within representation and processing systems, to the extent that they have been internalized. These hierarchical relationships are exploited in the elaboration and implementation of planning mechanisms" (p. 17).

Limitations in the Literature Concerning Planning

In relation to the functions for which planning is used, the literature is unusually reserved. The few references made to what planning is used for are mostly in the context that it would be advisable to know more about this. The notable exceptions are Pea (1982) and Kreitler and Kreitler (1987) in their studies on children's impressions about what planning is used for. A review of the literature could find no studies inquiring about what adults used planning for, from a domain-related perspective.

An overwhelming majority of the references to planning in the literature are in relation to the nature of planning. As discussed in chapter one, the abundance and repertoire of definitions have increased the difficulty in studying planning perspectives. Friedman, Scholnick, and Cocking (1987) speak directly to "a controversy about the prevalence of planning in human behavior" as a result of different definitions of planning (p.517). There is a clear need to go beyond the territoriality of research paradigms to understand how planning is defined by the practitioners who daily rely on this ability. The limited research to date has focused almost exclusively on children to define what is meant by the term planning.

There is also a lack of consensus among researchers in planning about which facets of goal-directed behavior should be singled out for discussion and investigation (Scholnick & Friedman, 1987). Despite the fact that goal selection is often infused with affect and the components of a plan may be emotionally laden, many of the laboratory simulations of real life problems found in the literature fail to allow subjects to participate in goal setting. Scholnick and Friedman (1993) contend that this diminishes opportunity for learning about goal setting and meaningful problem solving, as well as reduces the ecological validity of the tasks presented. These factors equally hold true for the motivation to plan and commitment to plan execution.

One striking limitation in many of the studies on planning is the assumption that planning is an individual problem solving activity (i.e., Newell & Simon, 1972; Hayes-Roth & Hayes-Roth, 1979). There also has been the pervasive assumption in many investigations of planning that it is performed in a contextual vacuum (Oppenheimer, 1987; Friedman,

Scholnick, & Cocking, 1987) without consideration to cultural and social factors. Unlike simulated problem solving, real life planning may have dire consequences, albeit emotional, social, physical, financial etc. Cognitive science also fosters the assumption that once presented with a problem, an individual automatically applies general rules or strategies for planning the solution. Real-life contexts indicate to the contrary, that planning is often a shared activity and the contents of plans are subject to negotiation in many instances.

Emphasis in planning literature throughout the past four decades has been placed empirically on the procedural knowledge involved in planning, perhaps at the expense of the declarative and conditional knowledge. In particular, significant attention has been given to the procedural knowledge of individuals in rather routine dilemmas. The seminal work by Hayes-Roth and Hayes-Roth (1979) explored how individual's planned a day's errands, with the aids of a list of activities and a map of a fictional town. Smith & Baltes (1990) used an adaptation of Hayes-Roth and Hayes-Roth (1979) when they presented subjects with scenarios of fictional individuals facing difficult decisions about the future. Meyer and Rebok (1985) had third graders, eighth graders, college students, and seniors sort decks of cards. Rebok (1989) again modified the errand planning by having subjects plan a grocery-shopping task. Pea and Hawkins (1987) used a chore-scheduling task with children, similar in demands to the errand-running task. Studies of this genre are dealing with reasonably well defined problems, which contain most of the necessary information to construct a plan. In each of these cases, the planner has the luxury of formulating a self-contained plan with no need to consider more global social, temporal, consequential, or interpersonal demands. These studies have been important in contributing to the understanding of the cognitive processes of planning. They do, however, ignore the constraints placed on the planning process by the extent of social approval, subjective perceptions, interpersonal variables which are most common elements in planning in everyday life or in a work setting. Planning is not merely a heuristic or cognitive process, but is contextually and subjectively influenced.

Goodnow (1987) has identified three assumptions in the current literature on planning. Firstly, one supposition is that the major barriers to effective planning are cognitive or heuristic (i.e., an ineptness at goal-setting, prioritizing, strategy generation etc.). Secondly, is that planning is primarily an individual process, seldom involving other

people. Coupled with this assumption is the premise that the pieces to be moved (errands to be run, sentences to be written) are amenable to being reallocated in sequencing at the planner's whim. Thirdly, there is an assumption that consequences of planning are invariably positive, socially acceptable, and desirable. She maintains that these assumptions are discordant with real life situations. Social constraints may prove as formidable as cognitive constraints. Everyday demands suggest that planning is often social: other people serving as recipients, co-planners, resources, or as pieces to be moved around in the planning activities. Planning is not socially acceptable in every case and may attract penalties. The appropriateness of varying degrees of planning differs in social approval and contextual relevance. For example, a children's party may be a disappointment to the youngsters should the mother insist on a too highly elaborated and rigidly executed plan or an artist may find the aesthetic impulses thwarted by too structured an initial blueprint. Many expressions of spontaneity, creativity, or intuition are given social protection by a prohibition against too much planning.

The most recent research on planning acknowledges these limitations of the cognitive science approach, favoring motivational, social, and contextually rich approaches. These broader variables are contingent upon the individual's perception of the problem and mental representation of the planning sequence. Many of the studies cited in the literature do not include these external/ social constraints representative of situations in which time is defined outside of one's control, a limit exists on one's freedom of movement, or the degree to which others facilitate or inhibit the planning process. Goodnow (1987) reveals a paucity of literature informing us about the social options and constraints about planning. Although this is true, there has been additional attention to these factors since her criticism, perhaps influenced by her comments. Scholnick & Friedman (1987) support Goodnow's position, suggesting that existing models of planning need to be expanded to account for social or collaborative planning.

Thus, in keeping with the original intent of the Gestaltists, planning is indeed more than the sum of its parts. The fragmentation about these processes within current literature appears a deterrent to a holistic understanding of the nature and function of such an important life skill. Successful planning requires the integration of the component parts,

requiring a cohesive representation of the problem domain, the construction and simulation of a solution path, revision, and evaluation. Individual beliefs and motivations provide an ever-present environs in which the planner operates. The most pervasive vantage through which to investigate these representations and motivational determinants lies in the perceptions individuals hold regarding this skill and its utility. In order to operationalize this more integrated perspective, a conceptual framework must be carefully selected to provide the necessary scaffolding for the present research.

Conceptual Framework

The preceding synopsis has firmly established that planning is not merely a cognitive activity. Many of the factors involved exist outside the planner, as do the aids to the process, i.e., people as resources, lists, maps, communication etc. As the child matures, the different facets -initially distinct and partly independent - become more integrated into components of one process, that of planning. The review of the literature reveals planning and its development to be too complex to be accounted for by a single determinant. The findings of Kreidler and Kreidler (1987) confirm that the development of planning can be only partly attributed to IQ. With age:

planning on all levels becomes increasingly integrated into the domain of personality at large -its motivations, goals, attitudes, desires, fears, and so on. As the individual grows older, the mere availability of a cognitive skill or structure is less of a reason for applying it. Rather, such skills and structures increasingly become tools for promoting the individual's overall goals in spheres that have initially little to do with planning. Hence, no complete understanding of planning and its development can be reached without studying the planner (p.269).

Lawrence (1991) urges researchers to explore beyond the cognitive processing to understand the organization, the manner in which they function together, and the uses to which planning is put. She supports Kreidler and Kreidler (1987) in that the integration of the functioning components is primarily a characteristic of planning, while the uses are characteristic of the planner.

As exhibited in chapter one, such numerous and divergent definitions of planning may be attributed to the fact that the theoretical frameworks are too narrow for a comprehensive understanding of such a complex cognitive process. Kontiainen (1991) postulates that one explanation for the lack of relevant theories or conceptual frameworks in a given field may be due to the lack of relevant conceptual analysis, a formidable task in the area of complex cognitive processes. An extensive review of the literature must conclude that there is to date no generally accepted model of the development of planning components and prerequisites for planning (Friedman, Scholnick, & Cocking, 1987). Most theories of planning do not claim to include all accounts of planning, but rather tend to focus on some particular facet of the processes involved. The most recent research shows a departure from a neat, well-defined problem solving focus to a more provisional, contextual type that can be solved at varying levels of proficiency. The problems to be solved are more likely to be those of resources and social interaction than prescriptive solutions. The differences in the types of problems to be solved has allowed broader reflection on the *aspects* and *levels* of planning previously kept at bay by much of the research.

To derive the maximum vantage from the data gathered, a broad theoretical perspective has been deliberately adopted rather than accept the constraints of one of the more narrow conceptions. The lack of an established conceptual framework in regard to perceptions on planning situates the present study in a theory-building rather than a theory-confirming perspective. A framework selected to study perceptions of planning must incorporate cognitive processing, personality, social, and contextual variables. The most comprehensive choice for the purposes of the present research is that of a cognitive-developmental framework. This approach allows the information processing methods and findings to enrich the developmental, transactional approaches of such as Piaget and Vygotsky, for a more finely tuned perspective of a complex series of operations. A blending of the two frameworks raises the potential that the findings of the study might offer benefit for learners of varying ages, for transfer to other contexts.

A distillation of the vast corpus of literature from cognitive and developmental frameworks reveals that two dimensions are preeminent, an internal dimension and an external dimension. A summary of the important elements found in the literature and

relevant sources are presented below. Six components emerge as descriptors of the internal dimensions of planning: 1) The *nature of planning* focusing on definitional aspects, planning as a problem solving activity, anticipatory, opportunistic, and transactional planning, and degrees of abstraction is presented in the works of Brateman (1987), Hayes and Nash (unpublished manuscript), Goodnow (1987), Brown (1987), Hayes-Roth and Hayes-Roth (1979), Rebok (1987), De Lisi (1987), and Scholnick and Friedman (1987); 2) The *nature of the problem* emphasizes the problem representation (i.e., type of problem, degrees of difficulty, of novelty, and of complexity) and contextual variables, as articulated by Newell and Simon (1972), Heppner and Krauskopf (1987), Pea (1982), and Miller et al. (1960); 3) *Planning processes* dealing with goal definition, encoding, generation of alternatives, strategy selection and flexibility, pattern matching, plan simulation, plan construction and execution are explored by Nickerson, Perkins, and Smith (1985), Wilensky (1981), Hoc (1988), Hayes and Nash (unpublished manuscript), Heppner and Krauskopf (1987), Kluwe & Friedrichsen (1985), Miller et al. (1960), Hayes-Roth and Hayes-Roth (1979) Borkowski, Carr, and Pressley (1987), and Pressley, Borkowski, and O'Sullivan (1985); 4) The *nature of planning beliefs* about this life skill, beliefs about control, and about degrees of planning have been studied by Blank, Levesque, and Winter (1993), Smith (in press), Pea and Hawkins (1987), Lachman and Burack (1993), Scholnick and Friedman (1993), Goodnow (1987), Miller et al. (1960), Hayes (1989), and Brown (1987); 5) The *nature of the planner* as distinguished by beliefs about individual differences, affective orientation (perception of self as a planner, perception of others as planners, resistance to planning), motivation and intentionality, and prior experience is extensively written about by Smith and Baltes (1990), Smith, Dixon, and Baltes (1989), Smith (in press), Kreitler and Kreitler (1987), Oppenheimer (1987), Goodnow (1987), Miller et al. (1960), Heppner and Krauskopf (1987), and Borkowski, Johnson, and Reid (1987), and lastly; 6) *Regulation*, including meta-planning, plan abstraction, representation, plan process remembering, feedback considerations, revision, and plan evaluation, is elaborated in the contributions by Brown (1987), Pea (1982), Randall (1987), Rebok (1987), Meyer and Rebok (1987), Newell and Simon (1972), Cocking and Copple (1987), Hayes and Nash (unpublished manuscript), Bratemen (1987), and Hayes-Roth and Hayes-Roth (1979).

The second dimension, the external dimensions of planning, is described in the literature dealing with contextual and social variables: 1) *Contextual variables* include such elements as constraints, environmental factors, resources, temporal considerations (for planning and for plan duration), consequences of planning and of not planning, domain-related factors, and personal (informal) versus professional (formal) planning and are studied in the works of Rebok (1987), Friedman and Scholnick (1987), Randall (1987), Hoc (1988), Cocking and Copple (1987), and Goodnow (1986); and, 2) *Social variables* may be at an interpersonal or societal level and may involve collaboration, coordination with other plans, and communication as indicated by the findings of Goodnow (1987), Miller et al. (1960), Oppenheimer (1987), and Rogoff, Gauvain, and Gardner (1987).

Research Problem

The literature reveals a need for a more in-depth understanding of how these internal and external dimensions are perceived by planners. The choice of a cognitive-developmental framework permits investigation of the broad variables which compose an individual's mental representation of such an enigmatic cognitive process as planning. Smith (in press) suggests that it is important to establish if there are differences in the variations and use of planning or differences in the experience and expertise among adult planners? Brown (1987) proposes that the examination of planning procedures of children would benefit by investigation into the types of planning engaged in by adult problem solvers. She argues that remarkably few research programs have emphasized planning or monitoring processes specifically. Lawrence (1991) maintains that while planning research is a relatively new domain, it has the promise of stimulating dialogue aimed at developing pragmatic methodologies for motivating students to engage in the organization of complex endeavors. Likewise, Yussen (1985) suggests that metacognitive theories about planning may initiate a new domain of research in adult cognitive development.

One of the most salient characteristics of planning and plans is the variety of means and products. The search to understand these processes is not for the purposes of discovering the specific mechanisms involved, but rather a broader perspective or

generalization of the way in which people perceive them. One possible way to arrive at a general view is to isolate the component parts from their contextual attachments and then to re-combine them for a better integration.. Observable behavior does not always explain the mechanisms evoked in its service. Our conceptions may be distinctly different from our behaviors. The products of planning are not always manifest, for a variety of reasons. Herein lies the challenge in the present study. In order to investigate the perceptions or mental representations groups of individuals have about planning, it becomes necessary to define their types of relevant knowledge. Exploration of declarative and procedural knowledge reveals the nature of the construct. Investigation into the conditional knowledge informs about the function to which the process is put. This evolves into a two-fold query into perceptions about both the nature and about the function of planning.

As previously brought to light, there is little in the literature about the functions for which planning is used, despite the assumptions made in choosing research planning tasks and instructional examples. The notion of function makes reference to what planning is used for. Hoc (1988) contends that it is necessary to study human cognition in conjunction with the tasks to which these processes are applied or the functions for which they serve. He identifies two rationales particularly suited to the research problem:

better knowledge of planning mechanisms should help choose those indices providing the most information on these often covert features. Secondly, in certain situations, individuals tend not to plan. Knowledge that certain forms of behavior (such as verbalizing) tend to encourage planning can be of use in the design of situations where planning is deliberately not elicited. From a practical point of view, better knowledge of those situations where planning plays either a positive or negative role (for example where it is highly unlikely that an individual would elaborate a workable plan) will allow for a better approach to educational and professional training problems, as well as work situation design (p.13)

For the intersection of skills training between school and applied situations, it is important to have representativity from walks of life in which many people are involved. The literature explicits an urgent need for teaching of metacognitive skills in school. Such instruction will facilitate greater transfer of learning from one context to another, from school to everyday life and work. Given the difficulty in teaching these higher order skills, there is a need to teach vocabulary and processes more 'relevant' to students and more

easily transferable to 'real-world' contexts. Planning employs most of the metacognitive abilities and is used in most contexts, and may be under-utilized as ready-made conduit for instruction in useful, life-span thinking skills. The increasing call for collaboration between education and business for the training of the future, would benefit from a cross-sectional interface within the research methodology.

Objectives

In light of the paucity of research about the development of planning and metapanning (Kreitler & Kreitler, 1987), no specific research hypothesis was permissible. However, based on the preceding review of the literature, justification exists for four research objectives:

(1) to define the term 'planning' from various domain perspectives

The literature confesses to know little about managerial processes, how to encourage them, or their relationship to effective problem solving (i.e., Covington, 1987). The wide range of theoretical and methodological perspectives used to study planning has provided a myriad of definitions. Rather than edify, the variety of definitions has made the term even more ambiguous (Scholnick & Friedman, 1987). Specifically, planning has been confused with problem solving itself. Some view problem solving and planning as interchangeable skills (i.e., Medland, 1990), or planning as one problem solving heuristic (Newell & Simon, 1972; Oppeheimer, 1987), while others view planning as a goal-oriented behavior, highly influenced by context (Hayes and Nash, unpublished manuscript), which develops at different times and levels (Friedman, Scholnick, & Cocking, 1987). Similarly, there is a confusion about the distinction between planning and action which influence definitions of planning. Some theorists firmly discriminate between the two (Hoc, 1988; Holyoak, 1990; Kreitler and Kreitler, 1987), while others adamantly maintain them to be indivisible (Meyer & Rebok, 1985; Rebok, 1989). These controversies are compounded by the plethora of definitions emerging from the literature (Miller et al., 1960; Hayes-Roth & Hayes-Roth, 1979; Pea, 1982; Rogoff et al., 1987; Scholnick & Friedman, 1993). The

construction of distinct cell definitions of planning, by various domain-related groups, may address such definitional controversies and serve to explore perceptions of the nature of planning. An investigation of this type will facilitate understanding of what is meant by the concept within several domains.

(2) to define the component terms of planning from various domain perspectives

In his discussion of the confusion surrounding the terminology of such concepts as planning, Hoc (1988) contends that these terms could have greater utility if they were more clearly defined, i.e., broken down precisely and made more explicit. A precision of the terms used in defining and discussing planning explicits the vocabulary and declarative knowledge of the targeted populations. The above mentioned exploration into domain-related definitions of planning, provides an opportunity to explore, in-depth, the terminology employed by these groups. An investigation of this type could strengthen awareness of the nature of planning and perhaps put to rest some current ambiguity. It is important in the instruction of planning that the terms used are meaningful and representative of those used in extra-curricular contexts to facilitate transfer.

(3) to identify the perceptions of the function of planning (what planning is used for) from domain-related perspectives

Numerous authors (i.e., Covington, 1987; Sternberg, 1985; Pea, 1987) call for a greater relevance of the problems in school to the problem solving processes in real life contexts. The literature clearly situates planning as a contextually specific activity (i.e., Rogoff et al., 1987; Cocking & Copple, 1987). Brown et al. (1983) emphasizes that children may not understand what kinds of situations planning is used for. This type of knowledge is normally gained informally from experience. A greater understanding of the functions of planning may give structure and opportunity for learning this conditional knowledge in curricular settings. A greater awareness of social norms for planning situations in various contexts, may predispose students to more readily apply their knowledge of planning in their lives (Goodnow, 1987). As planning is the use of knowledge for a purpose (Scholnick & Friedman, 1993), it is important that students become more

aware of context and domain specific demands (Lawrence, 1991). The third research objective addresses the functions for which planning is perceived to be used within targeted domains. This conditional knowledge is an important connector between declarative and procedural knowledge and is essential for planning success and maturity (De Lisi, 1987; Lachman & Burack, 1993; Kreitler & Kreitler, 1987). Knowing when and where to plan is essential to transfer (Brown et al., 1983). A greater understanding of the conditional knowledge of planning will have utility for enhancing transfer of learning, for structuring tasks for research, and for examples for curriculum development. Pea (1982) encouraged researchers to explore specific interrelationships among the purposes planning is used for, as well as conditions to enhance or limit the development of planning activities.

(4) to compare the perceptions of the nature and function of planning between various domain-related experts.

Planning is an important metacognitive skill. Wolters (1990) has even used planning as a measure of metacognitive ability. This fourth research objective responds to Pea's (1982) recommendation that planning be studied in relation to specific domains. Demonstrated similarity or dissimilarity between different domains may provide clarity about what planning is, how it is done, and for what purposes it is used. Such clarity may promote understanding of an integrated planning knowledge composed of the declarative, procedural, conditional, and specifically metacognitive knowledge. A comparison of perceptions of nature and function of planning will reveal the substance of the mental representations held by as variety of groups of individuals sampled. It is the objective of the study to identify the degree of convergence between and within groups of experts. Whether the results reveal convergence or non-convergence, it is of importance for both teaching and research.

CHAPTER 3

Methodology

The choice of research design depends upon the nature of the problem being studied, the nature of the population being researched, and the extent of the resources available. As metacognition is a theoretical construct, not directly subject to observation, access to these abilities is in part dependent upon the conscious awareness of the participating individuals. Brown (1987, p.71) suggests that conscious "access to the routines available to the system is the highest form of mature human intelligence." She maintains that metacognition "refers to understanding of knowledge, an understanding that can be reflected in either effective use or overt description of the knowledge in question.. Thus, a learner can be said to understand a particular cognitive activity if he or she can use it appropriately and discuss its use." (p.65). The methodology is designed to explore metacognitive knowledge related to planning.

As pointed out by Ericsson and Simon (1984) subjects in research into these processes are rarely asked for their general theories or intuitions. Several studies have attempted to address this oversight. Firstly, Sternberg, Conway, Kreton, & Bernstein (1981) employed a survey of the general public to investigate people's implicit theories or mental constructs about intelligence. In their study, individuals studying at a college library, shoppers at a supermarket, persons waiting for trains in a railway station were asked to list behaviors characteristic of 'intelligence', 'academic intelligence', 'everyday intelligence', or 'unintelligence' and to rate themselves on each type of intelligence queried. Results were structured around three indicators; a problem solving factor, a verbal-ability factor, and a social-competence factor. The study confirmed that individuals do indeed have implicit theories about intelligence similar to those of experts in the field. Herbert (1992) verified that lay people hold implicit theories or mental representations of problem solving, particularly in an everyday context.

Alexander and Dochy (1995) studied the conceptions of adults from two different cultures about the nature of the concepts of knowledge and beliefs with three levels of expertise: those seeking post-secondary degrees, those completing graduate degrees, and those considered to be experts in the areas of either knowledge or beliefs. They examined similarities and dissimilarities between groups about the conceptions of knowledge and beliefs and how they were defined by the participant groups. Results were compared by degree of expertise and cultural membership. The use of questioning was supported in the methodology by the initial use of a graphic catalyst to assist participants in focusing their thoughts. Respondents were encouraged to alter the graphic or create one of their own. The researchers found the study to be successful in uncovering the views their subjects held on these concepts. The findings revealed some similarities in the conceptions of knowing and believing within both cultural groups and identified differences of definition.

The studies cited above shed light on the efficacy of researching implicit theories or conceptions of complex constructs. The following describes and justifies the methodology used to investigate perceptions of planning. The Delphi Method constitutes the major portion of the data collection. Beginning with the research design, the chosen methodologies are discussed in detail, followed by a chapter summary.

Research Design

A mixed methodology was chosen to operationalize the four research objectives. The methodologies selected are of telephone survey, the Delphi Method (Linstone & Turoff, 1975), and content analysis, as displayed in Figure 1. The figure indicates an initial data collection by means of a telephone survey, analyzed for content. The analysis is then fed back to each of four selected samples through the Delphi Methodology. Each cell results are independently analyzed, modified, and returned to the respective cell from which they were derived. The figure graphically represents this process of reiteration three times (Round 1, Round 2, Round 3) before closure and final analysis of results. The arrows are indicative of the movement of data and the self-contained process of data collection and

analysis. Within cell analysis, without cross-fertilization, allows each domain-specific stream to run its full course. Figure 1 displays the across-cell content analysis, following closure of the data collection phase, to ascertain the possibility of convergence, i.e., the degree of similarity or dissimilarity between cells.

Telephone Survey Methodology

A telephone survey was requisite to provide baseline data for the substance of the first Delphi round, to address the research objective of defining planning. As the Delphi rounds were constrained to three for practical considerations, the material from the telephone survey helped to generate a more focused initial response from the participants. Telephone surveys have enjoyed a wide application in research methodology. Frey (1989) suggests that a number of factors have contributed to the increase in usage and acceptance of this approach: the widespread distribution of telephones in the general population, the development of a wide array of research on all aspects of conducting telephone surveys, a lowered acceptance of the traditional household face-to face interview, developments in telephone technology and telephone interview technology, and the immediacy of data retrieval. The preliminary methodology of a telephone survey was considered appropriate and expedient for the brief canvassing of the general public as to their knowledge of the cognitive processes of planning to furnish a starting point for the Delphi rounds. The method provides contact with individuals who might otherwise be difficult to locate or to engage in such a discussion. Dicker and Gilbert (1988) used the telephone to gather rapid and detailed responses to questionnaires in an evaluation of educational resource materials. They concluded that the telephone provided a 'successful and fruitful' means of evaluation.

There are always limitations to any methodological approach. Within the context of a telephone survey, it would be impossible to evaluate the quality of responses, given such

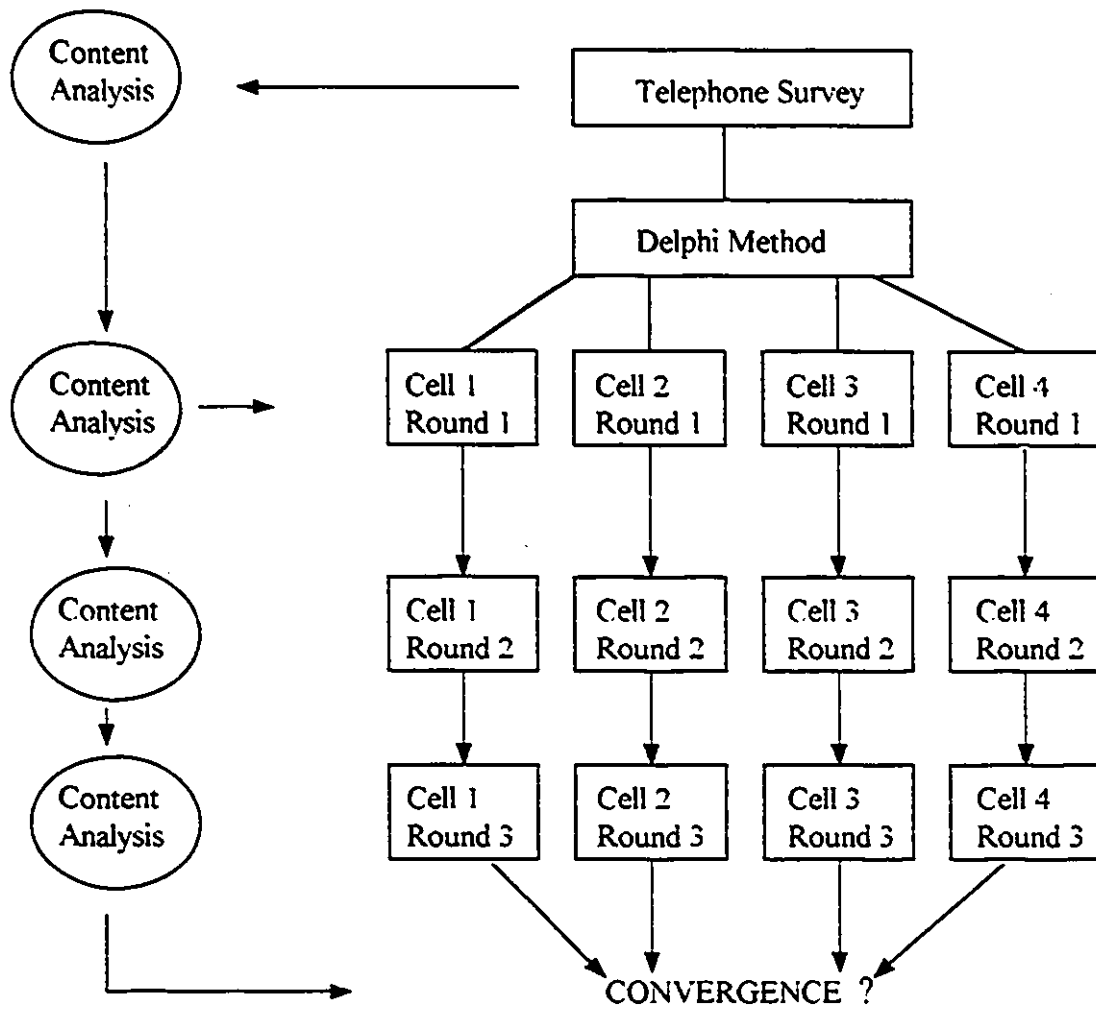


Figure 1 Mixed Methodology Design

individual factors as attitude toward the intervention or subject matter, the degree of facility and comfort in expressing such opinions, and the contextual factors for the specific time of the conversation. The success of such an interview may be largely dependent upon the manner in which the survey is introduced to a potential respondent (Lavrakas, 1993). Given the requirements of qualitative research for flexible methodologies, interviews have the distinct advantage of accommodating spontaneity, in addition to the more premeditated, rigidly structured facets (Miller, 1995). The quality of data gathered would certainly be affected by the extent to which the researcher was initially able to generate a rapport with the interviewee and the quality of interventions made by the researcher throughout the conversation. A review of the literature by Harvey, pertaining to this type of methodology, supported the feasibility of telephone research, noting that telephone interviews should be shorter in length and involve less complex questions than in-person interviews. The quality of data collected from telephone survey is less compromised by interviewer differences than it is in face-to face interviews (Frey, 1989). Given the security of confidentiality, interviewees may feel more comfortable in expressing their honest opinions over the telephone than they would in person (Nias, 1991). In comparison with other possible methods, the telephone survey offers the benefits of resource conservation (both time and money) (Lavrakas, 1993). Miller's (1995) analysis of this methodology concludes that telephone interviews are neither better or worse than those conducted face-to-face. He suggests that they are merely "different and are worthy of serious consideration as a viable research tool" (p.37). With these considerations in mind, given its strengths and limitations, the telephone survey method was deemed most suitable to the initial phase of the study.

Procedure

The initial procedure consisted of a survey of the general population. Although Frey (1989, p. 47) contends that representativeness is not necessarily an important consideration for exploratory studies, effort was made to achieve a high degree of representativity. Names were randomly selected from the city telephone book of a major Canadian city. The researcher spoke with whomever answered the phone, sometimes a house guest. A

consistent and structured preamble (see Appendix 1) was kept as simple and informal as possible to prevent the individual from viewing the contact as any sort of 'test' or otherwise evaluative measure of their intelligence or abilities. An emphasis was placed at all times that the purpose was to learn their personal view, all being of interest to the researcher. Making such random calls results in a pot pourri of receptions. The timing may or may not be convenient, the contactee more or less receptive to this intervention in his or her personal schedule; some individuals agreed to participate, while others did not. By and large the reception was cordial and a surprisingly high rate of individuals agreed to be involved in a short interview (average length 5-15 minutes). Any hesitation to respond was accepted by the researcher as a polite refusal, leading to a congenial termination of the exchange. Those accepting were allowed to ask any questions for clarification and to speak as long as they wished. The researcher was required to occasionally paraphrase or otherwise encourage the dialogue with such statements as: "Could you tell me more about your views on this?", "Could you give me an example of what you mean?" etc.

Initial Sample

The randomly sampled individuals (N=30: 13 males, 17 females) provided a representative sample of the general population and therefore a broad enough database for the telephone survey and the formulation of the first round of the Delphi statements to the respondents. The participants of the survey reported as diverse occupations as artist, draftsman, retired teacher, homemakers, military, bookkeeper, salesperson, dispatcher, university professor, the retired, the disabled unemployed, engineers, secretary, and students of education, general arts, and medicine.

Survey Research Questions

Based on the current consensus in the literature on cognitive science that three types of knowledge are fundamental to successful cognitive processing and function, (declarative, procedural, conditional), it was essential that the initial questions posed to the general population be simple, unambiguous, and yet adequate to elicit the desired data. The

telephone conversations were audio-recorded, with the full knowledge of the respondents and transcribed verbatim. The questions were as follows:

1. *What is planning?*, was asked to capture respondents' declarative knowledge about the concept and structure of the *nature* of planning.
2. *How do you do it?*, was asked to elicit procedural knowledge about the concept and structure of the *function* of planning.
3. *When and where is it used?*, queried conditional knowledge about the concept and structure of the *function* of planning.

Compilation of Results

Using the findings and vocabulary of the literature on planning in cognitive science and developmental psychology, the resultant comments from the participants in the telephone survey were grouped for content. It was decided to include only such items as were mentioned by at least one third of the individuals. In their research with children to uncover the meaning of planning in 11 year old children, Kreidler and Kreidler (1987) made the assumption that responses offered by at least 30% of the children were more meaningfully reflective of the sampled population than those offered by less than 30%. A total of 15 statements from the general public, accompanied by an example, in part constituted the questionnaire sent to the respondents in the first Delphi round, as displayed in Appendix C.

The Delphi Method

The constraints of any single piece of research demand that distinct and thoughtful choices be made as to design and population. Directed by the objective of examining the vocabulary and mental representation of the nature and function of planning, it was decided that this could be realistically accomplished by studying responses of purposive samples of experts of various domains. Olson and Biolsi (1991) claim that "the major challenge to investigators of expertise is to elicit and describe the content and general organization of experts' knowledge, as well as to identify or infer their general strategies for operating with

that knowledge to solve problems” (p.241). The Delphi Method was preferred as a suitable and flexible methodology for such purposes. The justification of this choice constitutes the following section, composed of a historical overview, characteristics of the methodology, application to the present research, population and samples, and finally data collection, preparation, and analysis.

Historical Overview

The Delphi Method is a deductive prognostic technique originated by Olaf Helmer and colleagues for the Rand Corporation in the early 1950's as 'Project Delphi', to canvass the opinion of a group of experts for military application. Named after the Oracles at Delphi, Greece, forecaster of future events, the technique was initially used for predictions. The technique involves written questionnaires or statements in a series of iterative 'rounds', with an increasing degree of focus based on feedback from the preceding round. This procedure is addressed to a group of individuals, referred to as a panel, for the anonymous exploration of an intricate topic over a period of time (Barrington, 1986). The first stage, or Round 1, solicits broad opinions or comments which are sorted, grouped, analyzed, and summarized by the researcher(s). The results are then returned to the panel members for their further comment as Round 2. Finally, Round 3 consists of the refined comments from the previous round for final judgment and remarks. Linstone and Turoff (1975) report that in most cases, three rounds of the technique were sufficient to attain stability of responses, further rounds showing little change and that inordinate reiteration proved unsatisfactory to respondents.

Since its inception, the Delphi Method has experienced a wide range of applications commiserate with a growing acknowledgment of necessity to include subjective knowledge directly into theoretical models accounting for complex problems in society (Linstone & Turoff, 1975). The fundamental nature of the technique lies in its methodology for structuring group communication in such a fashion as to allow a corpus of individuals to interact for the purposes of gaining understanding of a complex topic or issue (Noble, 1992). Its original intent was to derive a consensus from a panel of participants (Linstone &

Turoff, 1975). As the objective of consensus tends to inhibit the retention of diverse or controversial opinion, the methodology has more recently been used for its ability to demonstrate stability of response, and to generate and identify the nature and strength of feedback, which may include areas of dissimilarity as well as those of similarity (Scheibe, Skutsch, & Schofer, 1975). In allowing and preserving opinion distributions that achieve a multimodal consensus, the technique facilitates a greater depth and breath of probe not possible in any single-staged data collection (Barrington, 1986; Scheibe et al., 1975). The technique has been utilized in research with a wide variety of problems in over thirty domains including education, health, urban renewal, transportation, environment, government planning, and management (Barrington, 1986; Scheibe et al., 1975; Somers, Baker, & Isbell, 1984; Noble, 1992). It is evident, from a review of the literature, that the Delphi Method and its application are in a continual evolution, both in regard to the manner of application and the subjects to which it is applied.

Characteristics of the Delphi Method

The technique offers four primary characteristics for research of a qualitative nature: *anonymity, feedback, iteration, and statistical analysis*. As confidentiality is assured, the panel members are less likely to be influenced by each other, especially dominance by virtue of status or authority. This anonymity preserves minority responses. The questions posed from the preceding round facilitates reflection for the purpose of establishing a stability of response. Should a response rest outside the panel's majority, the participant is traditionally requested to qualify his/ her view. Statistical analysis, provides both the panelists and the researcher with a quantitative description of the comments submitted in each round. Although descriptive, an insistence on consensus fails to adequately disclose all information bearing on the issue provided by the respondents. When priority is changed from consensus to stability of responses, minority opinions can be registered.

Bimodal distribution may occur which will not be registered as a consensus but indicates an important and apparently insoluble cleft of opinion. Less dramatically, the distribution may flatten out and not reach any strong peaked shape at all. The results of the Delphi are no less important for this

however... A measure which takes into account such variations from the norm is one that measures not consensus as such, but stability of respondents' vote distribution curve over successive rounds in the Delphi. Because the interest lies in the opinion of the group rather than in that of individuals, this method [stability measurement computation] is preferable to one that would measure the amount of change in each individual's vote between rounds (Scheibe et al., 1975, p. 277).

Although a degree of oscillatory movement and change within the respondent group is inevitable, Scheibe et al. (1975) contend that when any two consecutive responses vacillate less than 15 percent, stability or equilibrium is said to have been achieved. Two consecutive responses which vary more than the 15 percent have not reached a stability of response, are in need of further clarification. This stability criterion establishes a point of closure, while preserving any well-defined areas of dissimilarity of opinion. A review of the literature on the Delphi Method reveals the technique has numerous advantages and disadvantages, summarized as follows.

Advantages

The Delphi Method has been employed for over forty years in a large number of studies in at least thirty domains, including education. In addition, the technique has a significant body of literature on its development and application (Noble, 1992). The use of a panel for research purposes facilitates the inclusion of multiple realities of perceptions and values within the group canvassed (Barrington, 1986). The method allows a researcher to purposefully select panel members whose views have an assumed credibility based on level of expertise, permitting inclusion of a wide and diverse sampling of intellectual resources (Linstone & Turoff, 1975). The technique has a high degree of utility for bringing experts together who might otherwise be constrained by travel, time, or finance, and in larger numbers than is logistically possible in in-depth face-to-face problem solving (Somers et al., 1984). The anonymity of the rounds process facilitates participation free from conflict or intimidation (Linstone & Turoff, 1975). The isolated generation of written responses may produce thoughtful, high-quality ideas (Somers et al., 1984). The characteristic of feedback permits each participant review and reconsideration of his or her responses in the light of

those of other panelists (Somers et al., 1984). The procedure also may serve to educate panelists or induce reflective thinking about responses, both his/her own or the other panelists, pertaining to a complex issue (Noble, 1992).

The reiterative rounds process facilitates a quantitative and qualitative comparison of responses not possible in single questionnaire surveys (Barrington, 1986). The qualitative nature of the method can also adequately accommodate and benefit from subjective or intuitive input, allowing maximum freedom of responses (Barrington, 1986). The technique allows the researcher to focus on any ambiguous or contentious elements of the problem generated in the responses (Scheibe et al., 1975). The reiterative rounds promote a stability of response which might not be possible in face-to-face discussions (Scheibe et al., 1975). The technique has utility for the projection of future trend possibilities (Merriam & Simpson, 1989).

Disadvantages

Despite its value for research, there are limitations to the methodology. The outcome of a Delphi Method can never be predicted due to the ever-present possibility of convergence or divergence of the responses (Barrington, 1986). Consensus or stability of response cannot be assured. Cultural orientation, subjective biases and knowledge constraints are invariably reflected in the statements provided to the panelists by the researcher and in the responses given by the panelists. For example, overtly succinct statements may result in an unacceptably wide variation in interpretation for response; likewise, statements containing too much information may include an unmanageable number of elements. There is a lack of clarity or rationale for the reasons behind the responses generated. Certain panelists may change their responses by virtue of the previous round results (Linstone & Turoff, 1975). Criteria for expertise of panel membership may be difficult to precisely define and do not assure the quality of the results obtained. The conclusions resulting from the technique may not be generalized within a given population unless the panelists have been randomly sampled from the population (Noble, 1992). The commitment required of the panelists may prove problematic and result in delays of

responses or drop-out of panelists during the procedure (Merriam & Simpson, 1989). An emphasis on consensus may inhibit the consideration of outlying but relevant opinions or may be achieved by an incorrect usage of the technique (Linstone & Turoff, 1975). Finally, the technique forces a closure on the problem in question, which may prove to be premature (Noble, 1992).

Application to Present Research

A modified Delphi Method was considered the most appropriate tool for the purposes of the present research. The literature provides ample justification for its use in educational issues, even specifically planning. An extensive search of the literature failed to locate a single citation reporting the application of the Delphi Method for exploration of metacognitive knowledge. In a related study, Kurth-Schai (1988) used a modified Delphi Method to collect the thoughts of children about the future. Researchers administered a series of questionnaires within the classroom setting (N=154) to more fully understand how children perceive the future unfolding. The reporting concluded that the Delphi Method was an appropriate and powerful research technique for the purposes of collecting the thoughts of children. The findings attest that the children's contributions were beneficial in minimizing researcher bias, thus generating data more accurately exemplifying their perceptions. Eijkelhof, Klaassen, Lijnse, and Scholte (1990) used a Delphi Method to explore the views of radiation experts on lay ideas of ionization radiation. Lay opinions were presented to the participating radiologists for their analysis and comments. The discussion was further refined throughout subsequent Delphi rounds. The study was conducted to help structure curriculum on radiation in science education. The authors concluded that the Delphi provided the most suitable vehicle for this type of inquiry.

The Delphi Method satisfies two important criteria: those of efficiency and effectiveness. Efficiency may be defined in terms of the time and effort required by the participants. An inherent constraint with this methodology is the projected completion time for each round. The procedure requires respondents to donate three relatively brief periods of time, separated by a break. This does not appear to place undue or unacceptable demands

upon them. The criterion of effectiveness may be judged by the quality of data gathered. This is to be assessed at the conclusions of the findings. The methodology is self-repeating, potentially self-adjusting, and lends itself to modification, a beneficial flexibility for qualitative research with large numbers of persons. The parameters outlined to participants during invitational contact must be regarded as contractual and every effort must be made to adhere to their specifications. The methodology was thus confined to three rounds of mailed-out material requiring an estimated 30-60 minutes for Round 1, and 30 minutes for Rounds 2 and 3. In keeping with the exploratory nature of the study, the Delphi Method has potential for assuring the maximum degree of individuality or freedom from constraints on self-expressions (Linstone & Turoff, 1975). The modifications of the technique used, allow minority opinion to be registered explicitly in most cases. The inherent flexibility of the methodology allows each round to be specifically sculptured to best suit the trajectory of the group communication.

Populations and Samples

As is customary in the Delphi Method, all participants for the study were purposively selected, volunteering to be a part of their designated group. The groups of experts sampled (total N= 39) represented areas of specialty in planning: Academic cell (N=9), Business cell (N=11), Lay cell (N=9), and Teacher cell (N=10), corresponding to Cell 1, Cell 2, Cell 3, and Cell 4 respectively in Figure 1. Every attempt was made to have similar representation from males and females alike, although equality of numbers was not thought to be a crucial factor. Finally, 23 males and 16 females participated in the study. Given the difficulty of gathering participants, particularly the academic specialists, the ratio of male to female was considered adequate for the purposes of the research.

An anticipated difficulty in conducting a Delphi Method is the attrition rate of the participants over the duration of the study. Noble (1992, p.75) reports that his response rates were 89% for Round 2 and 85% for Round 3. It is significant to note that the present study enjoyed particularly high response rates (100% for Round 1, 100% for Round 2, and 95% for Round 3); one participant moved with no forwarding address and one failed to

respond in the final round. The Delphi Method used for this study spanned a full 12 months for data collection for the four groups.

The term 'expert' as it is commonly used in the context of the Delphi Method has various connotations. Some latitude may be taken in defining the concept of expertise to suggest the pre-eminence of experience, and to accommodate varying and appropriate criteria for the different domains. Moore (1987, p.51) defines an expert to be an individual "who possesses the knowledge or experience necessary to participate in a Delphi. A nuclear physicist is an appropriate expert if the Delphi concerns atomic energy and a resident of a neighborhood is an expert on what should be a community's goals." A combination of knowledge and experience constitute the criteria for inclusion in the research presented. The specific combination varies for each group, depending on the type of expertise in planning.

The Academic Cell

Academic expertise in planning refers to those who are considered in the field to be experts by virtue of their contribution to knowledge of the cognitive processes involved in planning and their application. The study of planning in the literature has a lengthy and rich academic lineage. Academic expertise has been chosen, in part as a comparative standard for knowledge of these processes, and in part for the opportunity to establish what respected experts from different theoretical perspectives in the field agree or disagree on about the nature and function of planning. The content of chapter two partially attest to the quality of the knowledge base of these experts and does not require reiteration.

The Academic cell was comprised of international experts (4 females, 5 males) in planning and problem solving. The particular composition of this cell is an exciting addition to the quality of the present study. Over a period of twelve months, the potential participants were approached either at major conferences in cognitive processes and education (American Educational Research Association, American Psychological Association) or by written invitation. The quality of the participants in this cell is truly outstanding. These specialists have contributed significantly to the understanding of this process as it applies throughout the life-span. Their research has addressed planning in the

areas of cognitive development, memory, composition, reading, motivation, practical intelligence, critical thinking, strategy acquisition, strategy deployment, everyday applications, and gerontological development in various domains of endeavor. It is a rare opportunity to canvass the opinion of such renowned international experts on their knowledge of the components of planning. All were enthusiastic and gave freely of their time and expertise. For the interest of the reader, the names in this particular cell are given in the text, with the express permission of the individuals. It is to be noted that many of them are referenced in the review of the literature. The participants were Drs. John Borkowski, Cathy Collins Block, P. Paul Heppner, Beau-Fly Jones, Jeanette Lawrence, Michael Pressley, George Rebok, Jacqui Smith, and Richard Wagner (see Appendix D). These panelists are professors and researchers who have been successful in publishing books and articles in refereed journals; some holding executive positions in major professional organizations or editorships of respected refereed journals in the field.

The Business Cell

Business expertise is considered to represent the type of expert knowledge required for financial and administrative planning for success in the work place. Much of this knowledge base has typically been acquired slowly and painfully over years of experience through trial and error (Clark & Taylor, 1992). Success in business is often contingent upon the detailed and time-consuming management-team planning, to jointly determine financial forecasts, specific timetables, human and material resource allocation. The criteria for expertise in business lies in the authority, accountability, success, or responsibility of the individual for these functions. Miller et al. (1960) goes so far as to say that the field of business administration is the science of formulating and executing shared plans. Plunkett and Hale (1982) contend that planning in business is fundamentally to anticipate problems and opportunities, to construct and execute plans crucial to managerial success. Experience is valued as manifesting the skill of applying previous knowledge for problem avoidance.

The role of education in the development of this type of expertise is reflected in the findings of a recent study of over 17,000 private sector Canadian organizations in the 1991 National Training Survey (1993). These organizations reported providing an estimated

133.6 million hours of structured training to their employees in that year, in which decision making held the second highest priority. Duffy (1992) postulates that by the year 2000, 44% of the labor force will be involved in collecting, analyzing, synthesizing, structuring, storing, or retrieving information. The present financial commitment of corporations to employee education and retraining will double the current \$80 billion per annum by the year 2001, a concrete confirmation of corporate commitment to higher order thinking skills. Another indication of the interface between business and education in contemporary Canadian society is a growth in corporate partnerships between area schools and local businesses, from five in 1990 to over fifty in 1995 (The Ottawa Citizen, November 18, 1995).

In their analysis of training for business basic skills programs, Gordon, Ponticell, and Morgan (1994) stress the "rising tide of horror stories continues to detail that too many American workers have weak educational skills at all levels within business. This includes managers, office staff, and plant workers" (p.30). They maintain that this is precipitating a serious socioeconomic disaster, quoting the U.S. Commerce Department (1991) report holding weak educational skills responsible for a productivity loss of at least \$300 billion. One goal to address this deficit is to develop long term thinking and problem solving application abilities through remedial instruction in cognitive processing. These authors contend that "by using ...cognitive teaching curriculum, we can now plan the training of metacognitive skills and problem solving strategies that help adult trainees master thinking skills that are linked to job skill content found in a typical training program" (p.33).

The composition of the Business cell (8 males, 3 females) were members of the local business community in major urban centers, with one exception. Each was assumed by position and level of responsibility to possess expertise in planning in their related fields: each was a president, owner, general manager, or director of his or her respective organization. They included a partner in a legal firm and former mayor of a major municipality, a principal owner of a research firm, a president of an international consulting group, a president of a large commercial and institutional construction management company, a president of a large office furniture company, a president of a large property management firm, a general manager of a national land development company, an executive

director for a non-profit organization, an owner of franchises of an international fast food chain, an owner of a prominent local retail business, and a franchisee of a successful retail businesses chain.

The Lay Cell

Lay expertise represents the significant experiential knowledge base gained through everyday or personal problem solving. Recent literature has given increased attention to problem solving in the domain of everyday, real-life problems. Sternberg (1981, 1985), Hayes (1989), Perkins (1990), Schoenfeld (1987) are among those who have applied themselves to this genre. Efforts to establish criteria for expertise in this domain are illuminated by its counterpart, i.e., a lack of expertise and its consequences. Miller et al. (1960) discuss the difficulties individuals have in their everyday lives when the planning process goes awry. They postulate that many come for psychological counseling "with the complaint that they are unable to decide what to do, that they feel completely planless" (p.113) and "it is clear that to find oneself without a Plan is a serious matter" (p.112). In a most interesting discussion, they hypothesize:

Perhaps the complexities and ambiguities involved in the situation are too great for him to understand or to tolerate, and his planning mechanism turns itself off before it produces anything that could be executed. Perhaps he was living largely on borrowed Plans - Plans determined by a loved one, by children, by the boss - and the source of these Plans is suddenly withdrawn. Or perhaps he completed the execution of his Plans, the job is done, and he is ready to die but can only retire (p.113).

They maintain that individuals seek out professional help because they are unable to decide how to proceed, that some facet of their lives has become planless, either because a decision cannot be made between conflicting plans or that previously guiding plans are no longer reasonable or feasible. The breakdown of these plans is influenced by individual differences. Problems may arise from an attempt to imitate the plans of others, from time constraints or expectations, from the accuracy and specificity of the mental representation of the problem and the plan, from the individual's degree of flexibility in adapting plans to changing elements in the environment, from one's ability to coordinate plans with others who may be involved, and from the persistence or motivation for the administration of the plan etc.

Heppner and Krauskopf (1987) have applied information processing theory to the personal problem solving activity of counseling. They support Miller et al. in suggesting that many individuals who require assistance with this genre of problem solving are those who have difficulty planning at some or all stages and that an explicit understanding of these processes is useful both to the therapist for assessment and to the client for remediation.

Everyday problem solving has been researched from a developmental gerontological perspective by Cavanaugh, Kramer, Sinnott, Camp, & Markley (1985), Hultsch, Dixon, & Hertzog (1985), Sinnott (1989) and Williams, Denney, Schadler (1983). These authors stress that domain of interpersonal problem solving invites a wealth of alternatives. The evaluation of all possible strategies may become more taxing than cognitively or socially challenging (Scholnick & Friedman, 1993). Smith et al. (1989) suggest that older adults may be at an advantage because of their accumulated practical wisdom or metapanning skills. These same individuals, however, may become encapsulated in familiar strategies, finding it difficult to discard them even when they prove inadequate.

The facility to solve personal problems has also been researched and written about as a component of wisdom-related knowledge (Sternberg, 1990), referred to as 'life planning' by Smith & Baltes (1990) and Smith, Dixon, & Baltes (1989). The Max Planck Institute for Human Development and Education, Berlin, has undertaken a significant body of research on life-span intellectual and cognitive functioning titled *Wisdom and Expertise*. The objectives describe the "growth in the ontogenesis of the pragmatics of intelligence as analogous to the acquisition of a cognitive expertise" defined as wisdom-related knowledge about life-management, life-planning, and life-review (Smith, Dixon, & Baltes, 1989, p.307). Their research suggests that this expert knowledge in life-pragmatics is generalizable across multiple specific domains. These authors maintain that the concepts and criteria for expertise in formal domains are also applicable to comparatively ill-structured and informal knowledge domains including parenting or everyday living. Success of application of general life planning skills to specific social context (e.g., family, parenting, careers) is dependent upon the scope and depth of the individual's expertise. They suggest that the depth and quality of the search, integration, and evaluation of salient variables, including information for the construction and execution of effective plans, are part of the

construct of wisdom-related knowledge. Using verbal think-aloud protocols, responses of individuals of varying ages (25-35, 40-50, and 60-81 years) to normative and non-normative life-planning problems were examined (Smith & Baltes, 1990). The problems were an adaptation of those used in the Hayes-Roth & Hayes-Roth's (1979) study of planning (planning a day's errands). Their findings suggest that life planning constitutes a viable area for the study of adult development of knowledge about the world.

This cell was composed of a sub-group of the participants in the telephone survey. At the conclusion of the telephone conversations, individuals who seemed comfortable discussing their views on planning were invited to participate in the Delphi rounds. Those consenting (5 males, 4 females) represented a wide range of occupations: a scientist, a geologist, two lawyers, an engineer, a student, a business forms designer, a nurse, and a public servant.

The Teacher Cell

The final domain of expertise is that of teachers, considered by virtue of position and societal expectation, to be the earliest transmitters to model and instruct planning in a formal setting. The importance of planning in the instructional life of a classroom teacher is highlighted by Clark and Lampert (1986, p.28):

Teacher planning is a major determinant of what is taught in schools. The curriculum as published is transformed and adapted in the planning process by additions, deletions, interpretations, and by teacher decisions about pace, sequence, and emphasis. And in elementary classrooms, where a teacher is responsible for all subject matter areas, planning decisions about what to teach, how long to devote to each topic, and how much practice to provide take on additional significance and complexity. Other functions of teacher planning include instructional time for individuals and groups of students, composing student groupings, organizing daily, weekly, and term schedules, compensating for interruptions from outside the classroom and communicating with substitute teachers.

Enggen and Kauchak (1994) report that teachers spend from 6.6 hours to between 10 and 20 hours a week in the planning process. Veteran teachers plan continually, building on and revising previous plans to accommodate student progress, time and resource constraints

(Clark & Peterson, 1986). Sardo (1982) found that more experienced teachers tend to be less systematic planners, devoting less time to planning and lesson details than to more general considerations of the continuity of weekly activities (Clark & Peterson, 1986). Clark (1988) has identified three primary functions of planning for teachers: the reduction of teacher anxiety by making classroom interactions more predictable; an organizing device for both classroom management and instruction; opportunities for reflection. Research reports that students who are taught in well-planned lessons spend less time on non-instructional activities, less time waiting for their turn, and less time in non-directed activity (Byra & Coulon, 1992). Clark and Peterson (1986) conclude that further research on planning in teachers might prove more advantageous from a cognitive-developmental framework, rather than the predominant emphasis on accumulated descriptions of the planning of experienced teachers.

There is a general consensus that metacognitive abilities are important to teach for development of effective learning and problem solving (Collins & Mangieri, 1992; Adams, 1991; Jones & Idol, 1990; Schoenfeld, 1985; Marzano et al, 1988; Pressley et al. 1989). Planning has been clearly identified as an essential component of such thinking skills, to facilitate the transfer of learning from one context to another (Brown, 1978; Paris & Winograd, 1990; Costa, 1991). Marzano et al. (1988) suggest that students should be made aware that these skills are processes which are ongoing at every stage of learning. They contend that teachers:

need to model the process of planning, monitoring, evaluating, and revising and then gradually give students responsibility for these tasks. In fact, students should recognize that experts (e.g., teachers) devote substantial energy to planning, monitoring, evaluating and revising; that experts often have problems carrying out a plan or revision; and that they sometimes fail, but that they learn from their failures (p.15).

There has also been considerable research into the best learning atmospheres, content, and approaches to the instruction of these skills in mathematics (Schoenfeld, 1985, 1987; Burkhardt, Groves, Schoenfeld, Stacey, 1984; Greeno, 1982), reading (Garner & Alexander, 1989), writing (Flower & Hayes, 1981, Hayes & Nash, unpublished manuscript), and science (Kuhn, Amsel, & O'Loughlin, 1988). These abilities have proven

beneficial to such diverse populations as learning disabled (Brown, 1987; Pressley et al., 1989), native populations (Mulcahy & Marfo, 1987), on-the-job literacy training (Mikulecky & Ehlinger, 1986), at-risk students (Tinzmann, Jones, & Pierce, 1990), and delinquents (Ross, 1989). The proliferation of programs and methods to teach these metacognition is an indication of its value (Schoenfeld, 1987; Pressley, Goodchild, Zajchowski & Evans, 1989; Borkowski, Carr & Pressley, 1987; Adams, 1991; Collins & Mangieri, 1992; Collins Block, 1993). The reader is directed to Costa (1991) for a rationale and comparative overview of more than thirty of the most commonly used programs.

The Teacher cell was composed of teachers of various ages and levels who both model and teach planning, as a component of problem solving, in the schools. Respondents (5 females, 5 males) represented all levels of education; elementary, high school, and university. Of the three individuals holding the degree of Ph.D. in Education, each works directly in instructional settings, as a special education teacher, a vice-principal, and a university instructor in teacher education. Some participants were contacted through area schools or the local chapter of Phi Delta Kappa, an international professional teachers association. As participation was voluntary and solicited outside the school, it was unnecessary to go through respective school boards for permission. All correspondence was received at their place of residence.

Data Collection and Preparation

In the application of a modified Delphi Method, there arises a natural conflict between the objective of allowing a wide enough latitude in the presentation of material for participants to respond in their own voice and manner, and the objective of facilitating an efficient and manageable communication process among panel members. It was therefore decided to make the first round as general as possible, while providing enough structure in the subsequent rounds to facilitate closure within cells and analysis across cells. Each participant was sent an introductory letter describing the study and the process they were about to embark on (see Appendix E). Although covered in the initial contact, a written

description was advisable. Each participant was also sent a consent form (see Appendix B), which included an acknowledgment of confidentiality of their comments, as well as permission for the anonymous use of their comments in writing by the researcher. The material included in each round was formatted in such a fashion as to give respondents ample space to write their comments, not only for individual items, but also for general comments as well. Each panelist was given a code for the duration of the study, to assure confidentiality. Stamped, self-addressed envelopes were included for replies. Twelve months were required in total for the actual data collection; on the average, two to three months per round. Some individuals were prompt in their replies, while others were tardy due to busy schedules or personal difficulties. Three weeks following a mailout of a round, each panelist was reminded by telephone, fax, or mail, depending on opportunity and distance.

Simple instructions accompanied the material for each round. The results of the first round were analyzed and returned to the participants for round two. This process was repeated a third time before closure. The second and third rounds included only such information as had been gathered independently within each domain specific cell (i.e.: academic, business, lay, and teacher cells). In every case the vocabulary of the respondents was retained, including phraseology. Should changes be required, it was implicit in the methodology that they would emerge from the following round. In order to preserve the nuances of emerging similarity and dissimilarity, data from the different streams were collected and analyzed independently, at each stage, with the assistance of an independent judge with extensive experience in both qualitative data analysis and cognitive processes. The safe-guard provided by the addition of the judge added assurance of greater impartiality of analysis.

Round 1

The first round consisted of two parts. Firstly, the respondents were asked to read the 15 statements generated from the telephone survey and indicate their level of agreement or disagreement on a Likert Scale of 1-5 (5 being full agreement). Secondly, the participants were asked the same three research questions which had been posed to the general public in the survey: *What is planning?; How do you do it?; Where and when is it used ?*. This

provided enough structure to generate comments, a link to the data collection of the general public, and a corpus of comments for the second round. The results of the Likert scales were tabulated, converting each score to a percentage for comparison purposes, to compensate for an inconsistent number of participants across cells. The comments (some hand written, others typed) were compared for content. Responses were initially grouped into the two dimensions of planning investigated by the present study, those of *nature* and *function*. Within those dimensions, several large categories emerged from the data. The two criteria for the inclusion were, firstly, agreement (4-5 level on the Likert Scale) on each of the 15 statements, and secondly, frequency of the written comments. A graphical representation of the large categories, one for nature and one for function was constructed, giving more visual individuals an alternative representation of their responses than the written text. Every effort was made to display the graphical representation as simply as possible to minimize misinterpretation.

Round 2

All elements of the analysis of responses from the participants were treated in a consistent fashion. The two sections on nature of planning and function of planning were edited as suggested by the respondents and returned for further comment, to add details. Changes were made on the basis of the following criteria: (1) if the suggestion was an obvious elaboration or clarification of the material presented; (2) if there was a majority response for a given change; (3) if resulting changes produced an obvious redundancy, additional alterations were made; (4) if a minority objection (even one) was supportive of the intended meaning of a given statement.

Round 3

The results of Round 3 were prepared in the same manner as for Round 2. In keeping with the advantage of the Delphi Method, minority opinions were retained and appear in the final analysis with an *, although ratification from the group at large was not possible. As expected, by the final round, there was a high degree of consensus on much of the material presented, indicated by both positive comments and by a lack of comment in many cases. The uniformity of formatting for Rounds 2 and 3 and the reiteration of all

statements previously agreed upon, allowed a consistency of responses, while still permitting respondents further deliberation to comment or disagree on any item. This opportunity enabled individuals to elaborate or even change their minds as the rounds progressed, a distinct advantage of the methodology. As in Round 2, changes were made by majority frequency or in cases where an obvious clarification would benefit the group's intent. As the consensus grew throughout the rounds, a final version had emerged for each cell. Where differences of opinion were significant, the written comments were used to formulate a discussion of the issue in question, as described in chapter four.

The Structuring of Delphi Statements for Rounds 2 and 3

The results of the Round 1 were given to each group in a particular structure with regard to nature of planning and function of planning (see Appendices F & G for an example of the structure). Each of the four cells (Academic, Business, Lay, and Teacher) received only the amended mailout for its respective cell, analyzed independently, after each Delphi round. The format of this feedback was, however, similar enough for each of the four cells to: offer simplicity, preserve a measure of uniformity for further comment, and permit across-cell analysis following Round 3. The following is a more detailed description of the format, constituting Rounds 2 and 3.

1. The nature of planning.

To characterize the nature of planning, a definition of planning was constructed from the comments replying to the question: *What is planning?*, to satisfy the requirements of the first research objective (to define the term 'planning' from various domain perspectives). As mentioned previously, several large categories reflecting the nature of planning (Goal, Plan, Mental Representation, Decision-Making, Regulation, Social, Organization) were identified from Round 1 responses. There was a certain degree of variation across cells: for example, not every cell had a large category of "Social". A graphical representation depicted the large categories emerging from each cell, as displayed in Appendix F. It was hoped that this second section would also describe the large categories used in the graphical

representation. This aspect of the Delphi mailouts is discussed fully, in chapter four, as the results of the nature of planning are reported.

A second section on the nature of planning was added to further explore the views of the respondents, as they pertain to the second research objective (to define the component terms of planning) and consisted of the definitions of large categories. For example, the large category of *Decision-making* defined as “a determination arrived at after consideration” (Webster’s New Collegiate Dictionary, 1981), is followed by four descriptors extracted from the Business cell, Round 2 definition of planning, which pertain to decision-making: identifying and responding; choosing among competing possibilities; involving the consideration and selection of priorities, alternatives; strategies, and procedures for goal attainment; often in the face of competition, opposition, or adversity. The sum of the descriptors included all elements within the cell’s definition of planning. The reiteration of planning components in a different format from the text definition was intended to encourage further commentary. This was in fact the case. Comments relating to this second section of the nature of planning did evolve over the three rounds to become a valuable elaboration and further clarification of views on these categories and terms. It was significant to note that many more comments were generated by this addition than from the first section alone.

2. The function of planning.

The second portion of the mail-outs for Round 2 and 3, consisted of several pages relating to the function of planning, addressing the third research objective: to identify the perceptions of the function of planning (what planning is used for) from domain-related perspectives. The relevant comments from Round 1 relating to the research questions, *How do you do it?* and *When and where is it used?*, plus the results from the Likert Scale statements relating to function, were similarly grouped into large categories, varying in number from eight to nine, depending on the cell in question. Again, a simple, schematic graphical representation was provided with a list of the functions, as displayed in Appendix G. Each general function of planning was restated with the more specific descriptors to which it referred. An example from Teacher cell, Round 2, produced the function statement

Planning is used to coordinate activities with people. Descriptors pertaining to the function statement were derived from first round responses, in this case: to achieve a particular outcome desired by the group or an individual; to collaborate or consult with parties [or their representatives] affected by the process or outcomes of planning; to reach the objective while respecting an individual's or group's personality and preferences; to share input regarding objectives, strategies, procedures, requirements or limitations; to carve out time to spend with others; to deal with long range goals presented by those who direct them. Both function statements and descriptors were then available for agreement, disagreement, or commentary.

The intent was to present the results of the previous round in a format which would generate maximum input.

In the event that a group failed to explicitly comment on a function to which they had all given agreement (4-5 on the Likert Scale) in the Round 1, the group was asked explicitly. For example, from the Round 2 of the Teacher cell, regarding the function statement 3: *Planning is used to think about the future*, a note was added: [Although no specific comments were proposed about this use of planning, all members of the 'teachers' group were in agreement (strongly agree or moderately agree) with the statement #13 from the first Round that "Planning is a way of preparing for the future." You may wish to express a view on this now.]

Across Cell Analysis

Comments of the general public (Likert Scale responses) were compared with the Delphi respondents to the 15 statements from the telephone survey. These results are described in the relevant sections of presentation of data and interpretation of results. The structured results of the Delphi rounds for each cell were quantified and compared across cells. Individual components relating to nature and to function were thus extracted and contrasted. Across cell analysis of the formal portions of the Delphi process was restricted to the third round results. Areas of similarity and dissimilarity were explored.

A less formal aspect of the results emerged from the additional comments made by the participants throughout, i.e., notes, addendums etc. All such additional comments made during the three rounds were compiled and grouped, with the aid of the internal and external dimensions identified from the cognitive-developmental framework articulated in chapter two. This categorization of the Delphi comments in relation to findings from the literature provided the additional benefits of more fully preserving the comments in context (often paragraph form), allowing a dialogue among respondents from different groups in the across cell analysis. These results are included in chapters four and five. In this way, valuable commentary about aspects of planning was available, which may not have neatly fit into any of the component analyses described above. This final analysis provided another connector between the literature on planning and the input from the Delphi respondents. Any comments pertaining to the actual Delphi process, or to planning in general, were retained and also constitute elements for discussion in chapter six.

In summation, the qualitative nature of the research produced responses based not only upon various knowledge bases relevant to the questions posed but upon subjective opinion or intuition. The three-fold methodology attempts to capture the substance and nuance of the opinions of academic, business, layperson, and teacher expertise in regard to the metacognitive skill of planning and its components, which evolve from the data gathered. The two subsequent chapters are devoted to the reporting and interpretation of results. Chapter four covers the data from the telephone survey and those pertaining to the nature of planning. Chapter five is exclusively focused on the results regarding the function of planning.

CHAPTER 4

Results and Interpretation on the Nature of Planning

The exploratory nature of the research objectives necessitated that the data collected remain as true to the intent of the respondents as possible. Certain assumptions were made by the researcher in the reception of these data and their analysis; i.e., that the respondents were as honest as possible, that adequate time was given by each participant to render their responses meaningful and representative of their true knowledge, beliefs, and experience, and finally, that not all of these components would necessarily be expressed in full. The methodology was conceived to give respondents opportunity to express their views as they pertain to the emerging categories. The presentation and interpretation of results has been divided into two chapters: chapter four describes the results pertaining to the nature of planning, chapter five describes the results on the function of planning. Chapter four is organized into two sections: section one describes preliminary data results of the telephone survey and their relationship with first round Delphi results; section two describes the evolution of the three iterative Delphi results on the nature of planning.

Preliminary Data: Telephone Survey Results

The primary purpose of the telephone survey was to accelerate convergence from the Delphi rounds by providing a starting point for data collection. The survey solicited views about planning held by a random sample of the general public (N=30). The resulting statements were phrased as simply and unambiguously as possible to provide a broad notion of planning as a process and without overly influencing the comments made in the first round. This initial stage of the research was not intended to be exhaustive but rather to provide sufficient content to stimulate valuable responses from Delphi cells. The informal,

loosely structured format of the data collection rendered a wide variety of responses, from cursory to expository and anecdotal.

The fifteen statements resulting from the telephone survey analysis were provided to the Delphi respondents to initiate their reaction, and are displayed with examples for each statement in Appendix C. The Delphi participants were asked to respond to the statements on a Likert scale (strongly disagree, moderately disagree, no opinion, moderately agree, strongly agree) indicating extent of agreement. The fifteen statements, with their relative frequencies, are displayed in the last column of Table 1. These scores were converted to percentages for the objective of comparison. To simplify the overview, the results are discussed in light of the priority given by each cell, as indicated by the scores. For purposes of reporting the Academic, Business, Lay, and Teacher cells are referred to as A, B, L, T respectively.

The concepts expressed by the statements are found throughout the Delphi results; some emerge as key definitional components, others as functions of planning. The scores in Table 1 clearly confirm that the elements mentioned by at least one-third of the general public were considered important by all Delphi cells. Out of a possible 60 entries, only 6 were below 80%, a strong affirmation of support. The social interaction statement: *planning involves interacting with other people*, received consistently low scores (51, 75, 56, 66) from all groups. The social nature and function of planning was recurrently present in the three rounds of the Delphi and will be discussed at length in subsequent sections of both the present chapter and chapter five.

Several more specific results are worthy of note. *Planning is a life skill* achieved consensus across cells. This idea was proposed by the greatest number of survey respondents (70%), and an important priority given by the four cells. The highest priority was given by the Teacher cell. *Planning is a thinking activity* was considered a high priority Academic, Business, and Lay cells but a low priority (7th) by Teacher cell and survey. This was surprising, given that teachers are expected to provide instruction within the classroom setting in thinking skills such as planning. *To plan, one must set goal(s)* was polarized with Business (3rd) and Lay (1st) cells giving high priority and Academic (7th).

Table 1
Comparison of Responses from Survey and Delphi Round One

Response Statement	Scores from Round 1 (%)				Survey
	A ^a	B	L	T	f (%) ^b
Planning is a life skill.	80	91	93	100	70%
Planning is a thinking activity.	91	95	96	84	40%
Planning is a way of preparing for the future.	89	96	85	92	34%
Planning anticipates or responds to opportunities.	96	89	82	84	50%
Planning is an organizational tool.	93	96	93	100	34%
Planning predetermines a course of action.	78	91	89	86	60%
Planning involves interacting with other people	51	75	56	66	44%
Planning is goal-directed.	96	91	93	96	44%
To plan, one must set the goal(s).	80	87	96	80	40%
To plan one selects strategies.	85	91	89	92	63%
Time is a factor in planning.	89	96	87	100	34%
The context is important in planning.	93	69	84	90	57%
One requires motivation to plan.	80	82	82	84	40%
Learning is a part of effective planning.	82	91	80	90	40%
Making or constructing a plan is part of the process.	91	47	85	94	34%

a A, B, L, T stand for Academic, Business, Lay, Teacher cells respectively

b Relative frequency of responses by all respondents (N=30) in survey

Teacher (8th), and survey (7th) rating much lower. *Learning is a part of effective planning* was considered most important to the Business cell (3rd) and least in the Lay cell (8th). It is interesting to note that the two cells dealing explicitly with education gave this item a moderately low rating (Academic 6th, Teacher 5th). The survey did prove valuable in generating fifteen statements about important components of planning. The high scores confirm the validity of the statements.

Delphi Results

The common denominator between the telephone survey and the Delphi Method lies in the three research questions posed to the respondents. Question 1: *What is planning?*, was asked to stimulate comments on the declarative knowledge of the respondents. Question 2: *How do you do it?*, was directed to procedural knowledge. Question 3: *When and where is it used?*, was intended to gather conditional knowledge.

A reporting of the Delphi Results necessarily includes a substantial number of comments made by the respondents in regard to various aspects of the nature and the function of planning. The extent of this verbatim reporting is justified by the quality of the comments themselves as well as the over-arching concern of the author to allow these experts to guide our understanding. In keeping with the intent of the study, the vast experience and opinion of these subjects has been actively solicited. The comments of the Academic cell alone are a rare opportunity to tap into the extensive knowledge these individuals have developed about planning and in particular the breadth of perspective offered by the composition of that cell. The qualitative nature of the methodology allows participants to take ownership over the content of their cell contribution. Alteration, addition, and omission of any element is acceptable, given cell majority ratification. The individual comments are therefore as central to the data collection and reporting as any other portion and are to be respected as such. The accumulated wisdom, knowledge, and beliefs evidenced within these comments, regardless of domain, are thought to be a distinct highlight of the study. Indeed, an implicit postulate is the conviction that planning is a

cognitive process about which members of society may be highly cognizant. Many of the remarks are excellent analyses in themselves and reflective of current views in the literature. These comments are peppered throughout the ensuing discussion.

The results of the three Delphi rounds will be described for the four participating cells: Academic, Business, Lay, and Teacher, also referred to as A, B, L, and T respectively. The results are reported within cells and by level of agreement: F indicating 100% or full agreement; fractions such as 8/9 indicating eight of a sample of nine agreed. Quotations or references to comments made by a respondent are identified by the Delphi round number and participant code (i.e.: R2-B6 indicates the comment is taken from Round 2, Business cell, participant #6). The Delphi rounds themselves may also be referred within text by abbreviation, such as R2 referring to Round 2, etc. As patterns of results emerge from the data collected, it is important to highlight not only areas of consensus or agreement within cells, but also areas which may not have achieved consensus or agreement. By the nature of the Delphi Methodology, within cell disagreements are easily discarded as the rounds progress, but may be retained in individual comment form. Whenever divergent areas of focus arise within the comments of the respondents, they will be discussed as the results are presented.

The Nature of Planning

As indicated in chapter three, the portion of the mailouts for the Delphi rounds relating to nature of planning consisted of two sections: one relating to the definition of planning and a second one relating to components of the cell definition (Appendix F). Seven components were identified in total, although the number varied across cells. Each component term was defined and descriptors isolated from the cell definition pertaining to it. The purpose was to more clearly define the terms used and to solicit further elaboration and clarification on them. As the rounds evolved, the second portion took on a character of its own. This 'cross-referencing' aided in gaining a broader understanding of the intent of the cells. Some cells failed to render an element explicitly in the definition; for example, the Business cell did not mention decision making in the definition but described the concept.

The extent of agreement within cells about the nature of planning is outstanding (see Appendix I). Within the Academic cell, individuals internationally known for their expertise and publishing in cognitive processes, from varying theoretical perspectives, were remarkably able to achieve full agreement on both a definition of planning generated by their cell, and full agreement on all definitional components (6) and their descriptors (31). The Business cell achieved a stability of response for a definition of planning, lacking full agreement on only three descriptors: whether planning is a natural process (8/11 agree), whether planning is a logical process (10/11 agree), and whether planning involves the unconscious (7/11 agree). Each of these controversies will be discussed later. Full agreement was achieved on all 7 definitional components, and on all descriptors (40) with the exception of the three mentioned above. The Lay cell concluded in full agreement on a definition of planning, with one exception regarding the notion that planning may involve the unconscious (6/9 agreed, 3/9 were uncertain), to be discussed later under the emerging themes. This cell achieved full agreement on all definitional components (7) and their descriptors (34), with the exception regarding the unconscious, mentioned above. The Teacher cell, similarly achieved full agreement on a definition of planning, the definitional components (7), and their descriptors (40), with the exception of the mention of the unconscious in the definition and one descriptor, to be discussed later.

The nature of planning is studied in light of the first two research objectives: (1) to define the term 'planning' from domain perspectives and, (2) to define the component terms of planning. The results, within and across cells, are presented initially in overview, followed by detailed reporting on the specific definitions generated by each cell, and the definitional components, and descriptors. The chapter concludes with more general emerging themes, third round contributions, and a summary of the results relating to the nature of planning.

Definitions of Planning

The first research objective of defining the term 'planning', "What is planning?", is formalized into distinct cell definitions. The final definitions of planning generated by each cell are displayed in Table 2. Agreement on the definitional aspects contained in the cell

Table 2

Definitions of Planning by Each Cell of Delphi Round Three

Cell	Definition of Planning
Academic	Planning is a dynamic, transactional process involving the conscious or deliberate specification of a sequence of actions aimed at dealing with uncertainty for goal attainment. It is dynamic in that strategies used for goal attainment and actions are adapted to environmental contingencies; knowledge gained from completed plans influences the formulation of subsequent plans, goals, mental representations, and actions. Planning encompasses the revisionary processes related to devising ways to attain, elaborate, maintain, monitor, update, and/or abandon goals and schedules, in varying levels of abstraction. Planning, whether short- or long-term, for abstract or specific goals, individual or social, involves the generation, selection, organization, and coordination of strategies for implementing decisions and attaining goals. Planning includes goal management, time management, resource management, action management, and person and relationship management.
Business	Planning is a natural, logical process of identifying and responding to problems, goals, sub-goals, and objectives, which may be short or long term, simple or complex, conscious or unconscious, formal or informal. Planning is the act of choosing among competing possibilities, involving the consideration and selection of priorities, alternatives, strategies, and procedures for goal attainment. Planning is an organizational tool used to develop a program for action, including timing, scheduling, and contingencies in the event circumstances shift; it necessitates assembling all available information which could affect the process. Planning is an iterative process of continual evaluation and revision of goals, visions, plans, and tasks throughout implementation. Planning involves engaging and motivating others, including affected stakeholders at appropriate points. Plans may be: 'routine' plans which involve the coordination of many elements to achieve routine or repetitive tasks, which eventually become almost intuitive in nature; 'strategic' plans which involve innovation and non-routine creation of change, often in the face of competition, opposition, or adversity and; 'contingency' plans in the event routine or strategic plans fail.

Table 2 (continued)

Cell	Definition of Planning
Lay	Planning is a conscious or unconscious decision-making process, whereby an individual or group of individuals systematically organize a sequence of steps toward the achievement of a desired goal or objective. Depending on the circumstances, the process, steps, and goals may vary in complexity, scope, duration (short /long term), be individual or social, formal or informal. Planning involves analysis, choice, and coordination of goals, priorities, options, and courses of action with regard to human and material resources and other factors, including time. Goals and plans are continually evaluated and adjusted to account for or respond to feedback and unforeseen events. Often a personal, sometimes a consultative, collaborative process, planning is an essential element of control over personal and professional objectives at all levels.
Teacher	Planning is a metacognitive, decision-making process involving conceptualizing, choosing, prioritizing, and organizing goals, strategies and procedures needed to meet the objectives. Goals or plans may be short-term or long-term, simple or complex, flexible or rigid, formal or informal, individual or social. Consideration is given to the uses, influences, and constraints of human and material resources, including time. Planning may also involve intuition and the unconscious. In a process of ongoing plan implementation, monitoring, evaluation, and revision, the planner may use feedback to adjust or refine goals, expectations, and strategies. Planning involves ordering one's life according to personal goals, living standards, and responsibilities. Often a consultative, collaborative process, planning utilizes past experience, existing knowledge and even new knowledge.

definitions is found in Appendix I. Of the 100 definitional aspects, from all cells, displayed in Appendix I, consensus was achieved on a total of 97. Of the three not receiving full agreement, a majority agreement was still achieved. Each of the areas of contention revolved around whether planning is natural, logical or unconscious. These three are discussed at length later in the chapter.

Efforts to define complex cognitive processes are difficult at best and much of the work of the present thesis. One respondent (R1-A10) eloquently wrote that “the word ‘planning’ can be used in many different ways both in common language and in the psychological literature (see Scholnick & Friedman, 1987, 1993). Planning can refer to (i) processes involved in the anticipation of future behavior, (ii) something that regulates behavior (e.g., a procedure or template), and as (iii) a way of storing information about the world (e.g., a diagram or program)”. Another suggested that “planning is a cognitive task that can involve deciding what, when, and how to do things” (R1-A11). Two facets seemingly *a priori* for all cells (F) were that planning is goal-directed and involves a sequence of actions, which resonates with the consensus in the literature.

Each definition displays its own concise elegance and stands on its own merit. Appendix I substantiates consensus on most definitional aspects of planning within cells; the elements of any contention are relatively minor. Each of the four cell definitions achieved a solid consensus, with the addition of three explicit caveats from two members of the Academic cell. The concerns of each respondent are thought to be clarifications, rather than objections to the cell definition. The comments are qualifiers, thoughtful and pertinent, but do not undermine the stability of agreement within the cell. One respondent from the Academic cell registered two caveats concerning the notions of ‘conscious or deliberate’ and adaptation to the environment.

A Graphical Representation of the Nature of Planning

As indicated in chapter three, the material in each round was displayed within a set format for each cell. The responses from Round 1, with regard to the nature of planning, were reported in three ways, as indicated in Appendix F: as a graphical representation of the

components of the definition, as a formal definition, and as components of the definition with descriptors. It was hoped that a model could be constructed reflecting the progression of the three rounds. Figure 2 provides an example of the 'model' presented to one cell.

The proposed conceptual representations were constructed using a common set of components. It was hoped that a similar structure, flexible enough to support within cell variations, would also facilitate cell comparisons following Round 3. The responses from the Business, Lay, and Teacher cells regarding this graphical representation were minimal, seemingly indicating the 'model' to be satisfactory; some emulative comments like 'agreed' and 'excellent' were observed. In most cases, no comment was made, inferring acquiescence, resulting in no changes to the 'model' throughout. The lack of cell involvement with the 'model' weakens any inferences about its credibility.

As might be anticipated, the response to the presented 'model' held a much different import for the Academic cell, inducing a dramatic reaction in Round 2, with eight of nine participants commenting with debate and suggestion. Attempting to reflect the concerns and suggestions of the participants, these responses were incorporated into five alternative 'models', for their consideration in Round 3 (see Appendix H). The individuals in this cell furnished both thoughtful and critical reflections on the various options. Their concluding comments contained a disparate opinion, ranging from moderate support to total absence of support, as exemplified by the comments:

"unable to respond to the graphical representations (not sure how, etc.)" (R3-A6); "the definition of planning should mirror the 'best' nature of planning model" (R3-A1); "I hate them all. I am really not happy with any of the diagrams" (R3-A8); "I found it very difficult to choose among/between these different models. All capture important aspects of the planning process but with different emphases. For example, I keep wanting to find a model with mental representation of the plan & mental representation of the goal, each transactionally influencing each other. It would seem to me that all the major components could be represented twice, as part of the goal and as part of the plan (see #5, Appendix H)" (R3-A9); "I prefer diagrams #1 and #4" (as shown in Appendix H) (R3-A10).

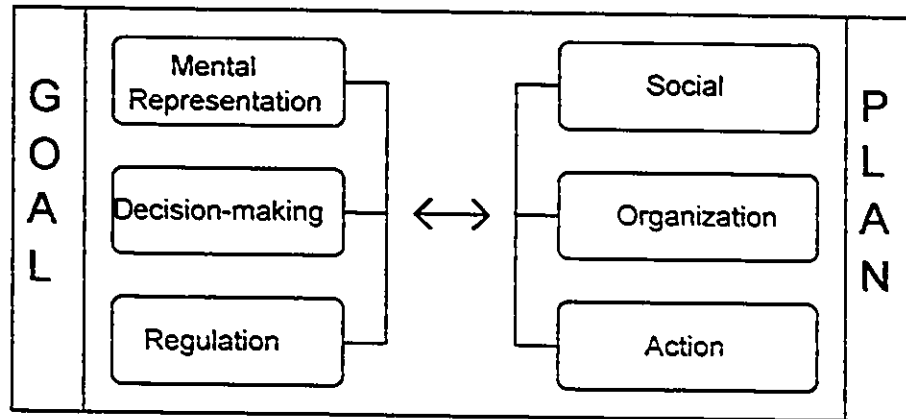


Figure 2 Graphical representation of the nature of planning presented to the Business cell for Delphi Round Two

The closest to agreement was the slight preference by the majority for diagrams #1 and/or #4. Despite the insightful contributions, it is clear that the specificity of criteria for such a model goes beyond the limited scope allotted in the present study. It was therefore evident that no model with majority agreement would emerge from this cell.

Signatures of the Definitions

The cell definitions were partitioned according to eight global orientations, called dimensions. These orientations can be represented by positions on the vertices of an octagon. The presence of an orientation is identified by a vertex of the octagon, while an absence of an orientation is represented by the center of the octagon, similar to the spokes on a wheel. The representative points produces a graphical representation of the 'signatures' of the definitions, as displayed in Figure 3. Each signature denotes the main foci of the cell definition. A perusal of Figure 3 indicates that the Academic and Lay cells are the most focused, with four dimensions each, the Business cell shows six dimensions, and the Teacher cell is the most explicated with seven. The cell signatures schematically highlight the eight dimensions, those of: Representation (R), Decision Making (DM), Strategy (STR), Organization (O), Management (M), Regulation (I), Individual (IND), and Social (S). The dimension of Representation refers to the processes involving consciousness, intuition, logic etc. included in the cell definition; Decision Making describes acts of choosing, prioritizing, analyzing; Strategy includes references tactics or procedures; Organization reflects mention of such as sequencing, procedures etc.; Management indicates the conducting or supervision of something, Regulation contain reference to revisionary processes, evaluation, iteration, monitoring; Individual encompasses that relating to the personal or subjective orientation; and Social describes that relating to others. The analysis of these representations is confined to the actual definitions produced by each cell, not including the components of the definitions, their descriptors, or auxiliary comments by respondents. With these constraints, no one cell demonstrates all of the eight dimensions. Organization (O), Regulation (I), Social (S) where it appears, achieved full agreement within each cell with no additions or caveats.

Table 3 displays excerpts from the cell definitions relating specifically to the dimensions. The partitioning of the definitions leads to an exhaustive separation with no overlapping. Table 3 is an elaboration of Figure 2, completed by the inclusion of the excerpts. The dimension of Strategy (STR) was observed within all cell definitions with the exception of the Lay cell. The strategic nature of planning was rated a third priority in statement results in the first round, survey statement results, but is not found in the Lay cell definition, as indicated in Table 3. All cells included the dimension of Organization (O). It is interesting to note that although achieving consensus in all Delphi cells, 'organization' received the lowest priority in the statements from the telephone survey. Regulation (R) and Organization (O) were the only dimensions of the definitions which were consistent across cells. The Teacher cell was the only one to explicit an Individual dimension. The Social dimension was identified in all cells but the Academic. Although not explicitly mentioned in this cell, the concept is approximated in the statement that planning involves person and relationship management. This cannot, however, be included in the social dimension as it does not indicate that there is a social nature of planning. The social aspect is dealt with in the components of the definition and descriptors and in Academic respondent comments, but not in the definition itself, as shown in Table 3. The social dimension is clearly seen by the Academic cell as a function rather than a part of the nature of planning. The signatures of the definitions provide a bird's eye glimpse to facilitate further analysis. The themes are reiterated throughout the data analysis in this chapter.

In summation, the process was highly successful in generating four excellent definitions. The degree of satisfaction of the respondents themselves is an important indicator of the validity of the process and is expressed by repeated comments such as very good, excellent, well put together, quite accurate, summarized perfectly, well-stated.

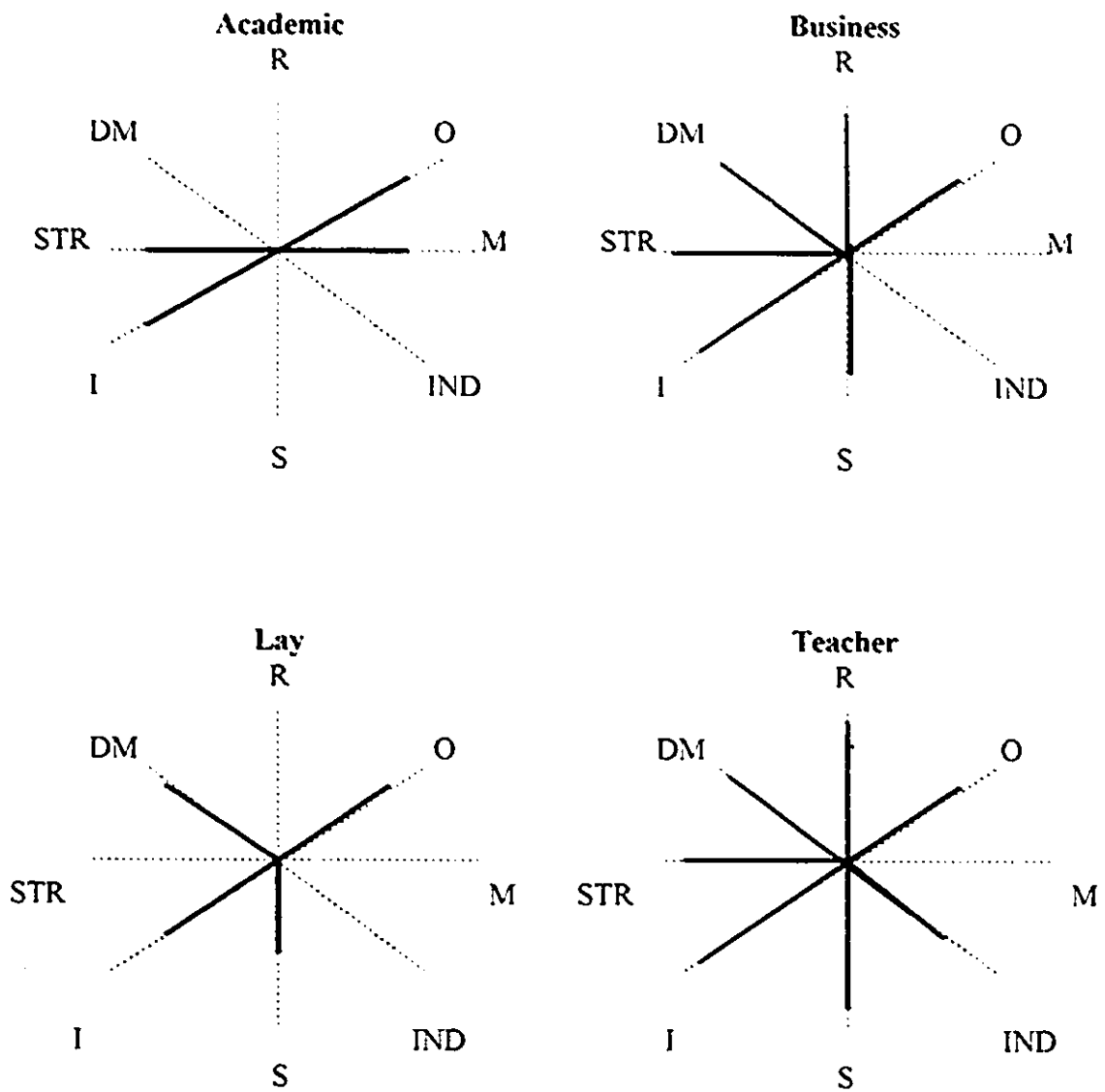


Figure 3 Signatures of Definitions

Note: R stands for the Representation Dimension
 O stands for the Organization Dimension
 DM stands for the Decision Making Dimension
 M stands for the Management Dimension
 STR stands for the Strategy Dimension
 I stands for the Regulation Dimension
 IND stands for the Individual Dimension
 S stands for the Social Dimension

Table 3
Partitions of the Definition of Planning According to Eight Dimensions

Dimension	Cell	Statements Relative to Cell and Dimension
Mental Represent-ation (R)	Business	“Planning is a natural, logical process of identifying and responding to problems, goals, sub-goals, and objectives, which may be short or long term, simple or complex, conscious or unconscious, formal or informal.” “‘routine’ plans which involve the coordination of many elements to achieve routine or repetitive tasks, which eventually become almost intuitive in nature”
	Teacher	“Planning is a metacognitive ... process involving conceptualizing ...” “Planning may also involve intuition and the unconscious.” “planning utilizes past experience, existing knowledge and even new knowledge.”
Decision Making (DM)	Business	“Planning is the act of choosing among competing possibilities, involving the consideration and selection of priorities, alternatives, strategies, and procedures for goal attainment. “
	Lay	“Planning is a conscious or subconscious decision-making process” “Planning involves analysis, choice, and coordination of goals, priorities, options, and courses of action with regard to human and material resources and other factors, including time”
	Teacher	“Planning is a decision-making process... choosing, prioritizing” “Goals or plans may be short-term or long-term, simple or complex, flexible or rigid, formal or informal, individual or social”
Strategy (S)	Academic	“Planning, whether short- or long-term, for abstract or specific goals, individual or social, involves the generation, selection, organization, and coordination of strategies for implementing decisions and attaining goals”
	Business	“ ‘strategic’ plans which involve innovation and non-routine creation of change, often in the face of competition, opposition, or adversity and; ‘contingency’ plans in the event routine or strategic plans fail.”
	Teacher	“involving ... strategies ... needed to meet the objectives”

Table 3 (continued)

Dimension	Cell	Statements Relative to Cell and Dimension
Organization (O)	Academic	"...involving the conscious or deliberate specification of a sequence of actions aimed at dealing with uncertainty for goal attainment"
	Business	"Planning is an organizational tool used to develop a program for action, including timing, scheduling; it necessitates assembling all available information which could affect the process."
	Lay	"whereby an individual or group of individuals systematically organize a sequence of steps toward the achievement of a desired goal or objective. Depending on the circumstances, the process, steps, and goals may vary in complexity, scope, duration (short /long term), be individual or social, formal or informal.
	Teacher	"organizing goals ... and procedures needed to meet the objectives. Consideration is given to the uses, influences, and constraints of human and material resources, including time."
Management (M)	Academic	"Planning includes goal management, time management, resource management, action management, and person and relationship management".
Regulation (R)	Academic	"Planning is a dynamic, transactional process ... It is dynamic in that strategies used for goal attainment and actions are adapted to environmental contingencies; knowledge gained from completed plans influences the formulation of subsequent plans, goals, mental representations, and actions." "Planning encompasses the revisionary processes related to devising ways to attain, elaborate, maintain, monitor, update, and/or abandon goals and schedules, in varying levels of abstraction"
	Business	"Planning is an iterative process of continual evaluation and revision of goals, visions, plans, and tasks throughout implementation ... Planning is ... used to develop ... contingencies in the event circumstances shift"
	Lay	"Goals and plans are continually evaluated and adjusted to account for or respond to feedback and unforeseen events."
	Teacher	"In a process of ongoing plan implementation, monitoring, evaluation, and revision, the planner may use feedback to adjust or refine goals, expectations, and strategies."

Table 3 (continued)

Dimension	Cell	Statements Relative to Cell and Dimension
Individual (IND)	Teacher	“Often a personal ...process, planning is an essential element of control over personal ... objectives at all levels”. “Ordering one’s life according to personal goals, living standards, and responsibilities”
	Business	“Planning involves engaging and motivating others, including affected stakeholders at appropriate points.”
Social (S)	Lay	“sometimes a consultative, collaborative process, planning is an essential element of control over ... professional objectives at all levels.”
	Teacher	“Often a consultative, collaborative process”

Definitional Components and Descriptors

The second research objective was to define the component terms of planning. As indicated by Table 4, the resulting definitions of component terms have reached consensus (F) within cells, as expressed in Round 3. The seven component terms which describe the content of the definitions are displayed in Table 4, along with the definition of each component term, and the cell agreement for each. It is to be expected that there be nuances which distinguish one cell from another. These across cell differences are considered to be minor, while the commonalties between the definitions of terms is surprisingly high. Of a total of 145 descriptors for the definitional components of planning, the participants achieved full agreement on 140 or 97%.

Analysis of the descriptors necessitates a choice between two possible avenues of emphasis. One possibility appeals to the many commonalties, across cells, among the descriptors for a given component, many of which could have been collapsed to facilitate across cell comparison. This approach would have avoided redundancies and accentuated across cell correspondence. The second possibility supports a decision to retain individual cell descriptors and detailed within-cell data. This option has certain repercussions in the between cell analysis. This approach accepts certain redundancies and permits a focus on the nuances of dissimilarity across cells among descriptors. Since the cells were independent in their evolution and analysis, it is seen to be a priority to retain the language and nuance idiosyncratic to each. Although justification may be made for either decision, the researcher has selected the second option to retained the descriptors particular to a cell. This emphasis is evident in the reporting of the results in the tables to follow.

The following discussion of each of the 7 components is supported by a table displaying the definition of the term, descriptors, and any relevant third round contributions. Agreements are given for each definition and descriptor (F refers to full agreement or consensus), accompanied by comments made by the respondents which elaborate on their views. Many of the comments were made in response to the initial

Table 4
Definition of Component Terms of Planning

Component	Definition	A	B	L	T
Goal	the end toward which effort is directed	F	F	F	F
Mental Representation	a psychological organization of components relating to a given set of phenomena in environments, in the mind of the planner	F			
	a psychological organization of components relating to a given environment		F	F	F
Decision Making	a determination arrived at after consideration	F	F	F	F
Organization	an arrangement or form of coherent unity or functioning whole	F			
	something arranged in a pattern or structure		F	F	F
Regulation	the act of monitoring, controlling, or guiding a process	F	F	F	F
Social	the interaction of an individual with other people		F	F	F
Plan	a blueprint for action	F	F	F	F

research questions. Once stated, participants rarely felt the necessity to reiterate the same points in subsequent rounds. This explains the large number of comments reported from the first round (R1). The comments are expressed with terminology from the review of the literature on cognitive processes, in italics. Third round contributions are marked by * in the tables and are synthesized at the conclusion of the chapter. Although they were not available for ratification by the group, these additions contain valuable insights.

The Goal Component

The four samples are in full agreement that planning itself is “directed toward the achievement of a desired goal or objective”, an agreement reflected in the numerous definitions of planning in the literature. All participants agree to define the term ‘goal’ to mean ‘the end toward which effort is directed’. Full agreement was achieved for the total of 7 different descriptors for goal, as shown in Table 5. All cells fully agreed that goals may be short-term or long-term; for example, “you need to be more specific that planning also encompasses very short-term, non-lofty goals” (R2-A8). Academic, Lay, and Teacher cells felt that goals may be individual or social (F). The Academic cell produced the statement that ‘goals may arise from the action of planning’ (F).

The conceptualization of *goal definition* was expanded in the comments from the respondents in the Academic and Lay cells. Two main ideas highlight the importance of goal definition and the initial tentative nature of many goals:

“[The goal] may be unspecified. People often plan and act with no set goal in mind, i.e. the goals arise from the action of planning” (R2-A9). “Planning is a process of defining a problem, need, or desired goal, including the definition of criteria for excellence for goal achievement or need satisfaction,.... sometimes setting benchmarks to measure movement toward goal achievement” (R1-A7). “The goal of the planner is formulated as part of his/her mental representation of the plan” (R1-A3). “Planning is goal-directed but not in the sense that one must select one final goal or set of goals. In many situations in real life, goal states can

only be inferred and the planner proceeds with a few discrete subgoals that may (or may not) lead to goal attainment. (R1-A9)

“Though often the goals come first. Planning may clarify goals” (R2-L4). “Generally though, the single most important aspect of a good plan is the clear understanding of the goal and even more importantly, the desire to achieve that goal. When a goal is understood, the plan can be adaptively changed to ensure the objectives are met. In addition, when the goal is understood, it is almost immediately clear when the plan is going 'off the tracks' (R1-L4).

The idea of *meta-goals*, abstract or conceptual goals scaffolded on personal beliefs and values which guide more operational goals, was introduced in the comments of all but the Teacher cell:

“Also, so as to guide the life goals for ourselves and others” (R2-A4).

“...examining links between goals, values and beliefs” (R1-A7).

“Planning in its best sense starts from defining one’s values, then goals - with time lines and plan of action. It involves setting priorities” (R1- B12).

“It is used because ... without the intelligent application of resource management, without the ability to apply reason to actions, without the ability to foresee the outcome of a sequence of events, then disaster may await because, though the goals are understood, the goals themselves are erroneous either because of ignorance, short-sightedness, or simply impractical behavior - such as placing the importance of profit above the protection of a needed species” (R1-L4).

The Teacher cell was unique in highlighting meta-goals in its definition by the statement “Planning involves ordering one’s life according to personal goals, living standards and responsibilities”. There was no mention of conflicting goals by any group. The provisional tone of many of the descriptors and additional comments support the literature (i.e., Hayes & Flower, 1981) that in cases of ill-defined goals, goal definition becomes a definite problem solving activity. The Goal component was clearly a priori for planning in the perceptions of the participants and seemed to be one in which the participants felt fully conversant, without debate.

Table 5
Results of the Definition and Descriptors of the Goal Component

Characteristic	Definition or Descriptor	A	B	L	T
Definition:	the end toward which effort is directed	F	F	F	F
Elaborations:	is most often conscious but can be unconscious or nebulous	*			
Descriptors:	problems or challenges, and objectives		F		
	may be short-term or long term	F	F	F	F
	may be abstract or specific	F			
	simple or complex		F	F	F
	formal or informal			F	
	may be individual or social	F		F	F
	may arise from the action of planning	F			
Additions:	is revisable once plan has started	*			
	may be <u>very</u> unclear or individual	*			
	may be shared	*			

* a remark which is offered by one individual in the final round and has therefore not been available for group consideration or consensus

The Mental Representation Component

The concept of mental representation was defined slightly differently by the Academic cell than the other three cells, as shown in Table 6. The Business, Lay, and Teacher cells agreed that mental representation referred to 'a psychological organization of components relating to a given environment', while the Academic cell refined their definition of the term to include 'a psychological organization of components relating to a given set of phenomena in environments, in the mind of the planner'.

There were 15 separate descriptors for Mental Representation, as displayed in Table 6. Three of these descriptors, relating to the processes of planning being logical, natural, or unconscious proved to be contentious. The latter two are discussed under emerging themes below. Only the Academic and Teacher cells mentioned and gained consensus on the contribution of knowledge to mental representations with the descriptors "knowledge gained from completed (uncompleted *) plans influence the formulation of subsequent plans, goals, mental representations, and actions" (A cell) and that planning "utilizes past experience, existing knowledge, and new knowledge" (T cell).

There was attention given in all cells to the idea of mental representation. There were two concepts touched upon by at least three cells. Firstly, the concept of planning as a conscious process, was given consensus within and across three cells (A, B, and L). Secondly, the possible inclusion of the unconscious in mental representations was addressed by each cell, achieving consensus in the Academic cell and majority agreement in the three other cells. Only the Academic and Business cells made special comment on the mental representation component of planning:

"I see representation as the generic and over-arching entity" (R3-A3).

"planning might well involve representations that are not consciously activated" (R3-A9).

"The key point is that a plan is always probabilistic in nature. It usually increases the odds of success amidst ———. But if the model of the world on which it is based is wrong, it can be counterproductive. There is a whole literature on the irrationality of rational planning under certain conditions" (R2-B3).

Table 6

Results of the Definition and Descriptors of the Mental Representation Component

Characteristic	Definition or Descriptor	A	B	L	T
Definition:	a psychological organization of components relating to a given set of phenomena in environments, in the mind of planner	F			
	a psychological organization of components relating to a given environment		F	F	F
Elaborations:	adding [visualization of end results in mind]		F		
Descriptors:	a conscious and/or deliberate process	F	F	F	
	a natural process		8/11		
	a metacognitive process involving conceptualization				F
	a logical process		10/11		
	an unconscious process [and automatic] may involve intuition	F	7/11	6/9	8/9 F
	may vary in levels of abstraction	F			
	varies in scope and complexity			F	
	may vary in levels of specificity	F			
	anticipates the future			F	
	includes individual or social, formal or informal structure			F	
	involving personal goals, living standards, and responsibilities				F
	involves innovation and non-routine creation of change		F		
	knowledge gained from completed (uncompleted *) plans influence the formulation of subsequent plans, goals, mental representations, and actions	F			F

In regard to this component, there was no mention of the idiosyncratic nature of mental representations. The Lay cell was the only one to make reference to the anticipatory function within mental representation and none mentioned the mental simulation of a plan. The Teacher cell was in full agreement that intuition may be involved in one's mental construction. This was not referred to by any other cell. Only two of the Business cell descriptors achieved consensus, regarding the conscious nature of mental representation and that it involves innovation and non-routine creation of change. The latter point was the single reference to creativity in regard to planning processes. It is interesting to note that the two cells concerned with education (Academic and Teacher) were the only ones to mention knowledge explicitly (F) in regard to planning. Despite the abstract nature of the Mental Representation component, it generated interest and vibrant comment. Precisely because of the conceptual orientation, this component spawned several contentious, nebulous, and persistent issues, to be discussed later.

The Decision Making Component

Further to the previous discussion on the Decision Making dimension in the signatures of the definitions, all cells agreed (F) that decision making refers to 'a determination arrived at after consideration'. The total of 9 descriptors, displayed in Table 7, all reached full agreement. Descriptors from the Business, Lay, and Teacher cells emphasized the ideas of choosing and prioritizing of goals, strategies, and procedures for goal attainment with regard to human and material resources. The Business cell provided the most descriptors (4) of all cells and were unique in mentioning that decision making is 'often in the face of competition, opposition, and adversity' (F). The Academic cell commented that "decision making is a transactional, revisionary process influenced by feedback from taking certain actions and then reconsidering initial decisions" (R3-A9) and that decision making is "often influenced by our values" (R2-A6). Although goal conflict was not mentioned in relation to the Goal component, this notion is present in most of the descriptors for decision making.

Table 7

Results of the Definition and Descriptors of the Decision Making Component

Decision Making		A	B	L	T
Definition:	a determination arrived at after consideration	F	F	F	F
Elaborations:	a determination arrived at after varying amounts of consideration	*			
	may not be conscious	*			
	decision making is a transactional, revisionary process influenced by feedback from taking certain actions and then reconsidering initial decisions	*			
Descriptors:	a process of analysis, choice, and coordination of goals, priorities, options, and courses of action with regard to human and material resources and other factors			F	
	consideration is given to the uses, influences, and constraints of human and material resources, including time				F
	includes generation, selection of strategies	F			
	aimed at dealing with uncertainty	F			
	identifying and responding		F		
	[weighing and]* choosing among competing possibilities		F		
	involving the consideration and selection of priorities, alternatives, strategies, and procedures for goal attainment		F		
	choosing, prioritizing goals, strategies, and procedures needed to meet goals				F
	often in the face of competition, opposition, or adversity		F		
Additions:	aimed at suiting activities and actions to the task	*			
	determining risks and cost of errors		*		

* a remark which is offered by one individual in the final round and has therefore not been available for group consideration or consensus

The decision making component appeared to be an important aspect of respondents' conception of planning. The lack of controversy or debate indicates a high level of comfort with this component and its integral place in the planning process.

The Organization Component

Organization was defined by the Academic cell as "an arrangement or form of coherent unity or functioning whole" (F), and by the Business, Lay, and Teacher cells as "something arranged in a pattern or structure" (F). Table 8 displays the full agreement on all 14 descriptors of Organization. The central theme of the descriptors emerged as the notion of "coordination" of elements for goal attainment. The Lay and Teacher cells personalized the component to indicate that organization is "an essential element of control over personal or professional objectives at all levels" (L cell, full agreement) and an "ordering of one's life" (T cell, full agreement).

Interestingly enough, there were no additional comments from the respondents concerning the component of Organization, perhaps indicating a fairly uniform and non-controversial level of comfort with this particular component. Similar to the decision making component, the organization component produced rich reference to the complexities of this process. The data suggests organization to be *prima facie* to planning for all cells.

The Regulation Component

Regulation, defined by all cells as "the act of monitoring, controlling, or guiding a process" (F) is augmented by the comments from the Academic cell that "as a theoretical construct, planning is a part of executive functioning and self-regulation - but is only as a component in each construct" (R1-A1) and involves "developing capacities to monitor progress" (R1-A7). Although the descriptors are few and particular to each cell, there is a similar intent to the comments. Full agreement on all 7 descriptors is displayed in Table 9. The Academic and Business cells concluded with the most descriptors, although the latter made no annotation. For the Academic cell, the regulation aspect of decision making is spoken of as "a transactional, revisionary process influenced by feedback from taking

Table 8

Results of the Definition and Descriptors of the Organization Component

Characteristics	Definition or Descriptor	A	B	L	T
Definitions:	an arrangement or form of coherent unity or functioning whole	F			
	something arranged in a pattern or structure		F	F	F
Descriptors:	the specification [systematic organization] of a sequence of [steps] actions aimed at achieving a [desired] goal [or objective]	F		F	
	involves coordination of strategies for implementing decisions and goal attainment	F			
	the coordination of goals, priorities, options with regard to human and material resources, and other factors, including time			F	
	the coordination of many elements to achieve goals, routine, non-routine, repetitive, or unique tasks		F		
	organizing goals, strategies, and procedures				F
	an essential element of control over personal and professional objectives at all levels			F	
	may vary in level of abstraction	F			
	may vary in level of specificity	F			
	often directly influenced by mental representations	F			
	a body or association		F		
	an organizational tool		F		
	includes time, scheduling		F	F	
	necessitates assembling all available information which could affect the process		F		
	ordering one's life				F

Table 9
Results of the Definition and Descriptors of the Regulation Component

Characteristic	Definition or Descriptor	A	B	L	T
Definitions:	the act of monitoring, controlling, or guiding a process	F	F	F	F
Elaborations:	the act of monitoring, controlling, abandoning, redirecting, or guiding a process	*			
	regulation involves 'watching your plan <u>evolve</u> ; it requires follow through and interaction		*		
Descriptors:	the revisionary process related to devising ways to attain, elaborate, maintain, monitor, update, and/or abandon goals and schedules	F			
	the goals and plans are continually evaluated and adjusted to account for or respond to feedback and unforeseen events			F	
	ongoing monitoring, evaluation, and revision uses feedback to adjust or refine goals, expectations, and strategies				F
	includes goal management, time management, resource management, action management, and person and relationship management	F			
	contingencies in the event circumstances shift or routine or strategic plans fail		F		
	an iterative process		F		
	continual evaluation and revision of goals, visions, plans, and tasks		F		

* a remark which is offered by one individual in the final round and has therefore not been available for group consideration or consensus

certain actions and then reconsidering initial decisions” (R3-A9). Further comment indicated that this regulation requires *feedback accommodation*: “....changing the problem definition or directions if the strategies, resources, and opportunities are not effective in moving toward goal achievement; making revisions and modifications in parts” (R1-A7). One respondent in this cell states that “my mind is open to evidence that my plan could be wrong, needs to be modified, and /or to be consciously improved based on on-going information I gain as the plan is implemented” (R1-A4).

Similarly, a respondent in the Lay cell contends that “plans and goals must be flexible so that if events change, goal/plan can change easily as well without much disruption to those involved” (R3-L5). This theme is repeated in the Teacher cell comment: “Metacognitively, planning is a process of constant revisions. We monitor our progress and adjust our strategies as we move toward the goal. Sometimes we find the goal is not attainable. We adjust our goal expectations and reset the goal” (R1-T4), and that “under no circumstances is it ever complete or 'set in stone' for me. I must always remain open for new information or influence which might require an alteration of the original plan” (R1-T11).

Given the importance of the regulation component in the literature (Piaget, 1960, 1977, 1978; Vygotsky, 1978; Pressley et al., 1989; Scholnick & Friedman, 1993) on planning and the definitional confusions therein, the descriptors take on a special significance. It is clear from the comments and from the descriptors themselves that the transactional nature of self-regulation with the problem environment is well understood by all cells. Despite the few descriptors (A=2, B=3, L=1, T=1), each one is more fully elaborated and conceptual than the descriptors for other components, in general. Most of the descriptors encompass various processes that are part of the regulation activity. These comments highlight the provisional aspect of planning. The vocabulary used by the respondents is precisely that utilized in the literature, i.e., revision, evaluation, monitoring, management etc. As the rounds progressed, the respondents felt compelled to stress that planning requires continual revision and modification.

The Social Component

Each cell commented extensively on the social nature of planning. The Social dimension of planning appears as signatures of the definitions (B, L, T), components of the definitions and descriptors (B, L, T). In spite of the fact that the 4 descriptors from all cells were simple, minimal in number, and non-controversial (F) (Table 10), there appeared to be a considerable interest in this component, as indicated by the within cell comments. Although the social component was absent from the Academic cell definition, and therefore without the stimulation of a formal category for iteration, the spontaneous written cell comments were extensive and illuminating. The responses relating to the social nature of planning fall into two levels: those of interpersonal interaction (micro level) and more global or societal level (macro level). In regard to the *interpersonal level* of the social nature of planning, the cells were explicit in their comments:

“Planning is an aspect of cognition which is socialized, applied, and challenged throughout the life span. An individual might plan his or her own life, construct and guide the life plans of others (e.g., as a parent or mentor), or participate in the co-development of joint life plans. In most cases, I plan by myself, but there are also instances (both everyday and life planning) where planning takes place in a social context and the end is a joint product” (R1-A10).

“In the planning process, you can involve other people to delegate responsibilities to but your planning thereafter must involve follow-up which involves further planning” (R1-B6). “The plan becomes the blueprint that allows all of the individuals involved to see the end goal and their responsibilities within the plan to achieve the goals: as well as seeing the other team member’s responsibilities” (R3-B8).

“Persons must think/agree with set goals in order to achieve them” (R3-L5).

“A consultative, collaborative process involving affected parties or their representatives. People affected by the process or outcomes of planning should be: consulted, collaborate in the process or be represented in the process” (R1-T5).

Table 10
Results of the Definition and Descriptors of the Social Component

Characteristic	Definition or Descriptor	A	B	L	T
Definitions:	the interaction of an individual with other people		F	F	F
Descriptors:	involves engaging others		F		
	includes affected stakeholders [and competitors *] at appropriate points		F		
	may be a consultative, collaborative process			F	F

* a remark which is offered by one individual in the final round and has therefore not been available for group consideration or consensus

The comments of the three (A, L, and T) cells mentioned the nature of planning as it relates to the *societal level*. This element did not surface from the Business cell. The Academic cell comments refer to the *infra-structure of planning in society*.

“In addition to the need for other people in giving feedback at various points, some plans may require other people in some or all stages of planning in which case, strategies for group selection, negotiation, consensus building, compromise, and conflict resolution may be involved in planning as well. Some plans require considerable preliminary activities to identify candidates for group selection, strategies for using subgroups, plans for synchronous and asynchronous communication, consideration of rewards and benefits for participation as well as preliminary information gathering activities to enrich the knowledge base about the problem, the problem solvers, and the solution options. Some plans require powerful dissemination and/ or public participation such as town meetings in order to be effective” (R1-A7). “On a macro-level, community leaders, politicians, managers, and administrators devise institutional plans which create opportunity structures and place constraints on the future lives of others” (R1-A10).

The comments from the Lay and Teacher cells focus on the *social commitment to successful planning*, and the *social consequences of poor planning*.

“In a democratic society planning involving those affected [or their representatives] is a critical goal achievement. Broad consultation/ collaboration ensures that the solutions that present themselves are widely supported and the processes are democratic and humane for all humanity. Sound planning is an effective process to address individual or global issues. It is proactive, principled problem solving” (R1-T5). “The lack of general systematic adherence to planning (even when there is vision), as an integral process in the optimization of school effectiveness explains the gap that exists between what our schools are and what they could be” (R1-T9).

“Planning can be sophisticated with respect to the complexity and means of manipulating time and resources. Business, the government, and the military have developed complex tools to assist managers and policy makers. The details of how

to plan are much studied in our world. In the political world the goals and the will are somewhat more elusive. I believe that any plan, any objective, whether clearly stated or not, must possess this collective desire to succeed as much as the intelligent application of resource management and contingency planning. Planning is used because without it, without the intelligent application of resource management, without the ability to apply reason to actions, without the ability to foresee the outcome of a sequence of events, then disaster may await as the apparently random - but in fact highly deterministic - forces of fate affect the first unconsidered actions of a poorly thought-out plan" (R1-L4).

The survey statement *planning involves interacting with other people*, received consistently low scores from all groups (A-51%, B-75%, L-56%, T-66%, survey - 44%). It may be inferred that the social nature of planning is seen as contextual, i.e., not always the case. However, when applicable, the responses indicate that it is highly relevant and important. The attention given to the social nature of planning resonates with the more recent interest in the literature. Reflecting Flavell's (1987) contention that social cognition is an important part of metacognitive awareness, the comments of the respondents reveal a sophisticated acknowledgment of the social dynamics which pertain to the planning processes. Numerous authors (Vygotsky, 1978; Rogoff, Gauvain, & Gardner, 1987; Scholnick & Friedman, 1987, Goodnow, 1987) place planning in a distinctly social context. Studies report that the social nature of planning increases with age (e.g., Kreidler & Kreidler, 1987). The insight within the respondent comments supports Pea's (1982) assertion that deeper, process-oriented understanding of facilitating and inhibiting social conditions promotes planning expertise.

The Plan Component

A 'plan' was defined by all cells as a 'blueprint for action' (F). Full agreement is shown in Table 11 for all 10 descriptors of a Plan. The Lay and Teacher cells were most concerned with the conditional aspect of a plan, i.e., whether it be short or long term (F),

Table 11

Results of the Definition and Descriptors of the Plan Component

Characteristic	Definition or Descriptor	A	B	L	T
Definitions:	a blueprint for action	F	F	F	F
Descriptors:	an overall representation of specific strategies for reaching a goal	F			
	a sequence of actions	F			
	may be short term or long term			F	F
	may be simple or complex			F	F
	may be formal or informal			F	F
	may be individual or social			F	F
	may be flexible or rigid				F
	'routine' plans		F		
	'strategic' plans		F		
	'contingency' plans		F		
	an organized step by step frame/ladder that outlines process that will lead to end objective		*		

* a remark which is offered by one individual in the final round and has therefore not been available for group consideration or consensus

simple or complex (F), formal or informal (F), individual or social (F). Additional comments were in relation to degree of novelty, degree of complexity, plan simulation, plan construction, plan execution, and plan abstraction. The Business cell explicated plans as either routine, strategic, or contingency. One Teacher cell respondent offered a personal anecdote in regard to the *degree of novelty* of a plan: "Being a 'creature of habit' once I have a basic successful plan for a situation, I do not come up with a new basic plan unless that situation is totally different. I start with my basic plans, adapt to the new requirements brought on by each new class & current circumstances" (R1-T11). One member of the Business cell spoke to the *degree of complexity*, that "there's really a whole cycle of plans where one plan leads to another plan and you can have plans within other plans that help you achieve the over-all grand-plan!" (R1-B10). *Plan construction* is commented on in the following ways by respondents on the Business and Teacher cells:

"The plan is the tool that ensures the greatest likelihood of achieving the desired results." (R3-B8). "If you don't have a road-map' not only do you not know where you are, but where you are going!" (R3-B5). "A plan also cannot be too rigid because there can be so many things that can change during the plan that you must be flexible enough to make adjustments" (R1-B10).

"It is difficult to imagine a plan which does not culminate in a documentary record; objectives, timetables, subjective matter, resources, strategies, procedures etc. Such a document is a record of the consensus achieved, a source for reference, and a guide to eventual evaluation" (R1-T9). "Short term plans normally fit into, support, or supplement the long term plans"(R1-T11).

In discussing *plan execution*, the Business cell respondent acknowledged that; "I think one of the most difficult things about planning is actually the 'follow-up' to the plan. Most often, a plan is made and then forgotten and that's why the plan ends up being ineffective. Follow-up during a plan, after a plan are important for motivation, learning, assessing and future 'planning' "(R1-B10).

One respondent in the Academic cell articulately spoke of *plan abstraction* in that "thoughts about one's life plan might also be stimulated (or challenged) by unexpected events (e.g., personal illness, political change)" and elaborated with the discussion;

"I have been most interested in relating planning research to the life-span literature and in asking whether and how individuals make life plans (i.e., much more long-term and vague than everyday plans). Life planning involves thinking about the possible future content, course, and purpose of an individual's life (Smith, in press). Planning about life couples decisions about 'what' one would like to happen in the future (i.e., personal goal setting) with strategies used to decide, communicate, and determine 'how, when, and whether' these things will in fact occur. It encompasses the choice of overarching life goals, guiding aphorisms, and long-range timetables as well as the dynamic processes related to devising ways to attain, maintain, monitor, and update these goals and schedules. (In life planning) the process is much more flexible and sporadic.... In relation to thinking about one's own life, planning might be anticipatory and stimulated by such questions as : "What will you do when you finish your education?"; "What plans do you have for building a family?"; "What will you do when your parents can no longer care for themselves?" (R1-A10).

With some exceptions, the descriptors regarding the Plan component are pragmatic and straightforward, suggestive of types of plans. The comments express a more abstract awareness of the complexity plan construction may represent. One pervasive tone to the comments is the high positive value the respondents place on plans, in general and plan flexibility in particular. It is interesting to note that in the survey statements, *making or constructing a plan is part of the process*, generated variable priority: scores of A - 91%, B - 47 %, L - 85%, T - 94%, and mentioned by 34% of the general public respondents. Also all quotes from the Business cell are from one respondent. This raises the question of whether the Business cell relates less to the formal aspect of plan construction than to the other seemingly more active, dynamic components of planning.

In summary, the extent of agreement arrived at for the components and their descriptors is considered exceptional, as indicated in Appendix I. An important element of the section on definitional components was its efficacy in defining terms. It is integral to the validity of the results that the categories of analysis are clear and congruent with the

understanding of the thirty-nine respondents. Each cell reached full agreement on the definition of the seven terms of Goal, Mental Representation, Decision Making, Organization, Regulation, Social, and Plan. It is significant to note that with minor cell variations, these cell definitions of planning components are completely compatible with those found in the literature, albeit eclectically, as described in chapter one. This provides a cohesive vocabulary for analysis and discussion of the four domain conceptions of planning. In addition, various comments from respondents indicated satisfaction with the resulting definitions of components, such as very good, excellent, or good summary.

Emerging Themes

Emerging themes, in the context of the present study, refer to topics upon which respondents continued to debate and/ or whose comments are not adequately represented within other categories of data analysis. These themes relating to the nature of planning have various levels of qualities and quantities of emphasis, and generally fall into two categories: beliefs about planning and planning as a process.

Beliefs about Planning

Although many of the comments cited previously in the text are, in substance, beliefs about planning, there were three additional foci of beliefs worthy of retention: planning as a life skill; fixed and mutable elements in the planning process; resistance to planning.

The statement, *planning is a life skill*, was generated by comments from 70% of the telephone survey respondents, the highest support in the survey data (refer to Table 1). The Delphi participants gave strong support as well (A- 89%, B- 91%, L- 93%, T- 100% scores). This category is used to augment the respondents' voice about planning as a life skill; the comments are general in character and interesting in content.

"Planning is a basic life skill that is used in many daily encounters to help us process information at a more complex level" (R1-A6).

“Everywhere, all the time, to be more efficient. It can be as simple as developing a way to be ready 15 minutes earlier than usual in the morning or as complicated as organizing a community event or a national election” (R1-T7).

“Planning is the focusing of issues or problems, the setting of priorities, the distinguishing between known and unknown factors, between important and unimportant factors, and between easily-achieved and more challenging factors” (R1-T2).

One particular comment regarding *fixed and mutable elements* in the planning process speaks to the notion of ‘movable pieces’, i.e., people or other facets of the problem environment which may be advantageously manipulated, as proposed by Goodnow (1987, 1993). She contends that despite its influence on the planning process, this idea has been largely ignored in the literature. The following comment also addresses the relationship Goodnow makes between beliefs about the movability of the pieces and the individual’s sense of control: “Planning is more easily and classically applied to certain things than to others. For example, a scientific study can be closely planned with a protocol but the evolution of your personal happiness i.e. ‘lifestyle planning’ directed towards ‘happy family’ has many more degrees of freedom, many factors which may be beyond personal control” (R1-L2).

One respondent believes that individuals have a certain *resistance to planning*: “I do think that the actual word ‘planning’ scares most people and they shy away from it when they think they ‘have to’ do it when in actuality most of us are planning in some way or another all our lives” (R1-B10). This resonates with the findings of Kreitler and Kreitler (1987) and Lachman and Burack (1993) that one’s beliefs about planning are highly influential in the decision to plan.

Beliefs about planning are implicit throughout the entire data collected in the study. The preceding three are representative of the understanding the respondents have about various factors which comprise beliefs about planning. The review of the literature in chapter two makes a definitive case for the pervasive influence such beliefs have on planning behavior.

Planning as a Process

The process of planning is potentially a wide and ranging topic. Categorization of the respondent comments relating to the process, reveal five related themes of planning as: a natural process, an unconscious process, a dynamic, transactional process, an individualistic process, and a strategic process. Each theme is distinct in the approach taken by the respondents, and is discussed in turn.

Planning as a natural process.

It is difficult to compare the intended import of the additional, spontaneous comments generated throughout the three rounds of exchange. One possible measurement of emphases can be evaluated by the number of words of comments, per topic, contributed by the participants in all three rounds. Given this criteria, seven topics were predominant. When rank ordered, the first five topics are in relation to function and are explored in chapter five. The last two are in relation to the nature of planning as a process: whether planning is a *natural process* (387 words) and whether planning is an *unconscious process* (264 words).

In their discussion on the origins and development of planning, Scholnick and Friedman (1987) conclude that the acquisition and implementation of standards through planned behavior are partially biologically driven and partially developed through social mediation. Their research suggests that some strategic behaviors are innate, some learned, and some inferentially constructed. As the individual matures, there is a progression of reliance on innate to learned, and eventually to creatively assembled plans.

An indicator of the importance of this theme lies in its prominence as the sixth most annotated, despite its containment to one cell. As shown in Table 6, the debate in regard to planning being a natural process was restricted to the Business cell, finally supported by 8/11 respondents. This concept was initiated from the first round by two individuals and was therefore available for full elaboration. A reading of the dialogue in progression is even more interesting when it is noted that two participants hold university degrees in planning

and others consult widely (i.e., internationally, nationally) in the field, while several have taken additional training in planning (for example, at Queen's University). The two dissenting individuals gave their rationale in Round 3. (Some remarks have been re-ordered for clarity.)

Round 1: "Planning is a "natural" skill. I don't believe you "do planning" -per se. I think planning of whatever nature at whatever scale is simply a natural, logical thought or action process. It cannot be taught by rote. It is almost an instinct. People either have the ability to plan or they don't . It is the ability to organize/direct any particular activity/work program, etc. in a manner that does not require a plodded out methodology. I believe planning in whatever form it takes, is used consciously or unconsciously on a continual basis. It is used to achieve end results and again I would question whether it is 'used' or simply evolves. Those who can't plan are those that are retrained by methodology/process etc." (R1-B7) "Some truly 'basic planning' becomes almost intuitive in nature and almost indistinguishable from one's behavioral routine!" (R1-B2)

Round 2: "I don't believe planning to be a 'natural' process - most do but some don't" (R2- B4)

Round 3: "Natural for some individuals, not for all" (R3- B5) "I doubt whether planning is 'natural' - it may be 'by nature' to many people, and many people must strive very hard to be able to plan.... Planning can only be 'unconscious' if one is a person to whom planning comes 'naturally'" (R3-B10)

One individual in the Lay cell pondered the same issue in the concluding round, although the concept had not come up in the cell progression:

"In a more general sense it is a 'natural' type of behavior in which people anticipate the future, calculate 'probabilities' and modify their behavior to arrive at certain goals - for most people this could be described more succinctly as 'collision avoidance' i.e.: knowing they have to eat next month they accordingly save or stockpile money or supplies. Taken more generally, - ethics and morals aside- is not planning an intrinsic quality in all human beings, as intrinsic as language, or any abstract thinking process? Is it instinctive, like squirrels gathering nuts for the winter? All the rest, all

the theories, are they not simply polishing up something we already do quite well? I believe, that as a species, we would have died out long ago if it were not for that in-born ability to plan for the future, foresee events, and all the other 'points' raised in this questionnaire.... though an emphasis on planning being "natural, perhaps instinctive, human activity" might be needed. Have we not evolved simply by our ability to plan?" (R3-L4).

This topic reflects disagreement with developmental theorists (i.e., Piaget, 1960) that planning naturally follows in a stage-determined manner, irrespective of types of problems. Social cognition theorists (i.e., Vygotsky, 1978; Rogoff et al., 1987) believe such higher order thinking processes as planning are modeled and learned in a social environment. It seems plausible that several of these respondents, themselves, exhibited a intrinsic predisposition to planning, a potential factor in their business success. The topic is closely related to the discussion to follow on the unconscious component of planning, as aptly put in the comment above that planning can only be 'unconscious' for those to whom it comes 'naturally'.

Planning as an unconscious process.

The possible role of the unconscious in planning was the most controversial component in the entire study (as indicated by levels of agreement, generating the seventh most annotated theme (as judged by the number of words). Appendix I displays the lack of consensus on this issue. The Academic, Business, and Lay cells' definitions describe planning clearly (F) as a conscious process. The issue of the unconscious did not arise in the formulation of the Academic cell definition at any point, explicitly stating that planning involves "the conscious or deliberate specification of ...actions". It may be implied by omission that the respondents were of accord in thinking of planning as a conscious process only. The issue of whether the unconscious is also involved in planning spontaneously arose within each cell in the discussion of the components of the definition and descriptors, as well as in the comments of the respondents.

The only Academic cell reference to the unconscious role in planning came imbedded in the first round comment; "It can be used anywhere, anytime (day or night

during sleep or semi-sleep).”(R1-A7), to which an individual replied in the second round “I’m not aware of scientific evidence showing that we plan while we sleep.” (R2-A9). During R2, the notion of the unconscious arose in the definitional component in regard to Mental Representation (“can be unconscious and automatic” [R2-A6]). This addendum was given full agreement in the third round, and received the comment: “I like to think of planning (as a conscious, deliberate process), though it might well involve representations that are not consciously activated” (R3-A9). One additional remark was generated in R3 concerning the unconscious in the definitional components in regard to Goal, (“ is most often conscious but can be unconscious or nebulous” (R3-A6)). One respondent made the R3 comment in regard to Decision Making that it “may not be conscious” (R3-A7).

The subject of the unconscious originally arose in the Business cell with the first round comment “I believe planning, in whatever form it takes, is used consciously or unconsciously on a continual basis” (R1-B7). When incorporated into the cell definition of planning, no comment was made in the second round. The third round however, finished with a 7/11 agreement. Disagreement was expressed by one respondent (B4) with no elaboration, and by three others, who made the following comments: “I believe planning is conscious only” (R3-B7). “Planning is a conscious process” (R3-B9). “Planning can only be ‘unconscious’ if one is a person to whom planning comes ‘naturally’ - In most cases, people conscientiously have some idea of concrete or abstract goals they want to obtain and therefore will actively work out a plan.” (R3-B10).

First round Lay responses introduced the concept of the unconscious in the following two comments: “Planning is the conscious or unconscious decisions made to reach a particular goal” (R1-L11), and “in reality, planning is utilized consciously or unconsciously in most aspects of life (R1-L2). In Round 2, two further respondents supported the notion of the possibility of the unconscious playing a role in planning. In the final analysis, six of nine respondents were in agreement with its inclusion. The three individuals not in agreement, expressed doubt, rather than disagreement: “I am unsure about whether mental representations can be ‘sub-conscious, I suppose.” (R3-L4), “I can’t make up my mind about this. If one is not aware, is it planning? Perhaps it is, as in driving, the

result of lots of previous training, so that it is automatic" (R3-L7), and finally, "I'm not sure planning can really be subconscious" (R3-L12). As the majority of respondents in the cell agreed, their definition concludes that planning "is a conscious or unconscious decision-making process".

The final results of the Teacher cell definition clearly states that "planning may also involve intuition and the unconscious". The first round initiated the subject with the comments: "Intuitive planning, unconscious planning & pre-determined planning depends on the situation & whom it will affect." (R1-T12) and "occasionally if deep interest is there, I seem to have the problem brought up in dreams. In (the final stages) the answer to the plan I need just suddenly seems to pop into my head" (R1-T11). There were no objections to the definition statement in the second or final rounds, with the exception of one expression of uncertainty (How can this be detected?, and a '?' concerning the item of the unconscious in the section on Mental Representations [R3-T9]). The inclusion of the possibility of intuition and the unconscious being involved in planning therefore gained a 9/10 agreement. Full agreement was achieved on the statement that planning may involve intuition.

In summary, the subject of the unconscious appears to be a non-issue in the Academic cell, engendering little concern or controversy. There was in fact no disagreement among the cell comments. The Lay cell showed no definite disagreement about the inclusion of the unconscious in the planning process, with three individuals being unsure of how they felt. This cannot be considered a disagreement, rather a query. Likewise, the one respondent's question mark in the Teacher cell must be considered a statement of doubt rather than disagreement. The Business cell was singular in that the opinions were split upon definite lines. Seven agree that planning may be an unconscious process, four were in definite disagreement. The dissenters felt that planning was a conscious process only.

Planning as a dynamic, transactional process.

As evidenced in the signatures of definitions, each cell felt strongly about the regulatory nature of planning. In addition to this consensus, the Academic cell was distinct in wanting to clarify the nature of planning as *anticipatory, opportunistic, and/or transactional*.

“It is a mistake to assume that planning happens first, then when completed the problem is solved or the task performed. It is very interactive” (R2-A11); “It can be done in anticipation, in advance with a future orientation - although that does not mean it has to be in the distant future. It also can be done on-the-job, opportunistically as things arise that need to be re-ordered or re-prioritized and where goals need to be changed”(R1-A1); “It can be forward, future-looking, but not always, since it can be opportunistically, on the run” (R1-A3); “It can be the first step to create changes if the amount of time spent selecting & analyzing data is sufficient. Most planning process do not anticipate probable outcomes sufficiently to be highly effective” (R1-A4); “Plans change as plan unfolds if there is a need for change?” (R2-A8); “All this (the components of the definition) is recursive, interacting” (R3-A8).

“On reflection, I believe that most formal planning is based on positive views of the world which then get derailed because potential risks or errors are not systematically assessed. The risk avoidance aspects of planning need to be stressed as well” (R3-B3).

“Planning is inherently a presumptuous process generally assuming that the ground rules as we know them will not change markedly. However, planning is often radically altered by major changes i.e. funding cutbacks, your health status, job loss, marriage breakup” (R1-L2).

“A written plan can sometimes prove a detriment to completing tasks because it may be rigid and a number of others are following it. Flexible planning is the natural way the brain works. Flexibility should be built into formal planning” (R1-T4).

These comments join others throughout the results attesting to the dynamic nature of planning. Each cell brings forward this emphasis in varying ways. There appears no disagreement on this theme, but rather a strong consensus. The chorus echoes the writings in the literature (i.e., Flavell, 1987; Hoc, 1988; Meyers & Rebok, 1985) regarding the correlation between successful planning and process flexibility.

Planning as an individualistic process.

The notion of *individual differences* was discussed at length in the comments of the respondents throughout, falling basically into three areas of focus: those of individual differences in general, those of the perception of self as a planner, and those relating to self-motivation. Individual differences in general were discussed in two cells only, fully by the Academic cell and in one comment from the Lay cell:

“There are considerable individual differences across people's planning skills, even within the same person across situations. It is complex and often intermittent process of using primarily cognitive, but also to some extent affective and behavioral operations, to sort through and collect information to develop a series of steps that one thinks will achieve some goal. ... The extent of the operations depends on variables related to the individual (e.g., amount of knowledge in the domain, psychical and psychological health, personal style of processing information, such as level of compulsiveness) and characteristics of the goal (e.g., importance, complexity, potential threat) Planning is used when the demands of the situation exceed the person's immediate cognitive or behavioral resources to reach a goal that is important in some way” (R1-A6). “I think of planning in a mature planner can mentally represent the plan-as-implemented, flexibly adapt it to changing problem circumstances, and coordinate multiple, and sometimes conflicting, goals and the means for their attainment” (R1-A9). “Planning can also be viewed as an interesting individual difference variable. Young children have limited planning ability relative to older children and adults, and I suspect that individual differences in preference for and ability at planning are fairly stable and consequential to attainment of one's goals” (R1-A11). “I believe planning involves a thorough knowledge of one's strengths, tendencies, and preferences” (R1-A4).

“The extent to which each individual plans, and the sophistication of the planning varies per individual depending on many factors. (i.e.: intellect, personal situation, goals, objectives ...)” (R2-L10).

It is interesting to note that although teachers are intimately involved with a wide spectrum of idiosyncratic modes of learning on a daily basis, there was no reference from the Teacher cell to this important variable in planning. Two comments relating to the *perception of self as planner* are from the Teachers cell, one to indicate that “planning is therefore mostly personal (90-95%)” (R1-T4), and one self-reflective, describing that “normally, when I plan I seek to include the unusual, the unique or different aspects. Even spur of the moment plans, for me, always include this unique aspect”(R1-T11).

The concept of motivation was expressed in relation to *self-motivation* in regard to both the nature and the function of planning (see chapter five). All cells, with the exception of the Lay cell, made comments to either express an opinion, or to deliberate on the issue:

“Planning is activated by goals and motivates, which if fulfilled enhance the future use of planning behaviors.What sustains planning, especially the regulation component? I think there is an inseparable link to motivation that is missing” (R1-A1).

“Planning doesn’t have to ‘motivate’ but it automatically can, if everyone is involved in organizing and decision-making and planning” (R3-B10). “I don’t believe the act of planning involves motivation. People must be motivated to achieve results but the act of planning does not involve motivation” (R3-B7).

“This can be motivated by boredom (boredom on my part is usually the motivation to produce a new plan for a new unit.), a new challenge, new equipment, a unique class situation” (R1-T11).

The ideas of individual differences, perception of self as a planner, and self-motivation are well covered in the literature review in chapters one and two. In fact, writings are permeated with cautionary notes about the applicability of a generalization because of the varities in human personality. These variabilities constitute the resources and predispositions the planner brings to the task. It is apparent from the respondents’ comments that this notion is a priori in their understanding. The preponderance of comments from the Academic cell is understandable. There are however, comments from all cells.

Planning as a strategic process.

The survey statement *to plan one selects strategies* was mentioned by the second highest number (63%) of general public respondents. The Business and Teacher cells gave it highest priority (A - 85%, B - 91%, L - 89%, T - 92%). The Lay cell failed to introduce the idea of strategy in discussion on the nature of planning, descriptors of components, or expository comment. It is somewhat surprising that there were so few comments on this topic. It is mentioned as a theme by virtue of the importance it holds in the literature, rather than the amount of relevant commentary. The Business cell did articulated 'strategic' plans as important elements of planning, in both their definition and the components of the definition. The Academic and Teacher cells made some reference to the idea of strategic planning: "Planning includes strategies that people can learn for goal management ..." (R2-A4). "...acting flexibly to adjust the process and direction if necessary" (R1-A7). "Then we set a goal & in most cases, which are personal individualistic, we develop strategies. Most of these strategies are variations on 'hard wired' previously conceived strategies. Difficult problems require setting strategies which are 'outside the box' and require a creative process of experimenting with new strategies" (R1-T4). It may be postulated that the idea of the strategic nature of planning is implicit to many individuals and therefore not as explicitly brought forward. It is also possible that the strategic nature may have been more evident had the queries been more overt in regard to procedural knowledge.

The debates described above in the five emerging themes mirror many of the controversies in the literature. The comments are valid and support can be found for various points of view in the review of the literature. The struggles to understand the nature of planning within the academic community are also fodder for interested members of other domains.

Third Round Contributions to the Nature of Planning

There were no additions to the definitions in any cell, from Round 3, as revealed in Appendix I. It may be inferred (considering the levels of agreement) that respondents were indeed satisfied with their group's production. Third round contributions refer to suggestions made by participants which, by virtue of the previously agreed upon closure, were unavailable for ratification by the groups. There were 12 such suggestions made in regard to descriptors of the components, nine from the Academic cell, three from the Business cell, and none from the Lay or Teacher cells. The contributions offered were by-and-large excellent and it is unfortunate that they were unavailable for group comment. A compensatory benefit of the Delphi Method and its reporting is the opportunity to make note of these insights for the benefit of the reader. Table 12 reveals that the vast majority of suggestions revolve around the provisional or undefined aspects of the component. The intent of these proposed descriptors follows a definite trend throughout the three rounds' comments to elaborate their perception of planning to include the more flexible, conditional, and revisionary nature. As respondents perused their previous results, their tendency was to modify or dilute statements which appeared too rigid. It is not surprising that the vast majority of the third round contributions were offered by the Academic cell, given their considerable knowledge base on the issues, specifically the addition of *varying amounts* to the component for decision making and the addition of *abandoning* to the component definition of regulation.

Summary of the Nature of Planning

The portion of the Delphi format devoted to the nature of planning addressed the first two research objectives: (1) to define the term 'planning' from the domain perspectives of Academic, Business, Lay, and Teacher expertise, and (2) to define the component terms of planning. In their study of the meaning of planning in children of various age groups, Kreitler and Kreitler (1987) found "a growing consensus concerning the structural aspects

Table 12

Third Round Contributions to Descriptors of the Components

Component	Cell	Third Round Descriptor Suggestion
Goal	A	is revisable once plan has started
	A	may be very <u>unclear</u> or individual
	A	may be shared
	A	is most often conscious but can be unconscious or nebulous
	A	
Decision Making	A	a determination arrived at after varying amounts of consideration
	A	may not be conscious
	A	a transactional, revisionary process influenced by feedback from taking certain actions and then reconsidering initial decisions
	A	aimed at suiting activities and actions to the task
	B	determining risks and costs of errors
Regulation	A	the act of monitoring, controlling, abandoning, redirecting, or guiding a process
	B	involves 'watching your plan <u>evolve</u> '; it requires follow through and interaction
Plan	B	an organized step by step frame/ladder that outlines process that will lead to end objective

of the meaning of planning. It may therefore be expected that at least in some areas there is a sufficient similarity in the views of the children to allow for a meaningful summary. Nevertheless, any attempt to summarize such descriptive data must necessarily be highly selective" (p. 227).

The fundamental purpose of the Delphi Methodology is to attain stability or consensus of response. It is therefore not surprising that the data collection undertaken in the present study has achieved high levels of agreement. What is significant, however, is the extent of this agreement, consensus on 97% and majority agreement on 100% of the definitional aspects; consensus on 97% of the definitional components, etc.. The one hundred percent agreement reached on the definition, definitional components, and their descriptors by the diverse theoretical orientations represented within the Academic cell is considered remarkable. Putting aside the difficult and perhaps unresolvable issues of whether planning is unconscious, natural, or logical (see Appendix I), it is also exceptional that full agreement was achieved by all cells for the definitions, components, and descriptors. The reporting of cell analysis of data through the independent Delphi process permitted accentuation of commonalties or differences. The broader categories of analysis indicates high levels of similarity across cells. The level of analysis of descriptors permits retention of differences in the more local concerns of each cell. The definitions generated by the cells are elegant and comprehensive, comparable to or more elaborated than those found in the literature. Each definition is excellent and is a testimony to the rich understanding by the cell members of the nature of planning.

The domain perspectives were also all able to agree on the fundamental components of the nature of planning as being goals(s), mental representations, decision making, organization, regulation, and plans (Table 4). The Business cell emphasis on decision making is consistent with the reporting of the 1991 National Training Survey (1993) indicating decision making as the second highest priority of structured training in businesses across Canada. The social nature of planning was affirmed by all cells with the exception of the Academic cell. The significance of regulation and organization were the most striking commonality across cells in regard to the nature of planning (Figure 3). The excellent quality of the cell definitions is exciting. Another indication of a high level of agreement may

be inferred from the fact that fourteen out of thirty-nine individuals returned their third round mailout with no further comment. Such comments as “ I could not really find anything to suggest on this round. You have done a great job of summarizing and ordering ideas”, “agreement on nature”, or “excellent” are additional support for the results.

CHAPTER 5

Results and Interpretation on the Function of Planning

In the study of planning, the perceived relevance of planning tasks is of great importance to the quality of data gathered (Kreitler & Kreitler, 1987). A greater understanding of the uses, or functions, of planning may shed light on how planning is perceived in various domains and on the relevance of planning task-design for research purposes. The second portion of the Delphi format was intended to satisfy the third research objective of identifying the purposes of planning (what planning is used for) from a domain-related perspective.

Analysis of the functions of planning poses the dilemma of whether to stress commonalities among descriptors or to retain dissimilarities. The function statements themselves are an excellent basis upon which to assess similarities. It was decided to retain the individual cell descriptors, as presented by the respondents, at the expense of a considerable amount of redundancy. Many of these could have been collapsed to stress convergence. Retention of the differences between them permits safeguarding the vocabulary and nuance of each cell. This may be particularly important in regard to the functions of planning, as they may reveal domain-related subtleties.

The researcher interpreted and displayed the function of planning in a graphical format of the stated functions in each cell. This was proposed to each cell with a list of the function statements, and a structure for registering descriptors of these functions, as well as additional comments. The graphical representation (Appendix G) was not meant to result in a model, but merely to serve as a visual aid for clarification of each round results. There were relatively few comments on this graphic, indicating the respondents inferred it to be a rather innocuous aid. Results for the function of planning will be described through an overview of function statements and their descriptors, followed by a detailed account of each type of function, in turn. The chapter will conclude with third round contributions, summary of the functions of planning, and finally the summary of results.

Function Statements and Descriptors

Responses from the Delphi Round 1 (R1) were categorized according to the type of function indicated. The presented format was again identical in all cells to facilitate across cell analysis following R3. The abbreviation 'FS' is used, for a given function statement, when referring to a specific category of function of planning. As indicated in Table 13, the Academic, Lay, and Teacher cells reported a total of 8 function statements; the Business cell reported 9. The function statements totaled 27 across the four cells, with consensus on 24, or 89%. Within the four cells, there emerged a total of 159 descriptors of the functions of planning. It is worthy of note that full agreement was achieved through the Delphi rounds on 151, or 95%. The total number of descriptors in each cell shows the Teacher cell with the most (54), the Academic cell second (50), the Lay cell next (28), with the Business cell showing the least (27). Of all the descriptors in each cell, the Teacher cell contributed the most (15) for FS9 (planning is used to enhance one's life).

In an across cell analysis of themes pertaining to functions of planning, one indicator of respondent interest or concern may be the number of words comprising the related supplementary comments. Of the seven most written about themes, the first five, rank ordered according to the numbers of words, were about the function of planning: (1) *social dimension of planning* (1347 words: 880 words about the interpersonal elements and 467 words about the societal elements); (2) *beliefs about degrees of planning* (856 words); (3) *contextual elements* (724 words); (4) *beliefs about planning and control* (648 words); (5) *evaluation as a function of planning* (396 words). The sixth and seventh highest have been presented as emerging themes in chapter four. The five themes will be discussed within the context of the relevant function statement; i.e., social function of planning under FS4, beliefs about degrees of planning under FS5 and FS6, contextual elements under FS8, beliefs about planning and control under FS7, and evaluation as a function of planning under FS10.

The Academic cell (N=8) achieved full agreement on 7 of 8 statements of the

Table 13

Final Results of Delphi Responses on the Function of Planning

Code	Function Statement	A	B	L	T
	Planning is used:				
FS1	to enhance problem solving or goal -directed activity	F ^a	F	F	F
FS2	to organize material resources to organize human and material resources	F	F	F	F
FS3	to structure the future to think about the future to prepare for the future	F	F	F	F
FS4	to coordinate activities with people	F	F	F	F
FS5	to increase control (real or perceived) over the planner's operations to deal with uncertainty achieve greater comfort with uncertainty	F	7/11	F	9/10 ^b
FS6	to increase (real or perceived *) environmental control to increase control over situations	F	F	F	F
FS7	to substitute for action	7/8			
FS8	to respond to most everyday situations to respond to most everyday problem solving situations	F	F	F	F
FS9	to enhance one's life		F	F	F
FS10	for evaluation		F		

* indicates additional comment from the final round, which makes a contribution to the clarification or elaboration of the original meaning of the cell, although it was unavailable for group consensus

a F refers to full agreement by the members of the entire cell

b The first number refers to the total respondents agreeing to the statement, the second number refers to the total number of respondents in the cell in question.

functions of planning. Table 13 shows that one respondent disagreed with FS7 (planning is used as a substitute for action). Consensus was achieved on 8 of 9 function statements in the Business cell, the exception concluding with a stability of response (7/11) to the FS5 (planning is used to achieve greater comfort with uncertainty). The Lay cell achieved consensus on all 8 identified function statements. The Teacher cell achieved consensus on 7 of 8 functions, the exception being FS5 (planning is used to deal with uncertainty) (9/10).

Results on the individual function statements are presented separately below. In the ensuing discussion, key concepts have been abstracted from the descriptors of the function statements and are presented in the analysis of each. The chapter summary includes a table display of these key concepts for each cell's function statements. The variety of ideas presented in the total of 159 descriptors for all function statements across four cells is considerable. The Academic cell concluded with consensus on all 50 descriptors of functions. The Business cell gave full agreement to 24 of 27 descriptors. The Lay cell achieved consensus on 25 of the 28 descriptors. The Teacher cell achieved full agreement on 51 of 54 descriptors. Unfortunately, in the Teacher cell, one respondent indicated 'disagree' beside a total of 6 of the 54, Round 3 function descriptors, remarking that "many times I disagree with a statement because it wasn't necessary as part of the list". As it was not possible to discern which items the respondent perceived to be redundant and which warranted genuine disagreement, it was necessary to discount the input of this individual on the final function descriptors only. Therefore in this cell for the function statements N=10, for the descriptors of functions N=9.

FS1 Planning is used to enhance problem solving or goal-directed activity.

It is clear from the results of the nature of planning that all cells view planning as goal-directed activity. The first function statement echoes this conviction, with all cells agreeing (F) with the function statement. One Lay cell respondent went even further in support of this, registering a final comment that "planning more than 'enhances', it is an inherent part of problem solving or goal-directed behavior" (R3-L10). Table 14 indicates that full agreement was achieved on 17 of 21 descriptors in relation to FS1. Disagreement

Table 14

Results of Descriptors for Function Statement One: Planning is used to enhance problem solving or goal directed activity.

Descriptor	A	B	L	T
to address a problem presented	F			
to attain short and long term goals involving the sequencing of a range of activities	F			
to solve [deal with] complex problems involving a [range] single or multiple goals	F			F
to process information at a more complex level	F			
to consider alternative possibilities (contingency planning)	F			
to address [reduce *] anxiety, enhance drive, and avoid failure, boredom, problems	F			
to break down the problem or challenge/goal into its constituent parts		F		
to map a course of how you want things to happen		F		
to achieve an objective in the most appropriate and efficient manner whenever the planner desires an outcome that requires application of effort or is outside the 'automatic', i.e., that does not already occur as the result of some earlier planning		F	8/9	
to make decisions easier			8/9	
to map out clear and concise goals (personal, business, financial, military, and political goals)			F	
to constructively set long term and short term goals for future activities				F
to set goals and develop strategies in formal and informal contexts				F
to allow short term plans to fit into, support, or supplement long term plans				F
to deal with the inter-connectedness of many goals				F
to map out a flexible action plan in approaching a task				F
to implement strategies				8/9
to develop or create strategies				*
to revise any imposed requirements or limitations				8/9
to build up a documentary record (objectives, timetables, subjective matter, resources, strategies, procedures etc.); providing a record of the consensus achieved, a source for reference, and a guide to eventual evaluation				F

* indicates additional comment from the final round, which makes a contribution to the clarification or elaboration of the original meaning of the group, although it was unavailable for group consensus

was registered in the Lay cell to two descriptors: that planning is used ‘whenever the planner desires an outcome that requires application of effort or is outside the ‘automatic’, i.e., that does not already occur as the result of some earlier planning’; and that planning is used ‘to make decisions easier’. There were two disagreements within the Teacher cell: to the use of planning ‘to implement strategies’ and to ‘revise any imposed requirements or limitations’. In their descriptors, the Academic cell stressed the ideas of *complexity* in problem solving and *reduction of anxiety*. Although mentioned extensively by other cells in regard to other functions, the Academic cell was singular in relating anxiety reduction as an enhancement to problem solving. The descriptors provided by the Business cell were primarily to do with *sequencing*. The Lay cell descriptors represented the idea of *simplifying* in problem solving. The Teacher cell descriptors concentrated on the concepts of *complexity*, *strategies*, and *evaluation*. The commonality across cells appears to be in the area of complexity (of goals, of problems, processing, and context) found in the Academic and Teacher cells. The variety expressed in the various descriptors to FS1, clearly indicates the conviction that planning is an important problem solving component. The specific elements are all found in the literature and represent a firm grasp of the relationship between problem solving, goal-orientation, and planning. Each cell shows awareness of the utility of planning for both simple and complex problems.

FS2 Planning is used to organize (human and) material resources.

The second function addresses both the notion of allocation of resources and the activity of organization. Not all cells used the same function statement to describe the use of planning as an organizer of resources. The Academic cell used this statement to refer to material resources only, determining that human resources were adequately covered by FS4 “planning is used to coordinate activities with people”. The Business, Lay, and Teacher cells maintained the inclusion of human and material resources in their statements. Full agreement was reached on all 25 descriptors of FS2 as displayed in Table 15. The Academic cell stressed the elements of *structure*, *management* (especially time), and *constraints*. The

Table 15

Results of Descriptors for Function Statement Two: Planning is used to organize human and material resources

Descriptor	A	B	L	T
With regard to material resources:				
to improve the efficiency with which one accomplishes tasks	F			
to order, prioritize, re-order, re-organize, reprioritize	F			
to impose structure and order	F			
to sequence lower-level skills, specific strategies, relevant domain-knowledge	F			
to sort through and collect information	F			
to manage time	F			F
to manage resources, actions, goals	F			
to coordinate actions around a set of interacting goals	F			
to address time or spatial pressures or goals conflicts	F			
to use tools and materials in the world (paper, drawings, materials)	F			
to map out a strategy on how to achieve objectives, to optimize the resources (money, man-power, time) available		F		
to coordinate a complex sequence of events and activities		F		
to prioritize activities		F		
to organize activities in a productive or goal-directed manner			F	
to organize time, working backwards, in tasks where the completion time is important			F	
to aid in organization				F
as an 'advanced organizer preceding actions				F
to organize the most efficient, effective approach to a task				F
to produce 'to do' lists, calendars, and daily plans for relatively simple routine goals, objectives, and tasks				F
to stick to schedules and make deadlines				F
With regard to human resources:				
as a tool for management and policy makers			F	
to achieve the best possible operation of an organization or group function (to enable organizations to run smoothly)			F	F
to function either individually or as a member of a team				F

Business cell related ideas of *strategy*, *coordination*, and *prioritization*. *Time* in the Lay cell and *schedule* in the Teacher cell emerged as the focus of organization. With the exception of time, mentioned by all, there was no particular across cell agreement about FS2 descriptors.

The number and pervasiveness of the descriptors in all cells support Goodnow's (1993) position that one of the prime function of planning is to gain control over resources, both material and human. The scarcity or value of a given resource may influence the effort extended in planning and/or the significance given to the activity of planning (Goodnow, 1987). Her contention of the impact on planning of the individual's perception of 'movability or pieces'; i.e., if or how given components (human or material) of the problem solving environment are available to be shifted or re-allocated in the process of planning. This perception influences both the decision to plan and plan construction.

Two statements generated from the telephone survey and the first round results relate directly to this function statement. *Planning is an organizational tool* received consistently high scores from all cells (A - 93%, B - 96%, L - 93%, T - 100%). *Time is a factor in planning* received only slightly lower scores (A - 89%, B - 96%, L - 87%, T - 100%). Both of these statements gained only 34% support from the telephone survey results. It may be inferred from these results that the use of planning to organize resources is recognized by all groups but is a substantially higher priority for experts. The differential in results may also be attributed to the fact that the people surveyed by telephone had the more difficult task of producing the original statements, while the cell respondents selected among them. Within the Delphi comparison, time emerges as a considerably more important factor for the Business and Teacher cells. The domain-related aspect of this finding may reflect that planning is a response to a greater sense of temporal urgency for those two groups. As Goodnow suggests, this may indeed facilitate a sense of control for all groups.

FS3 Planning is used to structure (think about / prepare for) the future.

Round 1 produced the function statement "planning is used to think about the future" in all cells. From the feedback given, this statement was changed to "structure the future" by the Academic cell and to "prepare for the future" by the Teacher cell. The

Business and Lay cells retained the original wording. Full agreement was attained on 14 of 16 descriptors, as displayed in Table 16, with the two exceptions referring to the idea of prediction or forecasting (B 10/11; T 8/10). The Academic cell descriptors brought forward the ideas of *goal setting*, *structure*, and *anticipation*. The Business cell focused on *preparation* and *avoidance of mishaps*. The Lay cell contributions were in regard to *preparation*. The Teacher cell also described *preparation* as well as *prediction*. Thus three cells indicated *preparation* as a way planning addresses the future.

The notion of planning as a future-oriented activity was strongly supported in the survey and first round results in all cells (A-89%, B-96%, L-85%, T-92%, survey - 34%). Similar to FS2, the Business and Teacher cells rated this function higher than the other two cells or the general public. This may be related to the concern with time expressed by these groups in relation to the anticipatory nature of planning as expressed in their high rating of time in the survey statement relating to time, noted above. The Academic cell scores the anticipatory element notably higher in the statement from the survey, *planning anticipates or responds to opportunities* (A - 96%, B - 89%, L - 82%, T - 84%, survey - 50%).

FS4 Planning is used to coordinate activities with other people.

Given that the Academic cell was the only one not including a Social component in its cell definition, results for FS4 indicate that this cell perceives the social element as a function. All cells agreed (F) that the function statement adequately expressed the social function of planning. Generating the most supplementary comments in the entire study (1347 words), the social function of planning explicated the same two categories in regard to function as to nature (see chapter four: definitional components and descriptors); those of interpersonal and societal.

Full agreement was achieved for all 21 descriptors, as displayed in Table 17, with the exception of two in the Business cell referring to motivation (‘to create ‘buy-in’ from all levels so that it is everyone’s plan (10/11) and ‘to involve *and motivate* a team ...’

Table 16

Results of Descriptors for Function Statement Three: Planning is used to structure the future.

Descriptor	A	B	L	T
to involve active effort to structure the future with goals and actions for reaching them	F			
to increase efficiency or effectiveness of future behaviors	F			
to think about the possible future content, course, and purpose of an individual's life (personal goal setting)	F			
to create some structure for thinking about and dealing with the inherent uncertainty of life	F			
to reflect about the outcomes of trying to solve the problem	F			
to estimate subjective probabilities	F			
to update memory structures in dealing with future hopes and fears	F			
to anticipate the future (future events)	F		F	
to help avoid [errors, risks, and *] mishaps in the future		F		
to effectively transact daily responsibilities, using a daily, weekly, monthly, and annual planner		F		
to help increase the odds that forecasts are borne out in reality		10/11		
to lay out milestones in the future			F	
to prepare for future events			F	
to prepare a platform or context around certain forecasted activities or directions				F
to predict				8/10

* indicates additional comment from the final round, which makes a contribution to the clarification or elaboration of the original meaning of the group, although it was unavailable for group consensus

Table 17

Results of Descriptors for Function Statement Four: Planning is used to coordinate activities with people.

Descriptor	A	B	L	T
to develop strategies for group selection, negotiation, consensus building, compromise, and conflict resolution	F			
to guide others (parenting or mentoring)	F			
to manage people and relationships	F			
to participate in the co-development of joint endeavors	F			
to create opportunity structures and place constraints on the future lives of others (by community leaders, politicians, managers, and administrators)	F			
to provide opportunities for feedback from appropriate sources	F			
to promote powerful dissemination and/ or public participation, such as town meetings, in order to be effective	F			
to delegate responsibilities		F		
to create 'buy-in' from all levels so that it is everyone's plan		10/11		
to involve a number of different stakeholders, all of whom must be engaged at appropriate points		F		
to involve (and motivate) a team (employees or family etc.		F		
		10/11		
to coordinate discussion with persons who may be affected			F	
to generate better or unexpected ideas and plans through consultation			F	
to coordinate professional and family lives			F	
to achieve a particular outcome desired by the group or an individual				F
to collaborate or consult with parties [or their representatives] affected by the process or outcomes of planning				F
to deal with long range goals presented by those who direct them				F
to achieve consensus				F
to reach the objective while respecting an individual's or group's personality and preferences				F
to share input regarding objectives, strategies, procedures, requirements, or limitations				F
to carve out time to spend with others				F

(10/11)). In reference to the latter, there was agreement (F) that planning was used 'to involve ... a team' but there was one objection to the inclusion of the word 'motivate'. In responding to these two descriptors, the Business cell comments debated whether motivation was an intrinsic part of the social function of planning:

"It's making things happen and making them happen so that it's not just you who wants it but your whole team (employees or family etc.) who now want it to happen as much as you do ! It's a detailed schedules that involves all of the people whom it effects leading to an attainable, measurable goal or standard!" (R1- B10). "Motivating -very important" (R3- B3, B12). " When we socialize we do not always motivate. I do believe though that humans do like to affect people so perhaps that's where the 'motivate' comes from" (R3-B10). "A plan that involves affected people leads to motivated people who can understand objectives and are therefore more excited to get there. But I do not feel that the function of planning means to motivate a team. I do feel that involvement and understanding of the plan and in the planning process can help obtain results because parties involved need to know 'why' and if they are 'talked to' and not 'talked with' they may hinder the success of the plan" (R3-B10).

The Academic cell descriptors refer to *social strategies, opportunities, constraints, and people and relationship management*. The Business cell presented a focus of *involvement* in regard to stakeholders, employees, family or such things as delegating responsibilities or creating 'buy-in'. The Lay cell felt that this social function of planning was for the purposes of *discussion* and *generation of ideas*. The Teacher cell descriptors indicate an emphasis on the idea of *collaboration* with others. Each of the cells had a varied focus concerning the use of planning in coordinating activities with people. The Academic cell was the only one to refer to the function of planning in guiding (parenting or mentoring) others. This is a surprising omission in the Teacher cell, given that individuals are commissioned by society to do so, and in the Lay cell from the perspective of parenting.

The survey statement *planning involves interacting with other people* was mentioned by 44% of the general public respondents. This same statement drew the lowest priority percentages of all fifteen (A - 51%, B - 75%, L - 56%, T - 66%). The social

component has appeared in all facets of analysis of the research. The number and variation of the descriptors for this function statement signal it as an important function of planning. The discrepancy between the scoring on the survey statement and the emphasis in the data on the social component in function may highlight the contextual aspect of this particular function. The literature (Goodnow, 1987; Kreitler & Kreitler, 1987; Rogoff et. al, 1987) stresses the influence of social recognition of the need for planning, social approval of plans, and the frequent contextual social determinants. These authors maintain that there is an increasingly social function of planning in everyday problem solving, as the individual ages. This accentuation is reflected in the FS4.

FS5 & FS6 Planning is used to increase control.

Hoc (1988) alleges that one of the most essential functions of planning is to strengthen the control over activity. The concept of control refers not only to actual control but to one's perception that one can take charge of the happenings in one's life (Lachman & Burack, 1993). Expectations or beliefs about the extent to which one's actions influence desired outcomes are influential in an individual's concept of control. This perception of control includes both beliefs about the extent of control possible in a given instance, about the internal and/or external factors influencing possible control, and about the extent to which this control is predictable (Blank, Levesque, and Winter, 1993). Two factors emerge as primary: a perception of subjective control and a perception of external control. These two factors relating to planning and control are discussed together, as the overlap in data between them is major and almost impossible to separate. Table 18 displays the how each cell expressed these two ideas in its function statements.

The introduction of the notion of control arose in the first round remarks by respondents in each cell. The following discussion highlights the evolution of the idea of control as it relates to the function of planning throughout the Delphi rounds, within cells and across cells. The Academic cell responses in Round 1, introduced both the ideas of

Table 18
Results of Function Statements Related to Planning and Control

Code	Function Statement	A	B	L	T
FS5	Planning is used to increase control (real or perceived) over the planner's operations	F			
	Planning is used to achieve greater comfort [to deal] with uncertainty		F	F	F
FS6	Planning is used to increase environmental control	F			
	Planning is used to increase control over situations		F	F	F

internal (subjective) and external control as two functions: 'planning is used to deal with uncertainty' and 'planning is used to increase control over situations'. The comments clearly suggest both:

"In almost all aspects of life where humans need to master a task or set of tasks or a situation, bring order to it, work out an attack and a way of operating that will bring order to the situation" (R1-A1). "While the most obvious use is to gain more control over variables that influence a goal, planning for improvements based on unforeseen conditions is on-going in most successful programs, institutions, and individuals. Planning is used to increase one's power over resources, both material and human" (R1-A4). "Planning makes individuals and groups more powerful in problem solving or goal achievement, compared to not planning" (R1-A7). "It is a means of creating some structure for thinking about and dealing with the inherent uncertainty of life" (R1-A10).

The feedback in Round 2 indicated that some preferred to amalgamate the two into 'planning is used to deal with uncertainty and increase control (real or perceived) over situations'. One respondent made a clear distinction between the two ideas of control, commenting that "there should also be a control over one's activities as another sub-section here - to express the MONITORING, REGULATING FUNCTION on mental activities" recommending "a subdivision of control to express environmental control and control of the planner's own operations" (R2-A3). Incorporating the concerns expressed the two functions were re-formulated for the second round, gaining full agreement on both, as displayed in Tables 19 and 20.

Full Agreement was attained on all 16 descriptors for FS5 and on 14 of 15 for FS6 for all cells. One respondent from the Business cell disagreed with the descriptor, planning is used 'to know what is required'. The Academic cell was singular in expliciting the notion of 'hypothetical' problems, i.e., real or perceived. The idea of subjective control was expressed by this cell in FS5 as *increase of power over resources, problem re-definition after action, individual contribution, an increase in self-mastery and control*.

Table 19

Results of Descriptors for Function Statement Five: Planning is used to increase control over the planner's operations

Descriptor	A	B	L	T
to increase mastery	F			
to refine a problem after doing something, taking some action	F			
to increase power over resources, both material and human	F			
to make a task manageable that would be otherwise unmanageable [to lighten the task or load *]	F			*
to enable people to use their talents to prepare the environment to change to accommodate a goal [give value in groups to individual's strengths, talents, contributions *]	F			*
to respond to the demands of situations which exceed the individual's immediate cognitive or behavioral resources	F			
to deal with uncertainty [to increase personal comfort with conditions of uncertainty]	F	F		
to mitigate the effects of poor habits and poor discipline		F		
to reduce the impact of the unknown and unforeseen			F	
to calculate 'probabilities'			F	
as a stress reliever (a stress relieving tool)			F	F
to avoid confusion and frustration				F
to choose a path				F
to minimize the effects of destructive outcomes				F
to deal with the emotional effects of change:				*
• create a safe/secure environment to proceed with goals				
• build in precautions/safety nets if dangers or pitfalls are anticipated				
• harness and/or channel enthusiasm and excitement				

* indicates additional comment from the final round, which makes a contribution to the clarification or elaboration of the original meaning of the group, although it was unavailable for group consensus

Table 20

Results of Descriptors for Function Statement Six: Planning is used to increase environmental control.

Descriptor	A	B	L	T
to respond to unexpected events or challenges	F			
to respond to an unfamiliar problem by alternating planning and action	F			
to gain more control over variables that influence a goal	F			
to enhance individual power	F			
to analyze and prioritize the variables		F		
to know what is required		10/11		
to ensure guidelines are followed		F		
to feel in control of your life in general			F	
to organize most everything we do and everything around us, so that we can have better control of our lives			F	
to identify sub-goals, which may be easier to manage or control			F	
as a place to start				F
to establish order in one's life				F
to organize each day so certain activities planned are not forgotten				F
so that people and situations don't get out of control				F
to avoid an unstructured day				F
to maximize positive closure to a predetermined decision				*
to produce change on a personal or societal level				*

* indicates additional comment from the final round, which makes a contribution to the clarification or elaboration of the original meaning of the group, although it was unavailable for group consensus

These themes were re-iterated in FS6 as *enhancing individual power* and *gaining control over* unfamiliar or unexpected problems, events, or challenges.

The Business cell began with the notion of control over situations in the first round, expanding it to read: 'planning is used to increase control over situations and achieve greater comfort with uncertainty'. Although this did not appear to be a primary concern in the first round, the responses were more extensive as the rounds progressed. The phrase, 'comfort with uncertainty' proved to be an obstacle, gaining only 7/11 agreements. One individual suggested that 'greater comfort' is not a function but a by-product of that control (R3-B5). It was unfortunate that the group did not have the opportunity to respond to a final round addition regarding avoiding errors and risks (see Tables 19 & 20). Descriptors for FS5 expressed the idea of subjective control as *self-mastery* and *increasing the level of control* and in FS6, planning is used to *analyze* and *prioritize* variables and to *execute guidelines*. One comment mused that:

"I don't know if planning lets us achieve greater comfort ...For myself, planning is how I change uncertainty to hopefully 'certainty'- to get desired results. A plan does make individuals 'feel better' or more confident because they feel they are dealing with their situation (certainty will depend on the quality of the plan.)" (F-R3-B10).

The greatest number of comments on the subject of control came from the Lay cell. The first round comments, similar to the Academic cell revolved around the two notions that : 'planning is used to deal with uncertainty' and 'planning is used to increase control over situations'. Many of the comments are impassioned with conviction about the efficacy of planning to increase control:

"Because human experience has shown that most desired outcomes are not attained without some conscious, structured effort - that best results are achieved when this structured effort is thought through carefully and systematically before starting" (R1-L12). "I have always planned everything in my life, right down to the color of socks I wear for the day. Planning assists so that we can make ourselves into better persons for ourselves and others" (R1-L5). "If planning was not used everyday of your life & for every aspect of your life - then life would be chaos. To feel in control of your life in general, everyone has a plan of what the day will be like (or what they

would like to happen). Sometimes unpredictable situations can occur which necessitate us to alter the plan we have made. Everything we do & everything around us is planned, so we can have control of our lives. If we loose sight of the plan, we cannot function" (R1-L11). "I wonder if depression is sometimes caused or exacerbated by lack of control, which means there is no reason to plan, or to hope?" (R1-L7). "I submit there can be no control without planning" (R2-L12).

Full agreement was achieved by the Lay cell in regard to these two functions and their descriptors, as displayed in Tables 19 and 20. The final descriptors are few and representative. There was lively debate over several propositions, which were eventually eliminated, about who has control and how it is exercised. Descriptors for FS5 expressed increase of subjective control by *calculating probabilities* and *relieving stress*. Environmental control (FS6) was increased when planning was used to *feel* in control of life and to *identify sub-goals*.

In a similar fashion, the Teacher cell indicated that they believed planning to be essential in the exercise of control over situations and helpful in dealing with uncertainty.

"I plan almost everything in my life - which probably ought to horrify me I have learned that an unstructured, unplanned day dribbles away"(R1-T2). "Any plan is better than no plan" "If you don't know where you are going, you'll end up somewhere else" (R1-T5). "Planning can be a stress reliever - confusion and frustration are often the results of lack of planning. Except for a small percentage, most people need to have a plan of sort to grow, to learn, achieve goals"(R1-T7).

One descriptor receiving full agreement is encompassing: 'so that people and situations don't get out of control' (R3). The assertion that planning is used to deal with uncertainty gained 9/10 agreements; that planning is used to increase control over situations gained full agreement. All descriptors gained full agreement. Planning is used to *reduce stress* and control is increased by *being proactive* (FS5) and externally *to establish order* (FS6) in the Teacher cell descriptors.

A comparison of the emphasis placed by each group indicates that the Business cell was less concerned with this issue than the others, albeit internal or external elements of control. As the composition of the cell is individuals who already have considerable control

(owners, CEO's etc.) in their professional lives, this low level of concern is understandable. An emphasis in the Academic cell can be seen on the idea of cognitive 'operations', rather than the more affective tone of the other three groups with 'uncertainty'. The Teacher cell indicated more interest in the external, contextual control.

Interest in planning and control generated the fourth highest rate (number of words) of comments of all themes in the study, lending support for the growing body of literature on planning and control, as described in chapter two. These beliefs about control are influential to behavior, regardless of their accuracy (Lachman & Burack, 1993). Gatz and Karel's (1993) findings, that general beliefs about control appear to be relatively stable individual differences, may be pertinent to the views of these experts. The reciprocity mentioned in chapter one, between the tendency of those who feel in control to engage in planning and the tendency of those who plan to experience a sense of control, may be reflected in the descriptors of these cells. The studies cited in support of the benefits (i.e., physiological, social, attitudinal, intellectual, and behavioral) experienced by planners who embody this sense of control may be an important factor in the development of expertise and professional achievement. Summarizing these benefits, Smith (in press) supports the descriptors of the Delphi respondents in all cells, that for both women and men, an active involvement in planning promotes motivation, enhances well-being, and reduces uncertainty. This function of planning was given strict attention and elaboration by the respondents. It was obviously an impassioned utility of planning.

FS7 Planning is used as a substitute for action.

Goodnow's (1987) contention that planning is, in some instances, not always regarded as socially acceptable or advantageous is reflected in the responses to the 7th function of planning. She maintains that sometimes planning or the degree of planning may vary in appropriateness or even be maladaptive under certain conditions. Particularly in shared planning, there may be a continuum of adaptability, from 'too little' to 'too much' planning, affecting the distribution of planning among people or the degree of planning relative to the goal or the context. One member of the Business cell succinctly remarked "if

the model of the world on which it is based is wrong, it can be counterproductive. There is a whole literature on the irrationality of rational planning under certain conditions" (R2-B3).

The concept leading to the function statement 'planning is used as a substitute for action' originated in the first round of the Academic and Lay cells only. Tracking both within cell debates is most interesting. The evolution revolved around the respondents' beliefs about degrees of planning rather than the more narrow consideration of planning being used as a substitute for action. The descriptors produced in response to FS7 are displayed in Table 21. Respondents in the Academic cell suggested that:

"Sometimes extended planning is not effective and may even prevent goal achievement: when planning is a substitute for inaction (some individuals and agencies stay in a planning stage so long that they make little or no progress), or when there is not enough information because the situation is so complex, when the problem is so unfamiliar (cutting edge) that they have to alternate planning and action (Fullan's Ready, Fire, Aim argument that it is best to plan or refine the program after doing something, taking some action)" (R1-A7). "When we lack information about the present and future state of the problem, and knowledge about actions that will move us through the problem space, we may choose not to plan at all or specify an incomplete plan. In that case our plan may arise from our reflections about the outcomes of trying to solve the problem. We do this even in cases where we do have this information and more complex knowledge about the actions and end states of the problem" (R1-A9). "Most of the planning I do is done in the head and on the fly. I do more systematic planning with records for more challenging situations, but I find that I usually am so busy that I get more done by not doing highly elaborate and effortful planning" (R1-A11).

The feedback from Rounds 2 and 3 highlights the relationship between planning and action.

The connotation of the word 'substitute' led to different interpretations. Participants wrote:

"Planning and Acting are intertwined; one does not substitute for another. We plan to act in a transactional model of planning. Although overplanning can lead to inaction, I think that it is incorrect to state that one is to 'substitute' for the other. In

Table 21

Results of Descriptors for Function Statement Seven: Planning is used to substitute for action.

Descriptor	A	B ⁺	L ⁺	T ⁺
to respond to situations in which individual and agencies plan for so long that they make little or no progress toward the goals	F			
to respond to a situation where there is not enough information and the situation is too complex	F			
to respond to a situation where there is too much information and one does not know what is relevant	F			
to respond to a situation where there are not enough resources to carry out the plan	F			
to respond minimally, due to busyness	F			
to give the appearance of progress, commitment	*			

* indicates additional comment from the final round, which makes a contribution to the clarification or elaboration of the original meaning of the group, although it was unavailable for group consensus

· not applicable to this cell

everyday planning, particularly when faced with too much or too little information, we often chose to proceed with an incompletely specified plan, which may become more elaborated as we engage in actions toward the goal" (R3-A9). "I began by calling these maladaptive, but of course, for busy, harassed people, non-planning and working reflexively and automatically may be more adaptive. That is a fine distinction" (R2-A3).

The statements with regard to this function infer an imbalance of planning to action rather than a direct substitution. In the final result, 7/8 respondents agreed to the function statement, the one disagreement was based on the above stated relationship between planning and action (A9). Table 21 displays the descriptors for the function statement and the agreement achieved.

The FS7 was included in the three Delphi rounds for the Lay cell, initiated by the R1 comment: "When I do something on impulse, my planning is developed as I go and is probably not as effective or efficient. Planning becomes a fault when taken to the point of a neurotic obsession"(R1-L7). In R2, the one descriptor ('becomes a fault when taken to the point of obsession') for this statement was eliminated, with 7/9 respondents commenting. For the third round, the function statement was changed to read: 'planning is used as a substitute for action, such as a delaying tactic or avoidance'. Without a descriptor, the researcher offered the suggestion "Would you care to comment on this?" The response was excellent in generating comments from 7/9 cell members:

"Too much planning leads to boredom ... a life where everything is predetermined ... planned" (R2-L10). "Also at an early stage a preliminary plan can be laid out to 'test the winds' before formalizing an official plan - and as well to 'buy time' but not as a total substitute for action!" (R3-L2). "This is dishonest" (R3-L3). "This would be pseudo-planning but I know a lot of people who use it quite effectively (as a delaying tactic)" (R3-L7). "I disagree- planning will enable or permit reasonable, logical action. The failure to plan will result in an inability to take rational or the best action. The failure to properly plan one's course of action will most likely result in delays and frustrations. Planning is not a delaying tactic but rather a decision-making process which can save time" (R3-L10). "If the end result of a particular situation is

already known, and the end result is not acceptable, a plan can be made to try to alter the end result" (R3-L11). "This does happen, but I would call it an abuse or misuse of planning. Anyone truly interested in planning would probably drop out - or at least be honest, and plan to delay (i.e., develop a plan that would result in the delay, rather than pretend to plan as a delaying tactic)" (R3-L12).

As the nature of the comments left too much to ambiguity for across cell comparison, the function statement was therefore dropped from the cell results.

Although only arising in two cells, this controversy generated the second highest (number of words) response rate of all themes in the study. It would appear that the function statement was misleading and that the intent of the comments (as seen in retrospect by the researcher) were in regard to the degree of planning, i.e., how much planning is adaptive, how much is maladaptive. Had this broader concept been available, it would have perhaps elicited annotation. As one individual in the Business cell argued: "planning should never be an excuse for inaction - as someone once asked, "...is it procrastination if you decide to postpone it right away?" !" (R1-B2).

Knowing how much planning is appropriate is a form of metacognitive conditional knowledge. The individual understands that too much planning may be an indicator of compulsiveness with detail or the planning processes themselves and that too little planning may suggest procrastination, denial, or disorganization. The most suitable degree of planning retains maximum flexibility, while making adequate preparation for possible changes (Lachman & Burack, 1993). The comments of both the Academic and Lay cells indicate a concern for the concept of degrees of planning, which resonate with the findings in the literature.

FS8 Planning is used to respond to most everyday (problem solving) situations.

The contextual dimension of planning is alluded to in various ways throughout the data. FS8 captures the inclusive nature of context in these processes. As one respondent so aptly remarked, "context assumes a role in these efforts through the interpretive activities of the planner during the course of planning. That is, context does not automatically determine

planning so much as the planner mentally represents the context to guide himself or herself through the problem. There is no such thing as 'context free' or 'situation free' planning" (R1-A9). The importance of this factor is reflected in the third highest (number of words) contributor of auxiliary comments in the data collection.

The function statement was finalized in two variations. The Academic and Lay cells' read: "planning is used to respond to most everyday situations" on the justification that planning is not restricted to problem solving. The Business and Teacher cell statement "planning is used to respond to most everyday problem solving situations" satisfied their intent. FS8 generated full agreement on 16 of 17 descriptors as displayed in Table 22. The Lay function descriptor 'work planning usually relates to the longer term and often involves a written protocol' was disagreed to by two individuals. In the Academic cell descriptors, the use of planning in most situations was represented by the ideas of *various contexts, an increase in choice* of overarching goals and values, and *planning-in-action*. The Business cell concluded that planning is used in *all facets of life, for most activities*. Similarly, the Lay cell attested that planning is *used continually in most aspects of life*, and expressed a little differently by the Teacher cell that planning is *used continually in most contexts*. The role of the conditional element of planning, i.e., that it 'depends' upon circumstances, is implicit in the remarks of all cells, and in the numerous descriptors indicating the pervasive contexts in which planning is appropriate and desirable. The two comprehensive descriptors from the Business cell were encompassing in expressing this universality.

Although context is important, the data clearly indicates that planning is used in almost any conditions. The recent literature is of accord that the conditions for solving everyday problems differ from those of a more well-defined nature. The pervasive character of the descriptors for FS8 make precisely the point described extensively in chapter two and which forms the underpinning of the present research, i.e., that planning is so integral to daily living that it provides just the commonality needed to form a baseline for metacognitive instruction. The response from this cell was strong and supportive of this premise. As the domain experts for this particular function statement, it is interesting to note

Table 22

Results of Descriptors for Function Statement Eight: Planning is used to respond to most everyday problem solving situations.

Descriptor	A	B	L	T
in various contexts, from carrying our work, running errands, having dinner parties, to writing essays, and saving for retirement	F			
used informally 'on the fly', just about anywhere and any time	F			
to proceed in the absence of fully formulated or elaborated plans (planning-in-action)	F			
to increase the choice of overarching goals and values in all facets of life	F	F		
to accomplish most activities on a daily basis		F		
to use both at work or at home (e.g. gardening, renovations) and is often used even when not explicitly called planning			F	
used by everyone, everyday on an on-going basis, although not everyone will recognize that what they are doing involves this life skill			F	
direct short term planning can relate to lunch meetings etc. or a 'things to do' list for the day			F	
work planning usually relates to the longer term and often involves a written protocol			7/9	
short term and long term planning is used in all parts of society			F	
in reality, planning is utilized consciously or unconsciously in most aspects of life			F	
to mean anything from arranging your daily work schedule to preparing a strategic plan for a major project or thinking about the approach one is going to take when chairing a particular meeting or arguing a particular goal			F	
in most decisions				F
used constantly in a personal form; formally or informally				F
to develop complex ways of organizing; as simple as being ready 15 minutes earlier than usual in the morning or as complicated as organizing a community event or a national election				F
to organize a dinner party, to write a thesis, to run the family home, classes, marketing, research, teaching units and lessons and in a job situation				F
to enhance the realization that in every situation you have more than one choice				*

* indicates additional comment from the final round, which makes a contribution to the clarification or elaboration of the original meaning of the group, although it was unavailable for group consensus

that the Lay cell descriptors are similar to and in agreement with those from the other cells.

FS9 Planning is used to enhance one's life.

Function statement 9 did not emerge within the Academic cell, and although found in the other three cells, seem to hold special interest for the Business and Teacher cells. All 21 descriptors, as displayed in Table 23, received consensus, indicating the positive import this function held in regard to planning. The Business cell descriptors were related to *productivity* and *success*. The Lay cell indicated that enhancement of one's life could be assisted by planning with *systematic effort* for *accomplishment*. Of all ten function statements, the Teacher cell provided the most descriptors of the enhancement of life through planning (15). A summation of these descriptors brings forth *personal growth and enjoyment of responsibilities and opportunities*, and as a support for *democratic and humane processes*. The ill-defined, less quantifiable nature of 'life enhancement' was articulated by one respondent:

"Can one plan a happy, creative, insightful existence at a personal level? Carried to its extreme, (planning denoting control of goal-directed activities), this is illusionary and paradoxical in nature. If it is involved primarily with mechanistic goals, then Orwellian outcomes are inevitable. If on the other hand, it is involved with non-mechanistic goals, then planning is seen as a much more general response to the need merely to be organized. Either way, planning limits one's life. Thus, 'planning' places self-imposed limits on group or individual activities in an attempt to enhance the overall quality of life". (R2-T8)

Chapter one summarizes many of the life-enhancing benefits of planning from the research findings. One such example is Borkowski and Thorpe's (1994) reported correlation between planning and high achievement in school. A conviction that planning strengthens one's capacity for success is surely an underlying assumption in the Ontario Common Curriculum (1993) inclusion of planning in the various core areas of study. The increasing attention paid

Table 23

Results of Descriptors for Function Statement Nine: Planning is used to enhance one's life.

Descriptor	A	B	L	T
to manage life and work effectively		F		
to ensure the end result is measurable so one can have a sense of success and to continually improve		F		
to become more productive		F		
to determine the best or optimum way to proceed		F		
to determine how to avoid errors and prevent bad things from happening		*		
in order to accomplish as much as possible in a reasonable time frame and with a certain degree of success			F	
to attain best results for most desired outcomes through the careful and systematic application of conscious, structured effort			F	
to limit one's life; by placing self-imposed limits on group and individual activities in an attempt to enhance the overall quality of life				F
to enjoy life's responsibilities and opportunities				F
to effectively address individual, familial, organizational, national, or global issues				F
to be more efficient				F
to take advantage of opportunities more effectively				F
to meet individual responsibilities				F
to include unusual, unique, spontaneous, or different aspects of situations				F
to maintain commitments				F
to find free time				F
to 'best' deadlines				F
to create momentum				F
to grow, to learn				F
to deal with boredom, a new challenge, new equipment, a unique situation				F
to balance one's personal life with one's job outside the home				F
to ensure through broad consultation/collaboration that the solutions that present themselves for wide support and processes are democratic and humane				F

* indicates additional comment from the final round, which makes a contribution to the clarification or elaboration of the original meaning of the group, although it was unavailable for group consensus

to planning in both the popular media and the literature in various domains reinforces this confidence.

FS10. Planning is used for evaluation.

The tenth statement places evaluation as a function of planning, from the perspective of the Business cell only. Despite this singularity, FS10 elicited the fifth most commented on theme (number of words). The three function descriptors received consensus from the Business cell: planning is used to set values and review them regularly; planning is used to facilitate the assessment of actions, results, failures, and progress; and planning is used to utilize follow-up for motivating, learning, assessing, improving, and future planning. The function statement originated from one first round comment that a “plan makes it easier to assess actions, results, failures and then evaluate where you are and where you want to be” (R1-B10). When re-phrased into the present function statement and presented for the second round, one respondent seriously objected, with the rationale that: “No - evaluation comes after - not sure this belongs here- ‘evaluation’ is sometimes a separate event??? This is the one element which doesn’t ring true for me - I believe it may be a separate exercise from planning per se” (R2-B2). This objection, made in the second round, was not reiterated in the third, making it impossible to know if the respondent had changed his mind or merely thought his views had been registered. The third round responses were supportive of the function statement:

“I do, many times use the results of a plan (when I reach an objective) to analyze why it’s successful and is the end goal optimum level, or can we enhance further” (R3-B10). “Once a plan is formalized, it will be critiqued on an on-going basis to determine whether the constituent goals are being achieved such that the end goal will be realized. During this process the constituent parts may be re-evaluated i.e.: re-stated in light of more accurate information since the plan was created. This may result as well in the final goal being modified or altered” (R3- B8). “Evaluation is a part of all planning” (R3-B9, B10).

There appears to be some confusion within the cell remarks about whether evaluation is a cognitive process involved in planning or whether evaluation is an actual function of planning. Most models of planning definitely include evaluation in the component processes of planning (i.e., Hayes-Roth & Hayes-Roth, 1979, Anderson, 1983; Rebok, 1989). Lawrence and Volet (1991) note that although complementary, the evaluative aspect of goals has received less attention than anticipatory planning. Goals function as criteria for evaluation and to estimate progress. Evaluation is a sub-skill of monitoring and is therefore as essential tool for self-regulation as discussed in chapter two. The literature appears to regard evaluation as an integral facet of metacognitive functioning.

Summary of Function of Planning

Kreitler and Kreitler (1987) specify the research challenge that “the specificity of planning does not consist mainly or exclusively in the kind of involved processes, but in their organization, in the way they function together, and in the uses to which it is put. Whereas the manner of functioning is mainly a characteristic of planning, the uses are rather dependent on the planner” (p.265). In support of this, Scholnick and Friedman (1993) suggest that a comprehensive account of planning must attempt to explain not only how people plan but also when people would use such a skill for a given purpose.

The second portion of the Delphi format addresses the third research objective to identify the purposes of planning (what planning is used for) from a domain-related perspective. The conditional knowledge of the four groups of experts is explored through the final research question, *Where and when is [planning] used?*. The strong consensus for the vast majority of the ten function statements indicates a domain consensus of the uses of planning. The variations in agreement for the function descriptors support the notion that the functions to which planning is put may have considerable idiosyncratic variation. A synthesis of the major ideas underlying the descriptors expressed by the respondents for each of the function statements is provided in Table 24, for comparison purposes and for

review. Each of the ideas have been discussed in relation to the relevant function statement and in relation to the descriptors of other cells.

The telephone survey proved suitable in furnishing a starting point for the Delphi rounds, as indicated by the cell support for the fifteen initial statements (see Table 1). The stimuli of these statements may have been instrumental in the attainment of such relevant, excellent results across cells for function. The efficacy of the methodological approach in generating high levels of agreement is supported by such comments as: "all this is really improved - useful, powerful, "excellent", and "agree with all".

Each of the function statements and the accompanying spontaneous commentary elaborate on elements found in the review of the literature. The responses concerning the social dimension of planning (FS4) highlight the need to consider planning as an interactive activity, integral to the various facets within the lives of individuals, i.e., personal, professional, interpersonal, and societal, as expressed by such authors as Rogoff et. Al. (1987), Goodnow (1987), and Heppner and Krauskopf (1987). Having generated the most supplementary comments in the study, this theme is considered to be a unanimously significant function of planning. Similarly, the concern expressed in regard to the interplay of planning and control reinforces a growing awareness in the literature of the relationship between these two. Perhaps the most comprehensive example may be found in the collection of works edited by Lachman (1993). Conversely, the attention paid to the notion of evaluation as a function of planning, within the Business cell, challenges the assumption made in much of the literature about the inclusion of evaluation in planning. Chapter one highlights the variation in the literature about views on planning and action. The results from the data suggest that, at least within the business conception, there is some confusion about the place of evaluation in regard to planning.

Consistent with the omission of the idea of Strategy in regard to the nature of planning, there was no function descriptor offered by the Lay cell about the strategic dimension of planning. The cell's descriptors of function were primarily of a more global (planning is used to map out clear and concise goals: personal, business, financial, military, and political goals), temporal (planning is used to prepare for future events), or affective

Table 24

Review of Main Ideas Expressed by Descriptors of Function Statements

FS	A	B	L	T
FS1	• complexity • reduce anxiety	• sequencing	• simplify	• complexity • strategies • evaluation • schedule
FS2	• structure • management • time • constraints	• strategy • coordinate • prioritize	• time	
FS3	• goal setting • structure • anticipation	• preparation • avoid mishaps	• preparation	• preparation • prediction
FS4	• strategies • opportunities / constraints • people & relationship management	• involvement	• discussion • generation of ideas	• collaboration
FS5	• increase power over resources • problem redefinition after action • individual contribution • increase level of comfort	• self-mastery • increase level of comfort	• calculate probabilities • relieve stress	• reduce stress • be proactive
FS6	• enhance individual power • gain control over unfamiliar or unexpected problems	• analyze & prioritize variables • execute guidelines	• identify sub-goals	• establish order
FS7	• response to ambiguities • respond minimally			
FS8	• in various contexts • increase choice of overarching goals & values • planning-in-action	• all facets of life, for most activities	• continually in most aspects of life	• continually in most contexts
FS9		• productivity success	• systematic effort • accomplishment	• personal growth • enjoyment of opportunities & responsibilities • democratic processes • review, reflection, improvement
FS10				

(planning is used as a stress reliever) nature. On the other hand, teachers mentioned strategies more often as a function than did other groups.

The results on function clearly situate planning as an important life skill, facilitating goal-attainment, problem solving, organization of resources, preparation for the future, social coordination, control over self and environment, and life-enhancement. Irrespective of slight variations, the data unequivocally also confirms the commonality of conditional knowledge among experts from different domains about the function of planning. The responses were rich and informative concerning what planning is used for and the degree of appropriateness of planning in different contexts.

CHAPTER 6

Discussion

This dissertation proposes that planning may be an adequate exemplar of metacognitive skills to warrant its consideration as a focus for instruction of these abilities at all stages of the life-span. In her discussion of the challenges of researching metacognitive processes, Brown (1987) cautions that these cognitive activities are often not statable; that knowing how to do something is not an insurance that they can be brought to the level of conscious awareness and verbalized. The Delphi Method has the inherent advantages of reiteration of the process and time for reflection, giving both stimulus and opportunity for rendering this type of knowledge more accessible. The review of the literature indicates that the cognitive-developmental framework underpinning the present study encompasses two main dimensions of planning; an internal and an external dimension. The six internal dimensions highlighted in chapter two (the nature of planning, the nature of the problem, planning processes, the nature of planning beliefs, the nature of the planner, and regulation) and the two external dimensions (contextual variables and social variables) are well represented in the results reported. The correspondence of the results with the most current literature on planning is extraordinary.

The three types of knowledge accountable for metacognitive knowledge are given considerable attention in the review of the literature by virtue of their foundational role in the structure of mental representations. The declarative and conditional knowledge of the respondents is considered to be of a high degree. The sections on nature and function of planning are explicit in elaborating the content of these two types of knowledge and are much of the substance of the results and analysis. The results attest to the fact that there is a commonality across cells of knowledge about what planning is and the conditions under which it is used. The research questions, *What is planning?*, *How do you do it?*, and *Where and when is it used?*, were posed only at the beginning of the data collection to generate a

starting point for both the survey and the Delphi Round 1. The data gathered in response to the second research question, *How do you do it?*, failed to contribute significantly to the four research objectives articulated at the inception of the study and were, therefore, not considered for the analysis. While it was not necessary to discuss it in the interpretation of results, procedural knowledge is evident in many of the responses. As the respondents are experts in their particular domains, a certain high level of procedural knowledge may also be implied. Responses to the second research question, *How do you do it?*, did generate articulation of specific processes, in degrees of generality. Some were personal procedures, while others were descriptions of optimal sequences. Some included: explicit planning taxonomies; specific personal planning strategies; contextual options. Appendix J displays examples of each type from the four cells. Analysis of these data would be an excellent follow up to the present study. As is evident from these samples, there is no lack of procedural knowledge among the respondents in each group. Thus, although not attended to in the results, justification exists for the assumption that the participants of the study have strong and elaborated procedural knowledge. Procedural knowledge has been perhaps given the most attention in the literature on planning over the past few decades. It is thought that there is enough of a foundation in the understanding of procedural knowledge to warrant focus on declarative and conditional.

The data analysis consisted of four distinct, independent stages, within each of the four groups, as displayed in Figure 1 in chapter three. When compared at the conclusion, the final analysis showed a strong convergence across cells. As the fundamental purpose of the Delphi Methodology is to attain stability or consensus of response, it is not surprising that the data collection has achieved high levels of agreement from all cells. What is significant is the extent of this agreement. The modified Delphi Method employed is considered to have been effective in the exploration of such a complex cognitive process as planning. The flexibility of the iterative methodology may be assessed by the ease with which the format was self-modifying to suit the views of the cell members. Their satisfaction is unquestioned, for both nature and function of planning, considering that all definitions reached solid consensus and an impressive 97% agreement on all components of the definition and their descriptors, 89% on the function statements, and 95% for the functions

descriptors. The rich quality of data gathered permits both inferences and conclusions from final analysis of the similarities and dissimilarities, within and between cells. The results precisely addresses the four research objectives of the present study:

Objective 1: to define the term ‘planning’ from various domain perspectives

The high quality of the cell definitions overwhelmingly supports the underlying postulate that there is a remarkably common mental representation about planning, between specialists in the field, sampled members of the general public, educational practitioners, and entrepreneurs. This highly elaborated declarative knowledge base produced four cell definitions of quality and substance. Consensus was achieved for all cells on 97% of the definitional aspects (Appendix I) and majority agreement on 100%. Consensus was gained for all cells on 97% of the definitional components as well. These notable levels of agreement give strong support to the definitions produced. When compared with the definitions of planning in the literature, it is the opinion of the researcher that each cell has produced a definition of superior quality and elaboration. The participants are cognizant of what planning means and were able to articulate their metacognitive knowledge in the data gathering phase. Table 25 displays a composite definition, extrapolated from the essence of the four cell definitions by the researcher. Other composites might be constructed and prove equally valuable, provided that all dimensions of the signatures of the definitions (representation, organization, decision making, management, strategy, regulation, individual, and social) are included. The combined knowledge and expertise about planning has yielded an excellent and comprehensive definition of planning. The extensive definitional controversies plaguing the literature on planning may be somewhat artificially generated and might benefit from this type of research.

The signatures of the definitions highlight the areas of focus of each definition. The most pronounced areas of commonality with regard to the definitions of planning are three: firstly, that planning is goal directed; secondly, that organization is almost synonymous with planning; and thirdly that regulation is cardinal to planning. The goal-directed nature of

Table 25
Composite Definition of Planning

Planning is a metacognitive, decision-making process involving conceptualizing, choosing, prioritizing, and organizing goals, strategies, and procedures for goal attainment. Depending on the circumstances, goals or plans may be short-term or long-term, simple or complex, flexible or rigid, formal or informal, individual or social. Planning involves analysis, choice, and coordination of goals, priorities, options, and courses of action with regard to human and material resources and other factors, including time. Planning may also involve intuition and the unconscious. Planning encompasses ongoing revisionary processes related to devising ways to attain, elaborate, maintain, monitor, update, and/or abandon goals and schedules, in varying levels of abstraction. It is dynamic in that strategies used for goal attainment and actions are adapted to environmental contingencies; knowledge gained from completed plans influences the formulation of subsequent plans, goals, mental representations, and actions. Plans may be: 'routine' plans which involve the coordination of many elements to achieve routine or repetitive tasks, which eventually become almost intuitive in nature; 'strategic' plans which involve innovation and non-routine creation of change, often in the face of competition, opposition, or adversity and; 'contingency' plans in the event routine or strategic plans fail. Planning includes goal management, time management, resource management, action management, and person and relationship management. Often a personal, sometimes a consultative, collaborative process, planning is an essential element of control over personal and professional objectives at all levels.

planning is reflected in each cell definition and also in FS1 (Planning is used to enhance problem solving or goal-directed activity). Covington (1987) suggests that *goal setting* appears to be the most generalizable of the planning skills, as it “enters into virtually all aspects of thinking, particularly strategic thinking; and ...has the most consistent record of responsiveness to instruction both among children and adults” (p.503). Both organization and regulation achieved consensus for definitions of the components and all descriptors (Tables 8 & 9). Not only is the nature of planning organizational but an important function also, as expressed in FS2 (Planning is used to organize [human and] material resources). Pervasive throughout the results is an emphasis on the paramount importance of plan flexibility and revision, both components of the metacognitive ability to regulate one’s planning activities. This provisional aspect of planning supports the literature (e.g., Meyers & Rebok, 1985; Brown, 1987) in the significance of regulation in mental representation and in effective planning.

It is to be expected that the Academic cell manifested an exceptional declarative and conditional knowledge of planning processes and its uses. What is unexpected is that nine experts from various countries and theoretical orientations were so easily able to achieve nearly 100% agreement on all aspects of the data collection (definition, component terms and descriptors, 7/8 function statements and all descriptors). In fact, their levels of agreement were the most outstanding of any cell. The review of the literature reveals a multitude of definitions used in research, as well as variance on position about the distinction between planning and action, and planning and problem solving. Such differences were not evidenced in the research findings, perhaps indicating the divisions may not be as severe as the literature indicates. There may, indeed, be a new convergence about what planning is and how it is used among experts which is not reflected in latest writings. By defining the terms used so precisely, it was possible to quickly generate an elegant and comprehensive definition of planning from this cell.

One of the most distinguishing findings from the Academic cell was the lack of a ‘social’ category for the nature of planning. As much of the academic life is more self-determinate (i.e., in area of expertise, instructional content, research foci, etc.) than many other occupations, these participants may, perhaps more than any other cell, perceive

planning to be primarily an individualistic process, occasionally requiring collaboration. This is supported by the survey statement, *planning involves interacting with other people*, receiving the lowest of the scores from the academic group (51%). One respondent (R1-A10) captured this difference in her comment “In most cases, I plan by myself, but there are also instances [both everyday and life planning] where planning takes place in a social context and the end is a joint product”. Her examples of collaborative planning are not domain-related but rather personal.

In summary, the methodology effectively responded to the first research objective of defining the term planning from various domain perspectives. The effort toward definition of such a complex process produced four exceptionally eloquent and complete cell definitions and one composite definition of planning. This research objective addressed the nature of planning in both conceptual and concrete fashions. The data show strong confidence from each cell of its conception of what planning really is.

Objective 2: to define the component terms of planning from various domain perspectives

There was also a demonstrated common vocabulary of the terms used to describe planning and its processes, established by the high levels of agreement on the definitions of component terms for all groups. The terminology employed by the participants (Table 9) is specifically that adopted in the literature on metacognition, i.e., monitor, revision, evaluation, management, iteration etc. Similarly, the seven component terms used to describe the nature of planning (goals, mental representation, decision making, organization, regulation, social, and plan) were clearly defined and used in a similar, often identical, manner by the respondents of each cell. This proves that there is an ‘acceptably common’ vocabulary in regard to planning. These rather simple terms may be used with learners of all ages and be easily transferred to everyday and work-related contexts throughout the life span.

The data gathered applies well to the second research objective and manifests a similarity of terminology available for instructional purposes. The current ambiguity of terms used in the literature and discussed extensively in chapter two, is at variance with the

findings of the present research. The results emphasize collective consensus within the sampled populations.

Objective 3: to identify the perceptions of the function of planning from domain-related perspectives

People's conceptions about planning define the sphere of planning and establish what is relevant or irrelevant to planning for themselves (Kreitler & Kreitler, 1987). The third research question, *Where and when it is used?*, invoked respondents' knowledge of the use to which planning is put. All cells were able to articulate an impressive level of conditional knowledge about the functions of planning, achieving high levels of agreement within cells. These individuals were aware of the purposes for which planning is used, as illustrated in the numerous descriptors of the function statements. Planning is used: to enhance problem solving or goal-directed activity; to organize human and material resources, to structure/ think about/ prepare for the future; to coordinate activities with people; to increase control (over self and situations) and deal with uncertainty; to respond to most everyday situations; to enhance one's life; and for evaluation. The particular contexts and fashions in which these functions of planning are manifest are nuanced in the 159 descriptors generated, of which 95% obtained consensus. These results supplement a paucity in the literature about the function of planning.

The Lay cell was singular in achieving full agreement on all 8 function statements (Table 13) as well as the definition, all components of the definition, with the exception of the notion of the unconscious, and all descriptors of the components. This represented the second highest level of agreement for the entire study, after the Academic cell. It is unique that there were no third round contributions for either nature or function from the Lay cell. It may be inferred from this that the respondents were unusually satisfied with the utility of the methodology to express their views within three rounds. It is interesting to note that the Lay cell rated the survey statement, *planning is a thinking activity*, the highest of all cells (96%) but the statement, *learning is a part of effective planning*, was rated the lowest (80%), as displayed in Table 1. Perhaps planning is seen, by the Lay cell, as a taxing mental

activity and rarely perceived as a proactive instrument for knowledge acquisition. The findings confirm that planning is seen as an extremely useful tool in a multitude of instances. Planning is viewed as an important life skill, which aids problem solving and goal attainment on various levels. The data are rich in content and potential application. Knowing where and when to apply planning knowledge is a vital component of metacognitive functioning. The results on respondents' conceptions of the functions of planning may be used to construct planning tasks perceived by learners to warrant planning. The ten function statements clearly define what experts in these four domains consider ecologically valid uses of planning and are well elaborated through the 159 descriptors. These results may also form a bridge between research findings and instruction in the conditional knowledge necessary to provide transfer to real-world situations.

Objective 4: to compare the perceptions of the nature and function of planning between various domain-related experts.

The choice of domains provided a type of 'reality check' between theorists of planning and practitioners in everyday, educational, and entrepreneurial contexts. The incorporation of data from both the survey population and its sub-group, the Lay cell, provides triangulation with findings from the more easily characterized elite participants from three other domains. The combined tacit knowledge and aggregate experience in life-planning endeavors contributed from the Lay cell, stands boldly with the other domain-related results, even those from experts in cognitive science. The inclusion of the conceptions of planning from these representatives of the general public is an exemplar of the pervasive similarity across sampled groups.

The Academic cell perception of planning as primarily a non-social endeavor is at variance with the perceptions of the other three cells, which definitely conceived of planning as a more social process. This difference is evidenced at all levels of the data collection regarding the nature of planning. The social nature and function of planning was clearly articulated in the results. Perhaps the omission of a social category from the Academic definition and therefore from the rest of the section on nature was an indicator that this cell

perceived planning as socialized (“planning is an aspect of cognition which is socialized ... throughout the life span” R1-A10) but not social in essence. The other cells clearly view planning as social in nature, although not always (Figure 3, Table 10). The social function of planning is given full agreement across all cells in FS4 (Planning is used to coordinate activities with other people), as displayed in Table 17. The support in both areas of the data collection gives credence to the assertions of such authors as Vygotsky (1978), Rogoff et al. (1987), Goodnow (1987), and Smith (in press), that planning is social in its development and practice. There was concern expressed not only for the interpersonal aspects of planning, but also about how planning is conducted on a societal level.

Some findings are particular by their infrequency. For example, there were only two mentions throughout the formal aspect of the study of the notion of creativity. The Business cell definition spoke of “plans which involve innovation and non-routine creation of change” and the Teacher cell referred “to include unusual, unique, spontaneous, or different aspects of situations” in the descriptors of FS9 (Planning is used to enhance one’s life). It is plausible that individual’s in the study perceive creativity in the realm of thinking and not in the nature or function of planning. There was only one mention of the idea of mental simulation of a plan (“Often, I think and think and think ... as I lay in bed, as I go about the day ... rehashing and reformulating, only making a plan once I’ve totally worked it out” (R1-A8)). It is conceivable that this aspect of planning may be so implicit to the respondents that it failed to rise to the conscious level of data production.

One distinct and rather unsettling finding from the data analysis is the perspective about planning from the Teacher cell, in regard to teaching and learning. Teachers perceived the research queries to be related to their own cognitive processes and planning behavior. The personal value of planning is seen particularly in the teachers’ well elaborated response to the FS9 (Planning is used to enhance one’s life), displayed in Table 23. It is a significant omission that the Teacher cell failed to directly link this exploration to their professional role as models and instructors. They neglected to mention their role in guiding the plans of those in their care or collaboration about planning with students. In fact, no teacher mentioned students at all, in comment or contribution. There was also no mention of the idiosyncratic nature of planning, which would be expected from their classroom experience.

At the most fundamental level, planning may be a skill teachers envisage themselves practicing well and often, but do not perceive this skill in a constant modeling and supporting role with their students. In a similar vein, the Teacher cell strongly supported the notion of the social nature and function of planning, but for themselves. Here also, they failed to mention students and peer collaboration within the classroom.

The teachers rated the survey statement, *planning is a thinking activity*, the lowest priority of all the cells and the survey results (A-91%, B-95%, L-96%, T-84%). This is interesting given that they were, with the Academic cell, the only ones to mention the role of knowledge in their cell definition. It may be inferred from this that, despite their declarative knowledge of planning as a metacognitive activity, in practice, they perceive planning as a primarily procedural, as did the Business cell.

The results from the Teacher cell highlight an impressive degree of awareness of planning processes and the uses to which it is put in their roles both professionally and personally. This is evident in the extremely high levels of consensus among the teachers in all areas of the data collection, their excellent comments, their lack of third round contributions in regard to nature, and finally the lack of controversial themes emerging from the cell. The high utility of planning is reflected in the fact that the teachers contributed the most descriptors of function and the highest number of third round contributions for function. The substance of these descriptors indicate that teachers see planning as an extremely valuable tool for dealing with complexity, stress, time constraints, and personal fulfillment (Table 24). The omission of reference to the students in their care may support the literature in its supposition that these skills are not reaching the students and that young people may require more modeling and explicit instruction from teachers about their own processes in planning, than is currently the norm.

The greatest differential in survey statement results were from the Business cell, as displayed in Table 1. The strongest difference was for the statement, *making or constructing a plan is part of the process*, rated the lowest score in the results (A-91%, B-47%, L-85%, T-94%), perhaps confirming that the members of the this cell associate less with the formal aspects of plan construction than with the more action-oriented facets of planning. The second greatest discrepancy was for the statement, *the context is important in*

planning. (A-93%, B-69%, L-84%, T-90%). It is plausible that planning is so pervasive in the lives of the members of the Business cell, that they perceive planning to apply in all 'in all facets of life' and 'to accomplish most activities on a daily basis' (Table 22). The Business cell also showed the greatest disagreement in regard to mental representation (Table 6) of all cells. Perceiving planning as a procedural activity, there seems less of an accord about the conceptual basis of planning, than in the other groups. The membership was clearly divided about the possibility that planning could be unconscious.

That many of these aspects of planning seem self-evident, is congruent with the Business cell supposition that planning is a 'natural' process. Their concerns, as expressed in the emerging themes, support the idea of planning as a relatively stable personality trait, as does Das et. al. (1995). One respondent maintains that "those who can't plan are those who are retrained by methodology/process etc." (R1-B7). As suggested previously, planning may appear to come easily (i.e., naturally) to these individuals, due to a personal predisposition for the type of planning-intensive practices which often constitute successful entrepreneurial activities.

When the results of the survey and the Delphi Method are compared with the literature on planning, it is revealed that the content of the data is reflective of the latest writings on planning, as indicated in the analyses in chapters four and five. The issues raised were often also of controversy in the literature. For example, some of the issues brought forward for debate, such as whether planning may be natural or unconscious are unresolvable in light of our present knowledge of the operations of the mind. The literature on the development of self-regulation suggests that planning begins as an automatic, non-conscious process, maturing into a deliberate, conscious one as the representational component expands (De Lisi, 1987). Pea's (1982) definition explicitly states that planning consists of consciously preconceiving a sequence of actions for goal attainment. Conversely, Flavell (1979) asserts that metacognitive knowledge influences problem solving behavior whether intentionally or unintentionally activated without it necessarily entering consciousness. Greeno and Riley (1987) concur that "metacognitive knowledge does not necessarily include explicit representation of general principles, nor is it necessarily accompanied by any self-conscious processes that would constitute awareness of the

cognitive organization that it determines” (p.296). Das et al. (1995) conclude that planning is both conscious and unconscious, influencing behavior implicitly, without awareness. They suggest that during the solving of complex problems or deliberation, much of the planning remains at the unconscious level. The contentiousness of such issues resonate with the literature and are of interest to many.

The Business cell’s final reflective comments on the Delphi Method, indicated that some in the group had particular difficulty relating to the research process as experienced. It may be inferred that for them planning is a highly dynamic activity, responsive to interactive relationships to the environment, rather than a static, paper-and-pencil ‘academic’ exercise. Two comments reveal a sense of detachment from the Delphi investigation:

The series of statements seems very non-controversial to me. I wonder what a consensus on such statements will really ... from the standpoint of advancing our knowledge of how planning works. I wonder why people would oppose or disagree with any of the statements. They all avoid the crux of the problem, which is that planning is about choice amongst competing, mutually exclusive possibilities. This is implied by some of the statements but does not come through very strongly. Only the simplest of plans merely involves putting tasks into sequence without choice as to which are the most essential” (R1- B3); “Can’t offer much comment on this round I’m afraid except that as the analysis becomes too deep, I find it less and less relevant for the type of planning I normally experience (R3- B2).

Despite this skepticism, a positive indicator of the internal validity of the methodology may be found in the unusually high response rates from the participants; 100% for R1, R2, and 95% for R3. An additional validation is imbedded within the methodology itself, in the opportunity given to respondents for comment on the process. The degree of participant satisfaction with the results is an important indicator of the validity of the process, as expressed in unsolicited remarks, such as: “With the one exception alone, I am prepared to ‘buy into’ most everything else here with respect to planning. In fact, the definition and components sections are so complete, I am at a loss as to what I can add in the way of comments - a rarity for me!” (R2-B2), “No comment, excellent - impressed” (R2-B1), “excellent results, as you can see, I agree with all the statements and can think of nothing to add, congratulations!” (R3-T11). Another advantage of the Delphi Method, is in the stimulation for learning possible for the participants. Dorner (1985) reports on several

experiments in which the quality of thinking of experimental subjects showed a distinct and statistically significant improvement when asked to critically analyze their own way of thinking from time to time. This is well expressed in such comments as: "I did find it interesting to watch the ideas coalesce as they have" (R3-L4) and "I really enjoyed taking part in your research and learned much by doing it" (R3-A9).

In summary, the finding from the present study reveal a striking convergence of the fundamental aspects of the perceptions of the sampled domain-related groups of experts regarding the nature and function of planning. There are areas of dissimilarity across cells, which portray potential domain-related discrepancies. These nuances are both interesting and indicative of individual differences in mental representations of planning. The methodology has been successful in uncovering these areas of similarity and dissimilarity within the data collected. It is hoped that this information will be helpful in furthering current understanding of what planning is and how it is used in various contexts.

Limitations of the Present Study

It is evident that error detection, plan execution, plan recovery, etc. may be triggered by stimuli or processes of which the individual is not necessarily conscious or able to verbalize. This puts a distinct caveat on the data gathered in the present study. The contributions of the respondents may not include elements of their awareness because the stimuli of the data collection process itself was not sufficient to render such knowledge to the surface. Respondents, even those with domain expertise, may also not have facility with written language to fully express their views. For example, for more empirical individuals, much of their knowledge of planning might only be brought to the fore in specific instances. For more abstract individuals, their declarative knowledge might exceed their procedural knowledge. Highly intuitive individuals might possess considerable conditional knowledge which is not available for structuring as declarative knowledge. Multiplicity of goals and complexity of situations might elicit rules for planning not evident in the more contemplative setting of the data response context. Different aspects of planning may have

different triggering thresholds, contingent upon individual differences. The constraints to the gathering of data implied by these conditions are regrettable but existent. These subtle distinctions, although potentially relevant are not addressed in this research.

The constraints placed on any piece of research dictate the possibility of adequately covering but a focused view on any subject. The present study is limited by both sample size and methodology. The data is entirely reliant upon the responses of the individuals in the survey and the Delphi rounds. The Delphi Methodology does allow for reflective comment. The Delphi Method has utility in reducing, although never eliminating researcher effects. The format itself may be self-limiting, prohibiting or inhibiting useful responses which do not apparently 'fit the format'. It is possible that some confirmations assumed by the researcher may be responses by omission, or a failing to respond due to lack of interest or perceived lack of relevance on the part of the respondent.

An additional limitation of the study was the failure to produce an acceptable 'model' of the nature of planning from the graphical representation presented to the respondents. This would have been an important contribution in itself. However, it was felt that the use of a graphical representation for both sections of nature and function of planning was beneficial in producing excellent commentary. In support of Alexander and Dochy (1995), the findings suggest that the graphics did provide an important catalyst for explication of understanding that may otherwise have gone unrecorded.

One omission of the research design was highlighted by a participant in his comment; "I wonder if it would be revealing to rank order the subclaims under each of the 8 functions to get an idea of how important it is" (R3-A8). The study itself would have been strengthened also by a request to respondents to rank order the ten function statements themselves.

The high correspondence of agreement of the Lay cell with the three more specific domain-related cells may, at first glance, be in part attributed to the exceptionally high (highest national) per capita educational level of the sampled population. This group composition corresponded to roughly one third of the larger sample (N=30) of the telephone survey. This may place some reserve on the generalizability of the Lay cell results. Given another sample, for example in a smaller, less central location, results may vary.

Despite these limitations, it is felt that the goals of the present research have been achieved, providing a solid, empirical, and foundational basis for many of the assumptions currently made about planning, both in the literature and in the instructional environment. From a definitional standpoint, the findings of the study provide a concordance between tacit knowledge, professional knowledge, and cognitive psychology. Considering the definitional confusion articulated in the review of the literature, it is hoped that this type of clarification will be of use to both educators and researchers in the field.

Implications for Education

Some of the literature of the nineties makes a clear call for the development of these higher-order thinking skills as a way to prepare learners for the complexity of the demands imposed in the future (Tinzmann, Jones, & Pierce, 1990; Jones & Idol, 1990; Adams, 1991; Collins & Mangieri, 1992; Duffy, 1992; Collins Block, 1993). This is predicated upon substantial evidence that effective planning instruction can be augmented by direct, systematic, school-based instruction. The degree of the gains incurred by the learners is related to the conditions of instruction. As previously mentioned, the literature supports these gains for children of widely varying ability levels (Covington, 1987). Covington (1987) affirms that these conclusions fortify the growing belief that intelligent behavior (i.e., planning, in Binet's terms) can be augmented, regardless of the ability level. The implications for cognitive intervention throughout the life-span are significant for both formal and informal instruction. A focus on skills that can be applied during school, work, and everyday problem solving would facilitate the global goal of equipping learners for maximum transfer. The central purpose of the study was to obtain information about metacognitive knowledge of planning from different perspectives. It is the contention of the researcher that planning has been undervalued as a conduit of instruction in higher order thinking skills. Planning holds promise for the embodiment of many of the metacognitive abilities and processes used by individuals in these varying domains. The current body of findings on this important life skill should be of interest to all individuals in supervision over

others, whether teacher-student, parent-child, boss-employee etc.

Friedman, Scholnick, and Cocking (1987) propose three candidates for changes in planning proficiency: cognitive maturity, increased familiarity within a given domain, and enhanced motivation for augmenting the cognitive skills required in planning. They highlight a 'great gap' in the literature which fails to provide evidence that proficiency in representation, knowledge acquisition, and reasoning are sufficient conditions to produce expert planning. They even suggest that such skill may not even be adequate to rally the cognitive resources necessary for planning. In order to encourage another's planfulness, it is helpful to know if the more novel planner has adequate knowledge for the task at hand, if the individual possesses an adequate representation of the problem situation, or if assistance is required to enhance the self-monitoring process. Kreitler and Kreitler (1987) emphasize the important link between what they term as metapanning knowledge (or conditional knowledge, e.g., when, why) and beliefs in the value of planning as crucial to planning success. Function statement 1 (Planning is used to enhance problem solving or goal-directed activity), FS8 (Planning is used to respond to most everyday situations), and FS9 (Planning is used to enhance one's life) provide clear and specific justification for the benefits of planning. Teachers need to be aware that student harbor a natural resistance to standing back from their work to abstract an overall blueprint for organization. They need to understand their central role in providing supportive structures for learning, implementing, and transferring these skills.

Expenditure of cognitive effort is required for planning, on the hope that it will be justified by the end result. Not all academic tasks demand such labor. Many rely merely on routinized procedures. There are however, a multitude of activities which do. Students are obliged to choose topics, research content, structure exposés, organize and evaluate materials, and learn large quantities of subject-specific knowledge. Independent projects are assigned in part to promote practice at coordinating these functions through careful planning. Research has established planning as an important skill for dealing with various types of independent and complex tasks, in academic, professional, and personal endeavors. Research has also demonstrated that young people do not apply their knowledge of planning processes to their activities. It becomes clear that there is inadequate transfer of

classroom instruction to situations requiring planning, both in and out of school. The need exists for better instruction, support, and practice in the metacognitive thinking skills which address these deficiencies. In her research on planning in adolescence, Lawrence (1991) determines that although high school students tend not to plan, she sees possibilities for improvement. Most adults and students agreed that 14 and 15 year olds can plan, even if they chose not to. Boys were less optimistic than girls and adults when reporting whether they or their peers actually do plan. In a study of errand-running, boys who spontaneously took time to evaluate a first run, were more efficient on the second trial. Lawrence concludes that these findings support the significance of self-control mechanisms, such as self-awareness, for the formation of new plans.

Nickerson et al. (1985) point out two immediate implications of metacognitive skills training. Firstly, there is a substantial body of research supporting the findings that metacognitive skills are more likely to spontaneously transfer than other skills training. Secondly, transfer itself may be viewed as a metacognitive skill available for direct instruction. Rogoff, Gauvain, and Gardner (1987) maintain that when planning tasks for children are set by someone else, young children often experience difficulty in determining the nature of the problem and holding focus on the goal. Friedman, Scholnick, and Cocking (1987) reiterate that it is still not clear whether planning is a single or composite process having general or context-specific application. Resolutions of these questions will influence the trajectory of planning models and the resultant instructional designs.

There exists a real need for 'planning instructors'. When a cognitive deficit is identified, remediation should be available for learning the components of planning, in a clear and practiced fashion. Instruction and practice have proven to have an impact on the development of metacognitive skills such as planning (Friedman, Scholnick, & Cocking, 1987). As one respondent wrote "I believe planning strategies can and should be taught" (R1-A4). The literature proposes various methodologies for enhancing declarative, procedural, and conditional knowledge about planning. As Vygotsky (1978) advocates, teachers first need to model good planning practices by exhibiting metapanning and procedural planning skills explicitly for students and by being well-organized and verbal in highlighting these abilities. For example, in their discussion of teaching thinking

dispositions. Tishman, Jay, and Perkins (1993) recommend that sensitivity to planful and strategic thinking can be developed by such verbal teacher modeling: "As I was working on such and such a project, I realized my thinking was disorganized, so I made a plan. First, I made a list of my goals" (p.148). Teachers must provide tailored challenges for students with appropriate instructional aids to allow the students to function proficiently within his/her zone of proximal development. Planning aids have been found to make a substantial difference in performance (Chalmers & Lawrence, 1993). Although problem identification and planning operations are foundational skills requiring careful instruction, the practice of planning must be contextualized for students. Planning strategies must of necessity also be adapted to address individual learning styles (Lachman and Burack, 1993). Research (e.g., Brown, 1987) informs us that good planners: make numerous metaplanes and executive decisions; exercise deliberate control over their planning processes; utilize world knowledge; are more flexible than poor planners; frequently shift focus among varying levels of abstraction; make more high level abstract decisions; understand the importance of global planning; develop a prototypical procedure for action. In an ideal situation, teachers provide the scaffolding for students to practice self-regulation through the acquisition of personal planning skills. These teachers model such behavior and provide continual prompts for learners to manifest and explore these emerging abilities.

The present study provides well-explicated data to help students develop their declarative and conditional understanding of both the nature and the function of planning. The definitions of planning, with well-elaborated component terms from four different domains could generate fruitful, in-depth discussion of what is meant by planning and how it is used in the real world. In this fashion, the mental representations of planning held by students can be developed and made more conscious. As the literature suggests, those who plan augment their sense of control over their own operations and over their environmental contingencies. This enhances an interior locus-of-control, which in turn increases motivation, both for decisions to plan and for sustaining effort during planning. Function statement 5 (Planning is used to increase control over the planner's operations or to deal with uncertainty) and FS6 (Planning is used to increase control over situations) provide unambiguous confirmation of the value of planning on an individual's sense of control. At a

time when many young people do not have a strong sense of personal control, this focus may have a positive and reverberating effect.

When planning is considered to involve other people, learning must include social mores and expectations for successful interaction, how to incorporate others into one's planning, how to accept feedback gracefully for the benefit of improved plans and their implementation, and the implicit expectations of planning appropriateness in various social contexts (Goodnow, 1987). Function statement 4 (Planning is used to coordinate activities with people) gives numerous examples of the utility of planning in social situations. In their numerous studies of collaborative planning, Rogoff and colleagues have examined how guidance for or from others has benefited or changed planning performance. They found that children learn how to plan more effectively when guided by either adults or expert peers than from unskilled peers (Radziszewska & Rogoff, 1991). Gauvain (1992) and Gauvain and Rogoff (1989) were able to show how children benefit by interactively assuming a measure of responsibility for task completion during practice. Rogoff (1991) concludes that appropriate guided participation or apprenticeship in intellectual and everyday problem solving socializes children's planning strategies.

Smith (in press) proposes parameters for a social-interactive approach to planning process which may have efficacy for learners of all ages. She terms these planning processes (p. 28) as *activities, strategies, and dimensions of interpersonal relationships* associated with: goal management (e.g., goal[s] and partner[s] selection, priority and agenda setting, conflict negotiation, monitoring); time management (e.g., time allocation and investment, and timing of actions); resource management (allocation of effort, skill, information, and materials (property, money); action management (scheduling, coordination, and feedback); and people and relationship management (tactics and style of interaction). Drawing upon research from organizational and applied settings, Smith specifies time and the development of mutual understanding as integral components of successful planning, as well as goal, time, and action management (i.e., setting clear agendas and schedules but flexible deadlines), and interaction management (fostering understanding, mutual consideration, and reconciliation of conflicting preferences). She also identifies information management and responsibility for control over time as important aspects of planning strategies in large

groups. Provisions must also be made to accommodate various arrangements of social interactions (subgroup composition) for the duration of planning and implementation.

The constraints on the time, resources, and depth of instruction available for learners throughout the life-span vary considerably. The duration of formal education is fraught with instructional demands. There may be significant efficacy in focusing instruction on planning, as it entails a wide range of the metacognitive processes used for the effective problem solving throughout the life-span (goal definition, plan construction, execution, and monitoring, etc.). Pea (1982) suggested a dozen years ago that the "need for instructional programs that guide the development of planning activities is particularly acute, not only for school contexts, but also for everyday problem-solving activities involving career, financial, educational, and family planning" (p.14) and that knowledge of "developmental processes could also be integrated into school curricula and adult education programs that are devoted to promoting planning development" (p.24). It is maintained by the author that this need is still as important and as urgent in the nineties as it was then.

Further Research Considerations

The efficacy of the three-pronged methodology for study of metacognitive processes, lends itself to the suggestion that a similar approach could be used to explore other hard to capture higher-order thinking processes. In addition, a duplicate study with level of education as a variable, i.e., comparing graduates, undergraduates and high school students with results of present study or a comparison of Lay results from the present study with lay responses from numerous geographic and socio-economic locations, might help to refine knowledge on planning perceptions. Similarly, a focus-group approach of perceptions on planning may yield interesting findings through the added benefit of the interactive, face-to-face discussion.

It would be interesting to analyze procedural knowledge through a comparison of what people think they do during planning and what they actually do when presented with a problem to solve. In addition, the results on the function of planning could provide a starting point for a factor analysis of other domain-related function descriptors, with a large

population, (i.e., $n = 300$), for comparison with the findings of the present study. This elaboration could be valuable in constructing tasks for further research, or examples for application to instructional situations. Also, the considerable interest in the amount of planning appropriate in given contexts, expressed in the discussion on FS7 (Planning is used to substitute for action), suggests that further research is warranted in this area. Initiating the second highest number of words in the study, this theme appears to have a depth of opinion, which may contribute to understanding of this type of conditional knowledge. The literature is explicit in the benefits of knowing appropriate degrees of planning required for different problem solving situations.

In Conclusion

A possible advantage to enlisting various approaches to the study of cognitive processes may be to identify fundamental, more general components (Hoc, 1988). The cognitive-developmental framework does permit broader incorporation of relevant contributions from cognitive sciences, social cognition, psychology, and education. Studies crossing the research paradigms are mostly of the descriptive type, an essential precursor to the future explanatory phase (Hoc, 1988). The review of the literature highlights the progressive movement within these fields toward a conceptually ecumenical integration, promoting a more holistic, psycho-social perspective on cognitive processes. This tendency also includes the challenging struggle to orchestrate previously viewed distinct processes into a more comprehensive understanding. One consequence of this cooperation of disciplines is a greater interdependency upon well-defined terms. One of the most persistent complaints in the literature on cognitive processes concerns the confusion surrounding the definition of many key concepts and terms. The present research has embraced this challenge and successfully rendered the concept, vocabulary, and function of planning as transparent as possible. By examining the definitions and components of planning across domains, similarities and dissimilarities among perceptions have been revealed which might have otherwise been obscured by semantics. The present study confirms that there is a common vocabulary and mental representation of the nature and function of planning

among successful planners to establish its efficacy as an umbrella process for the teaching of metacognitive skills across the life-span. It is the hope of the researcher that the ability to reach consensus on four domain specific definitions of planning will give fodder to those in the field to renew efforts to simplify these debates and to render them more accountable to how others in different domains perceive planning and its uses. Given the importance of planning, future research on these processes will no doubt flourish.

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APPENDICES

Appendix A: Telephone Survey Introduction

My name is Margaret Herbert. I am doing research for a Ph.D. in Education at the University of Ottawa. I was wondering if you could spare me 10-15 minutes to answer three questions?

Your phone number has been randomly selected from the Ottawa-Carleton telephone book to reach a representative sample of the general public. Your responses are entirely anonymous, as I don't even know your name. I would however like to know your occupation to see if there are any similarities of views related to occupation.

I am researching one aspect of problem solving ... the aspect of planning. I would like you to answer three questions about your understanding of planning.

- Qu. #1 What is planning?
Qu. #2 How do you do it?
Qu. #3 Where and when is it used?

Thank you very much for your responses. I am appreciative of your time and your views.

Would you be interested in participating in a process of three rounds of written comments to simple statements sent to you over a 2-4 month period? Each round would probably entail between 30-60 minutes of your time. I need your name address and phone number to send you the written statements. These would probably come to you in December or January.

Appendix B: Letter of Consent and Confidentiality**LETTER OF CONSENT**

I, the undersigned, agree to participate in research conducted by Margaret Herbert, Ph.D. candidate, under the auspices of the University of Ottawa, Faculty of Education. The purpose of the research is to gain insight into the understanding various groups of individuals have of planning; more specifically, the differences in knowledge structures of groups of experts as to the nature and function of the cognitive process of planning.

I understand that the my participation in this research will consist of three different rounds of written statements sent to me for my reflection and comment; each round taking approximately 30-60 minutes to thoughtfully complete. I understand that I am free to withdraw from the research at any time. I understand that the comments I shall make will be held in confidence and that no specific reference will be made to my individual input, without my express permission. I grant my permission to Margaret Herbert to use anonymous extracts of my comments in written form.

Participant:

Date:

Researcher:

Date:

Appendix C: Survey Results

STATEMENTS AND EXAMPLES PROVIDED BY THE TELEPHONE SURVEY *		
Statement	%	Example
Planning is a life skill.	70%	"It could be used in every occasion during the day; every occasion in life"
Planning is a mental or thinking activity.	40%	"its when you organize your ideas"
Planning is a way of preparing for the future.	34%	"its looking into the future"
Planning is an organizational tool.	34%	"to organize in advance"
Making or constructing a plan is a part of the process.	34%	"put together a rational plan"
Planning is goal-directed.	44%	"you have a goal and you want to get to the goal"
To plan, one must set the goals[s].	40%	"the best way is to sit down and figure out what my goal is going to be"
To plan one selects strategies.	63%	"I would sit down and make a list of everything that I think would be involved"
Planning predetermines a course of action	60%	"You set out steps that you are going to take to reach your objective"
The context is important in planning"	57%	" It depends on what you are planning"
Planning anticipates or responds to activities.	50%	"It is figuring out what you are going to do in any eventuality"
Planning involves interacting with other people.	44%	"A plan generally is something that one person has and then they get other people ... to go along with it"
One requires motivation to plan.	40%	"there is a desire to overcome it [the problem]"
Learning is a part of effective planning.	40%	"...research each goal"
Time is a factor in planning.	34%	"I put things on my calendar, what I have due"

* percentages have been rounded off where applicable

Appendix D: List of Participants in Academic Cell for Delphi Inquiry

Dr. John G. Borkowski
University of Notre Dame
Notre Dame, Indiana

Dr. Cathy Collins Block
Texas Christian University
Fort Worth, Texas

Dr. P. Paul Heppner
University of Missouri-Columbia
Columbia, Missouri

Dr. Beau-Fly Jones
North Central Regional Educational Laboratory
Oak Brook, Illinois

Dr. Jeanette Lawrence
Center for the Study of Higher Education
University of Melbourne
Parkville, Victoria, Australia

Dr. Michael Pressley
School of Education-SUNY_A
Albany

Dr. George Rebok
School of Hygiene and Public Health
Department of Mental Hygiene
Johns Hopkins University
Baltimore, Maryland

Dr. Jacqui Smith
Max Planck Institute for Human Dev. & Education
Berlin, Germany

Dr. Richard K Wagner
Florida State University
Tallahassee

Appendix E: Sample Letter to Academic Cell

October 14, 1993

Dr. Michael Pressley,
Ed. Psychology & Statistics,
School of Education SUNY A,
1400 Washington Avenue,
Albany, NY 12722

Dear Dr. Pressley,

It was nice to see you at the APA. I hope that your move went well and that you are beginning to feel settled. There are always so many details entailed in making such a transition.

Please find enclosed a brief outline of my study, research objectives, methodology and implications for education. I will be sending participant panelists a summary of results following completion of the study. Given the caliber of panelists, I hope that you enjoy being part of the Delphi Method inquiry and am very appreciative of your participation. Your expertise will add a great deal to my findings. Dr. Herbert Simon, with whom my thesis advisor, Dr. Jean-Paul Dionne, has worked at Carnegie-Mellon, has agreed to read and comment on the research.

The initial survey is underway and will provide the substance for the first Delphi Round, to commence hopefully by the end of the term. The time requirements for participation are intended to be kept to a minimum (approx. 60 minutes per round). I will write to you soon. If you have any questions or comments I would be pleased to answer them. All the best.

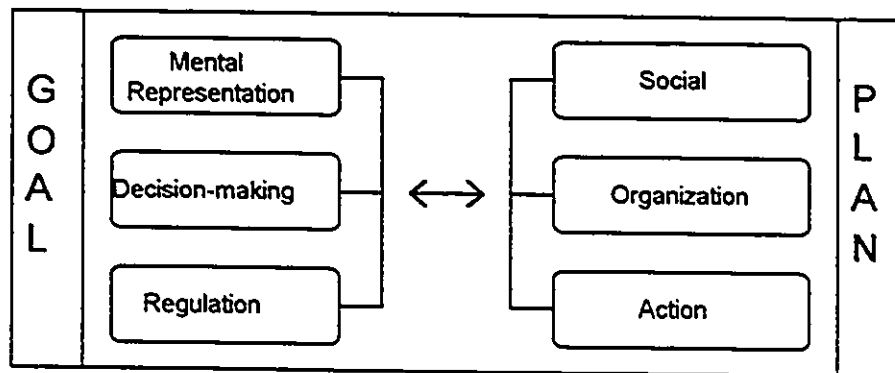
Sincerely,

Margaret E. Herbert
Phone 613-523-7569
Fax 613-564-9098

Appendix F: Results of Nature of Planning Round 3 for Lay Cell

Instructions: You will find a graphical representation and revised definition of the *Nature of Planning* which incorporates most of the feedback from your group. Please read pages 1 and 2, and EDIT by making note on the paper of important areas of confirmation and contention to various points.

L2, L3, L5 no comment



Definition of Planning

- L4 Excellent
- L10 excellent definition
- L11 well put together; summarized perfectly

Planning is a conscious or unconscious* decision-making process, whereby an

L7 * 'or unconscious' ?

individual or group of individuals systematically organize a sequence of steps toward the achievement of a desired goal or objective. Depending on the circumstances, the process, steps, and goals may vary in complexity, scope, duration (short /long term), be individual or social, formal or informal. Planning involves analysis, choice, and coordination of goals, priorities, options, and courses of action* with regard to human and material resources and

L7 * 'courses of action' -I like this definition best of all. However, the entire paragraph is a very clear expansion.

other factors, including time. Goals and plans are continually evaluated and adjusted to account for or respond to feedback and unforeseen events. Often a personal, sometimes a consultative, collaborative process, planning is an essential element * of

L10 essential element

control over personal and professional objectives at all levels.

Component:	[Definition of Components] Comments from Participants Relating to Components
Goal:	[the end toward which effort is directed] may be short-term or long term formal or informal, individual or social, simple or complex
Mental Representation:	[a psychological organization of components relating to a given environment*]
L7	* substitute 'subject' for 'environment?' conscious or unconscious* ** +process
L4	* 'unconscious' unsure ...I suppose
L7	** 'unconscious' I can't make up my mind about this. If one is not aware, is it planning? Perhaps it is, as in driving, the result of lots of previous training, so that it is automatic
L12	<u>unconscious</u> - I'm not sure planning can really be unconscious! anticipates the future includes individual or social, formal or informal structure varies in scope and complexity
Decision-making:	[a determination ** arrived at after consideration] decision making process*
L7	* omit
L12	this would be the <u>decision</u> (a noun) decision making is an action or process * analysis, choice, and coordination of goals, priorities, options, and courses of action with regard to human & material resources & other factors
L7	* begin with 'a process of ...'
Regulation *:	[to monitor *, control, or guide a process]
L12	"regulation" noun (regulate vs 'to monitor' verb the goals & plans are continually evaluated and adjusted to account for or respond to feedback and unforeseen events

Social: [the interaction of an individual with other people]
may* be a consultative, collaborative process

L7 * substitute 'should' for 'may'

Organization: ** [something * arranged in a pattern or structure]

L4 * 'something' circled; 'systematic organization' below underlined and bracketed -
too weak ...normally hierarchical

** what about the organization as an entity and as a tool / structured
interpersonal relationships?

systematic organization of a sequence of steps toward the
achievement of a desired goal or objective *

L7 * is this the same as the one below?

the coordination of goals, priorities, options with regard to
human & material resources and other factors, including
time

an essential element of control over personal and professional
objectives at all levels

Action: [the manner or method of performing*] **

L4 * performing - weak - push or pull - cause and effect - goal is ultimately
achieved through series of actions

L12 ** ?

Arrow: [an indicator of interaction]
feedback, unforeseen events

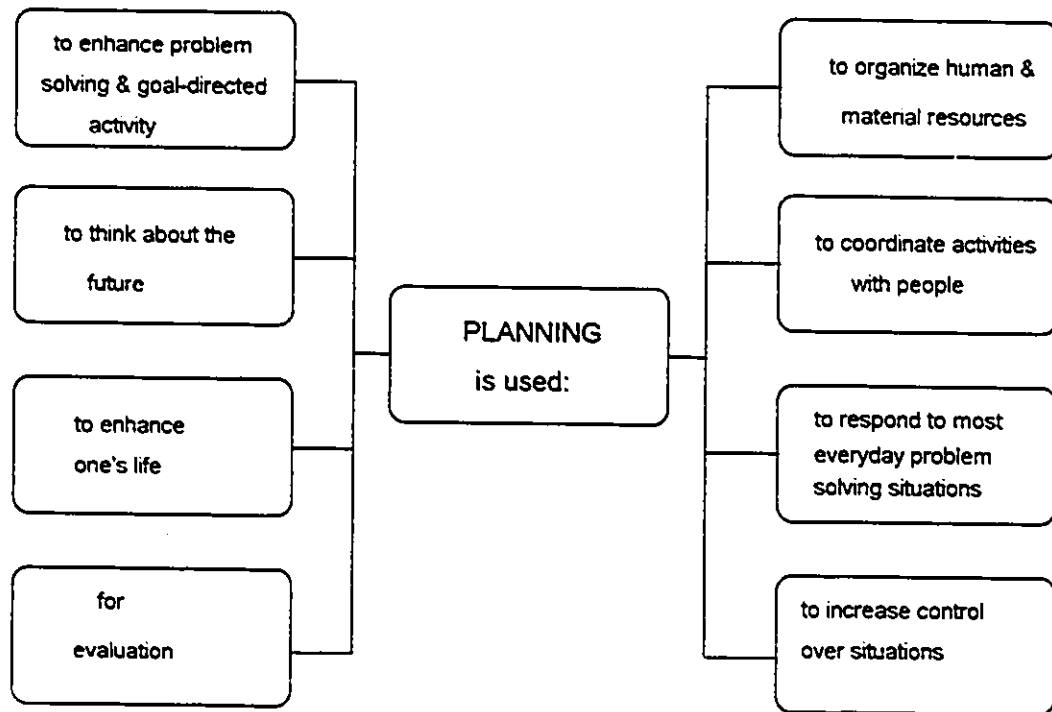
Plan: [a blueprint for action]
may be short-term or long term, simple or complex, formal or
informal, individual or social

Additional comments:

L7 I find it interesting that both GOAL and PLAN have the same description
(which I think is accurate) Whoops - second thought - these are just adjectives
aren't they? which of course applies to both

Appendix G: Results of Function of Planning Round 3 for Business Cell

Instructions: Please read over the revised *Function of Planning* and make notations on the page to indicate agreement or disagreement with the statements. [Items in italics are additions or alterations from the last Round]



B1	Agreement on everything except #5 (see #5)
B9	double headed arrow going from bottom left [for evaluation] to the center [planning is used]

1. Planning is used to enhance problem solving or goal-directed activity.
Planning is used to organize human and material resources.
2. Planning is used to think about the future.* **

B3 * read: ...the future and also about current risks

B7 ** #3 circled [see further comment]

Planning is used to coordinate activities with people.

Planning is used to increase control over situations *and achieve greater comfort with uncertainty*. * ** + ++ ^

- | | |
|------|---|
| B3 | * read '...with uncertainty, and avoid errors and risks |
| B10 | ** I don't know if planning lets us achieve greater comfort ...For myself, planning is how I change uncertainty to hopefully 'certainty' - to get desired results. A plan does make individuals 'feel better' or more confident because they feel they are <u>dealing</u> with their situation (certainty will depend on the <u>quality</u> of the plan.) |
| B12? | + section in italics crossed out |
| B7 | ++ 'comfort with uncertainty' circled [see further comment] |
| B5 | ^ re part in italics: This is a by-product of that control. |

3. Planning is used to respond to most everyday life problem solving situations.
Planning is used to enhance one's life.
4. Planning is used for evaluation. * ** +

- | | |
|------|---|
| B10 | * I would say <u>evaluation</u> is a part of planning |
| B12? | ** could be |
| B9 | + evaluation is a part of all planning |

1. Planning is used to enhance problem solving or goal-directed activity.

to break down the problem *or challenge* /goal into its constituent parts *and then reassemble - it in new ways* * ** + ^ ^^

- | | |
|-----|--|
| B6 | * 'to breakparts' - agree; 'and then reassembleways' - disagree |
| B8 | ** maybe |
| B10 | + <u>problem solving</u> not planning |
| B7 | ++ 'resembled' circled |
| B5 | ^ I don't believe that goal can be changed. The way to that goal can be changed. |
| B2 | ^^ not necessarily |

to achieve an objective in the most appropriate and efficient manner *
to make things happen * **

- | | |
|-----|---|
| B10 | * that are conducive to the situation |
| B4 | ** (map a course of how you want things to happen) 'Action' makes things happen |

- | | |
|----|--------------------------------|
| B3 | Add: to avoid errors and risks |
|----|--------------------------------|

2. Planning is used to organize human and material resources.*

B10 * People function better if they feel that they are respected and that their opinion is heard and therefore they are receptive to others' opinions and goals. Open communication leads to synthesis of ideas, creativity, and more motivated people who then understand objectives and plans of the entire team/upper-management and therefore will see how they can contribute to make things work successfully

to map out a strategy on how to achieve objectives, to optimize the resources (money, man-power, time) available
to coordinate a complex sequence of events and activities
to prioritize activities * ** + ++

B3 * read: to arrange activities according to priority
B8 ** yes definitely,, to identify the most important/critical factors, which need to be addressed first prior to the less important issues
B10 + it can be if the 'plan' is organizing human activity on a large scale
B12? ++ for me definitely

B10 Add: Planning schedules, events, activities

3. Planning is used to think about the future.* ** +

B8 * A plan is created that will allow the individual or organization attain pre-determined goals in the most efficient manner (time/resources) possible
B7 ** I'm not comfortable with this concept as 'planning'. I see a difference in planning vs forecasting
B5 + If you don't have a road-map' not only do you not know where you are, but where you are going!

to help increase the odds that forecasts are borne out in reality *

B10 * sets up a plan of action that hopefully heads to desired results, but not necessarily so.

to effectively transact daily responsibilities, using a daily, weekly, monthly and annual planner (each of these bears different connotations from daily meetings to annual quantitative or qualitative goals)

to avoid mishaps in the future* ** + ++

B3 * to avoid errors, risks, and mishaps
B10 ** to a certain extent/ Mishaps can happen even if one does plan, but planning, especially detailed, specific agendas/plans can achieve desired results much more efficiently than people who are 'loose cannons'
B12? + read" may help to avoid
B4 ++ read: to help avoid (minimize mishaps)

4. Planning is used to coordinate activities with people.

to involve *and obtain agreement from* * **a number of different stakeholders,
all of whom must be engaged at the appropriate points +

- B10 * or at least some kind of general consensus
B7 ** I don't see planning as a means to obtain agreement
B2 + is there some overlap with the last item in #4?

to delegate responsibilities

to involve *and motivate* ** a team (employees or family etc.) *

- B10 * a plan that involves affected people leads to motivated people who can understand objective and are therefore more excited to get there. But I do not feel that the function of planning means to motivate a team. I do feel that involvement and understanding of the plan and in the planning process can help obtain results because parties involved need to know 'why', and if they are 'talked to' and not 'talked with' they may hinder the success of plan.
B7 ** previous comments apply

to create 'buy-in' ** *from all levels so that it is everyone's plan* *

- B6 * disagree. This may not be achievable
B4 ** create 'buy-in - interesting

Comment: B8 The plan becomes the blueprint that allows all of the individuals involved see the end goal and their responsibility within the plan to achieve the goals; as well as seeing the other team member's responsibilities

5. Planning is used to increase * control over situations.

- B7 * 'used to increase' circled - Planning results in increased control, I don't see it 'used to'

to *mitigate the effects of poor habits and poor discipline* *

- B10 * I would hope that people do not make plans only to solve problems
to *analyze and prioritize the variables*

*to increase personal comfort with conditions of uncertainty * ***

- B1 * disagree- "It could be that I just don't understand what it means, and this is likely the case, but I feel uncomfortable with [this]. There is a good deal of 'uncertainty' that we cannot plan for and to which we have to react or to adapt to the best way possible. It may be that I am looking at this too philosophically but there are matters of health, personal relationships, and unforeseen disasters that cannot be planned for in the traditional sense. It is for this reason that I don't understand the 'increase of personal comfort'"
- B3 ** read: uncertainty and risk

*to know what is required **

- B10 * ?

*to ensure guidelines are followed * ***

- B10 * ...and understood
- B2 ** not every situation has or requires them!

Comment: B8 The plan is the tool that ensures the greatest likelihood of achieving the desired results

6. Planning is used to respond to most everyday life problem solving situations.

in all facets of life

*to accomplish most activities on a daily basis * ** +*

- B8 * most activities on a daily basis - This plan is not formal - most people would plan daily but perhaps not recognize the fact that they are engaged in a planning activity
- B10 ** sure, it could be an extremely simple plan on a daily basis, but I would say it's a plan
- B2 + yes - albeit in an informal fashion!

7. Planning is used to enhance one's life.

to effectively manage life and work *

- B3 * read: to manage life and work effectively

to make sure the end result is measurable so one can have a sense of success
*and to continually improve * ***

- B10 * if plan is part of a bigger plan. Also, 'continually improve' depends on person or team or situation. I do, many times use the results of a plan (when I reach an objective) to analyze why it's successful and is the end goal optimum level, or can we enhance results further
- B5 ** Yea! Bow to the altar of TQM!!!
- to become more productive

*to determine the best or optimum way to proceed **

B10 * deciding → then formulate a plan

B3 Add: to determine how to avoid errors and prevent bad things from happening

8. Planning is used for evaluation.

to set values and review them *regularly*

to facilitate the assessment of actions, results, failure, and progress

to utilize follow-up for *motivating* *, learning, assessing, *improving*, and future planning

B7 * 'motivation' circled [see previous comments]

Comment:

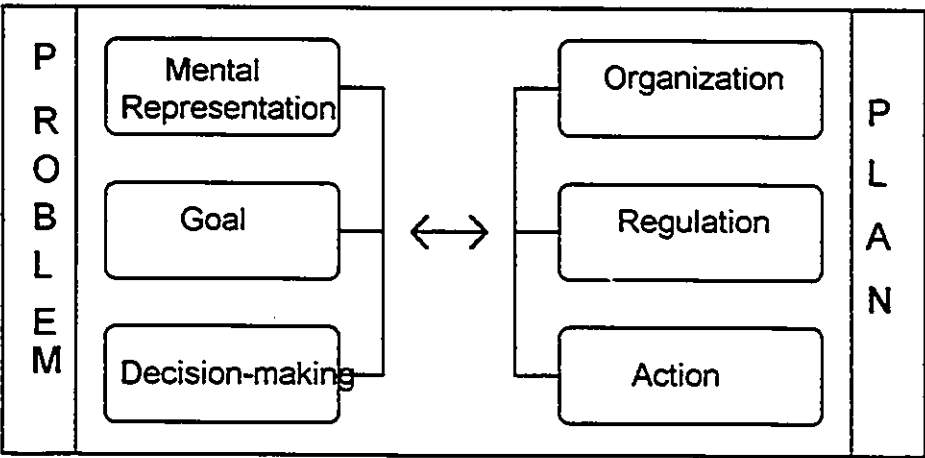
B8 Once a plan is formalized, it will be critiqued on an on-going basis to determine whether the constituent goals are being achieved such that the end goal will be realized. During this process the constituent parts may be re-evaluated i.e.: re-stated in light of more accurate information since the plan was created. This may result as well in the final goal being modified or altered.

B10 If I have stopped making sense - I apologize but the words and phrases all started to mean the same thing. Perhaps its been over-analyzing on my part. I don't know if I know what planning is anymore!!!

Appendix H Round 2 Alternative ‘Models’ and Comments for Academic Cell

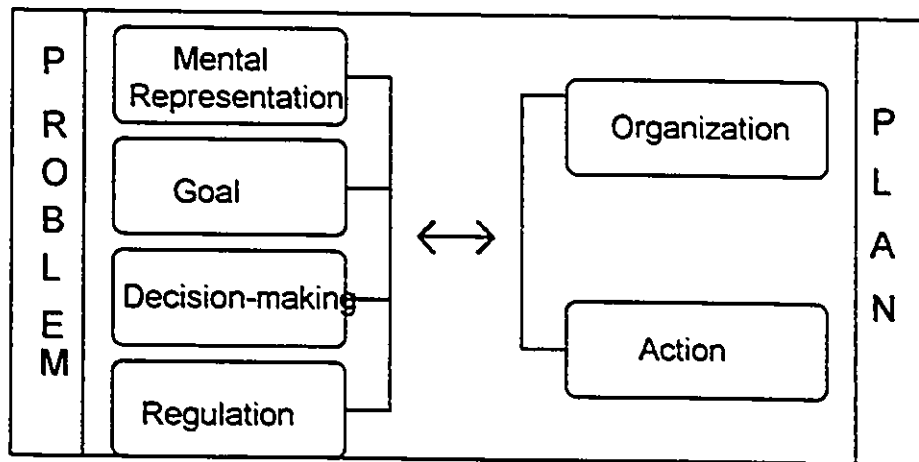
A6	unable to respond to the graphical representations (not sure how, etc.)
A1	The definition of planning should mirror the ‘best’ nature of planning model
A8	I hate them all. I am really not happy with any of the diagrams.
A9	I found it very difficult to choose among/between these different models. All capture important aspects of the planning process but with different emphases. For example, I keep wanting to find a model with mental representation of the plan & mental representation of the goal, each transactionally influencing each other. It would seem to me that all the major components could be represented twice, as part of the goal and as part of the plan (see #5).
A10	I could not really find any things to suggest on this round. You have done a great job of summarizing and ordering the ideas. I prefer diagrams #1 and #4

#1

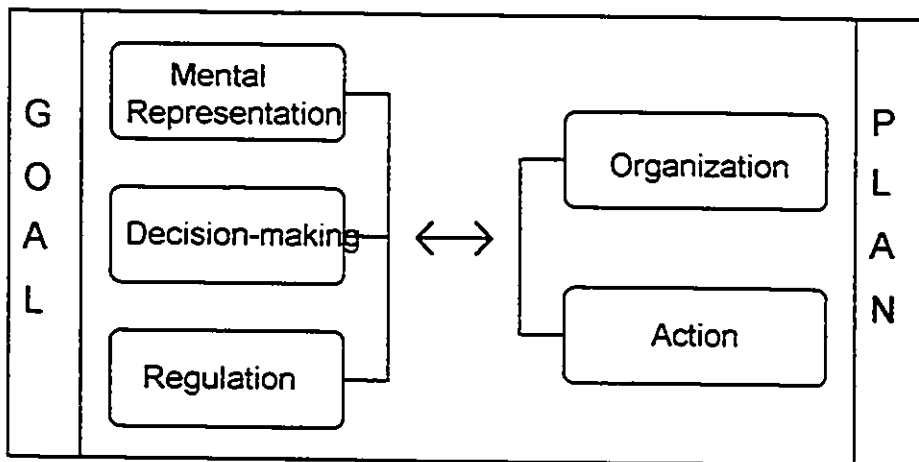


A3	#1 is my second preference with additional arrows (see response)
A4	#1 is my preference (also #4)
A1	preferred models #1 & #4

#2

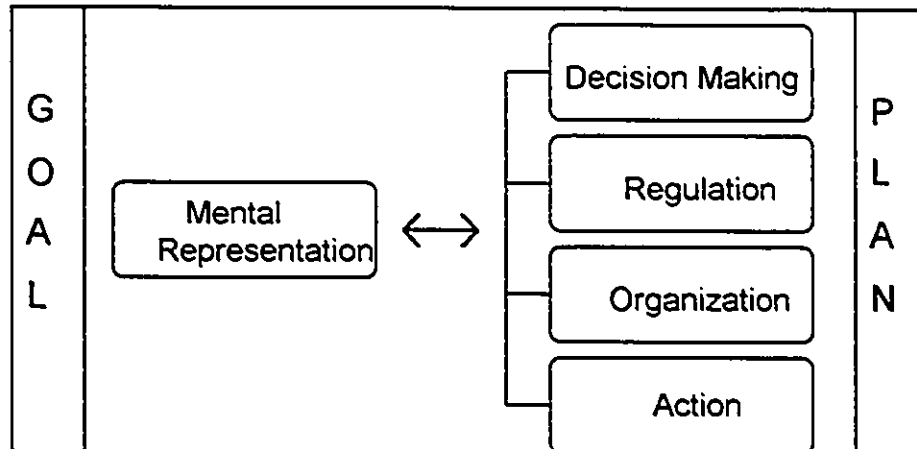


#3



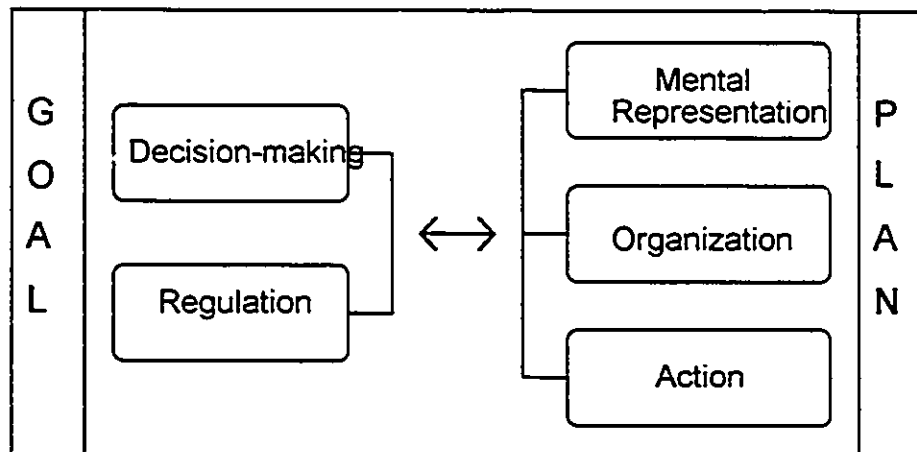
A3 If use this needs extra arrows (see response)

#4



- A3 #4 My preferred diagram because I see representation as the generic and overarching entity. See Plan feeding back (see response)
- A4 #4 is my preference (also #1)
- A1 preferred models #1 & #4 : order of boxes on right read: d-m, organization, regulation, and action (2 & 3 inverted) done on sheet -see his response

#5



- A3 This implies different primacy than #4
- A9 (see original) *Mental Representation* could be also above decision making on the left with a two headed arrow to the mental representation on the right.

Appendix I: Results of Definitional Aspects of Planning

	Aspect	A	B	L	T
Planning is	a dynamic process	F			
	a transactional (iterative) process	F	F		
	a metacognitive process				F
	a decision making process	F	F	F	F
	a conscious process	F	F	F	
	a deliberate process	F			
	a natural process		8/11		
	a logical process		10/11		
	a revisionary process	F	F	F	F
may involve	the unconscious		7/11	6/9	9/10
	intuition				F
	collaboration, consultation			F	F
	engaging others, including affected stakeholders		F		
aimed at	the achievement of a desired goal or objective (goal attainment)	F	F	F	F
	problems or challenges, sub-goals, visions		F		
	control over personal and professional objectives at all levels			F	
	ordering one's life according to personal goals, living standards, and responsibilities				F
	dealing with uncertainty	F			
	anticipating the future (unforeseen events)			F	
is done with regard to	uses of human and material resources			F	F
	influences and constraints of human and material resources				F
	circumstances			F	
	contingencies in the event circumstances shift (unforeseen events)		F	F	
	other factors, including time		F	F	F
	competition, opposition, or adversity		F		
whereby	individuals (often personal) or a group of individuals			F	

	<i>Aspect</i>	A	B	L	T
which involves	options (alternatives)		F	F	
	specification of (a sequence or program of) action(s)	F	F	F	F
	procedures		F		F
	a sequence of steps			F	
	conceptualization				F
	analysis			F	
	coordination of goals			F	
	organization	F	F	F	F
	choice, prioritization		F	F	F
	implementation	F	F		
	monitoring				F
	continual evaluation		F		F
Goals are	conceptualized				F
	identified and responded to		F		
	attained	F			
	prioritized, organized				F
	chosen (selected)		F		F
	elaborated, maintained, monitored	F			
	updated, refined, adjusted, revised	F	F	F	F
	abandoned	F			
Problems or challenges	are identified and responded to		F		
	may be short or long term, complex or simple, conscious or unconscious, formal or informal		F		
Plans, actions procedures, &/or steps	conceptualized				F
	considered		F		
	chosen (selected), prioritized		F		F
	organized				F
	elaborated	F			
	implemented	F			F
	attained, maintained	F			
	coordinated		F		
	monitored	F			F

	<i>Aspect</i>	A	B	L	T
	evaluated		F	F	F
	updated, revised, adjusted, refined, redirected, adapted	F	F	F	F
	abandon	F			
Strategies are	conceptualized				F
	generated	F			
	considered		F		
	selected, chosen	F	F		F
	prioritized				F
	organized	F			F
	coordinated	F			
	adjusted, refined, adapted to environmental contingencies	F			F
The process may	vary in complexity		F	F	
	vary in scope			F	
	vary in duration (short/long term)	F	F	F	
	vary in levels of abstraction	F			
	be individual or social			F	
	be formal or informal		F	F	
Goals may	vary in complexity		F	F	F
	vary in scope			F	
	vary in duration (short/long term)	F	F	F	F
	be individual or social	F		F	F
	be formal or informal		F	F	F
	be flexible or rigid				F
	be specific or abstract	F			
	be conscious or unconscious		F		
Plans may	be short or long term, be simple or complex			F	F
	be flexible or rigid				F
	be formal or informal, be individual or social			F	F
	be routine		F		
	be strategic		F		
	be contingent in the event routine or strategic plans fail		F		
	involve innovation and non-routine creation of change		F		

	<i>Aspect</i>	A	B	L	T
The tasks or steps may	vary in complexity, vary in scope			F	
	vary in levels of abstraction	F			
	vary in duration (short/long term)			F	
	be individual or social, formal or informal			F	
	be routine or repetitive		F		
Planning utilizes	knowledge *	F			F
	all available information which could affect the process		F		
	past experience, new knowledge				F
	feedback			F	F
Planning includes	goal management, time management, resource management, action management, and personal and relationship management	F			

* knowledge (gained from [completed] plans influences the formulation of subsequent plans, goals, mental representations, and actions)

Appendix J: Examples of Procedural Knowledge

1) Explicit planning taxonomies:

(R1-A7) It is a complex and often sustained process that may involve: [1] considering alternative solution paths to a problem (options or means to achieve a goal); [2] examining links between goals, beliefs, and values; [3] selecting various strategies to get to the goal, perhaps considering the problem from different perspectives and assumptions; [4] for very complex problems, considering possibilities for breaking down the goal path into a series of subgoals; [5] mobilizing resources and opportunities available and needed to reach the broad goal and subgoals; [6] sometimes setting benchmarks to measure movement toward goal achievement; [7] providing opportunities for feedback from appropriate sources; [8] anticipating barriers or obstacles and solutions; [9] developing capacities to monitor progress; [10] changing the problem definition or directions if the strategies, resources, and opportunities are not effective in moving toward goal achievement; [11] making revisions and modifications in parts.

(R1-B8) [1] Determine the problem or desired - end result; [2] Break down the problem/goal into its constituent parts; [3] Determine action required (or information) for each step; [4] Commence action on each step sequentially; [5] Revise steps as move through the process; [6] Revise end goal if necessary based on new information.

(R1- L12) [1] By deciding, agreeing upon or accepting the desired end state - where you want to get to; [2] By measuring, agreed upon or accepting the initial state - where you are now, or where you will be when you start to implement the plan; [3] By developing a sequential sequence of steps that lead from the initial state to the end state. Step 3 can include parallel steps - indeed, a valid plan could consist of a large number of steps or actions that all occur at the same time and collectively produce the desired end state - but that is rare. In most situations that involve other people in the planning process step 3 should include analysis and discussion of the steps to achieve agreement [ideally, consensus] on what each step will achieve, what resources are required, when it should start and end, and so on.

(R1- T12) Predetermine what needs to be done; Consider the time ... how much time are you willing to devote to it; Set the steps into motion; Consider Pros & cons/ Alternatives/ Strategies; Action the plan; Evaluate the outcome; Re-evaluate if necessary & re-set 2nd plan.

2) Specific personal planning strategies:

(R1-A4) I plan by envisioning my end result. I allocate time and resources proportionately. The most important aspects and most challenging parts of a goal receive highest allocations. I then write my plan, making daily action-plans to progress toward my goals each day. My mind is open to evidence that my plan could be wrong, needs to be modified, and /or to be consciously improved based on on-going information I gain as the plan is implemented.

(R1- B5) My business planning consists of five year strategic planning which is done with my management team, in an academic environment. It ranges from financial, administrative, and personal bases. Next comes annual planning, which consists of the above but with the added dimension of sales goals for each branch and division within the branches. Monthly planning is again goal directed to ensure that our 30-60-90 day forecasts are borne out in reality! Both annual and monthly planning is done in conjunction with my general manager/ C.A. Weekly and daily planning is a round of meeting planning with prospects, clients, management team and sales people. These components are recorded in a computer program Word Perfect Offices. My personal /home planning is also done in the latter medium with input from family members.

(R1- L7) Ascertain the desired result or goals, then choose the time to start or complete. When I do something on impulse, my planning is developed as I go and is probably not as effective or efficient. If the completion time is the important factor, I generally work backwards, listing the required time for each stage which will give me the time to start. This only works when the specific or similar task has been done before [I guess that's the 'training']. I like doing my planning this way because I'm a procrastinator and seen to work efficiently when under pressure.

(R1-T2I) generally begin by mentally 'ordering' the problem or issue in my mind; that is, I try to pull the core problem or issue apart from the attendant, but secondary issues so that I can focus on the part that needs to be planned. This sometimes takes me quite some time and I find that walking the dog or swimming helps me to disentangle the threads of the issue. Then I'm ready to work with paper, and perhaps with the computer, depending on the matter at hand. In some cases, I intentionally give myself confidence by noting the parameters of the issue, and by ordering what I already know or have at hand by placing this on paper as well. As I fill in the outline, I take note of what I need to find or do & often a second list is generated by this process. On a less esoteric level, if I am planning a dinner party, I decide on the meal's theme, note what I already have prepared for it [in the freezer], list what I need to make & the recipe pages & source & prepare my shopping list. On a more esoteric level, in the writing of my thesis, I did much the same thing: I rooted around in the general territory that interested me, disentangled the themes that looked too

digressive or unresearchable, began a brief outline with attendant lists of books, primary sources to consult, and very early began the writing process, with what I already knew. Then I systematically followed up this with research to plug holes and wrote as I researched.

3) Contextual options:

(R1-A11) Varies depend on the type and difficulty of planning involved. Most of the planning I do is done in the head and on the fly. I do more systematic planning with records for more challenging situations, but I find that I usually am so busy that I get more done by not doing highly elaborate and effortful planning.

(R1-B6) I think there are two levels of planning -the informal "thought planning" and the more formal "written planning". Both processes involve check lists which are completed and added to on a regular basis. Highly organized people tend to use planning on a continuing basis.

(R1-L10) A plan may be formally established or informally developed within one's mind depending on the circumstances: a) Firstly, you must ask yourself if you need a plan! Why do you want to make a plan? Why do you want to establish a way or method of proceeding? This step involves an examination of your objectives and/or goals; b) Secondly, once you have determined your needs, you must ask yourself how you can achieve those needs (i.e., goals, objectives...). To properly carry out this step, you must give the matter proper thought and preparation (objectives/goals vary ...can include meetings, deadlines, having more time, being more organized, completing specific projects ...); c) Thirdly, you must choose a course of action - pre-determine your method of proceeding. All courses of action may not be mutually exclusive - thus, you may choose a combination of alternatives; d) Lastly, you should implement your plan. A plan may need to be altered in mid-course because of unforeseen events.

(R1-T8) It depends upon the nature of the goal. Some goals are relatively uninvolved, others are more complex. Some involve relationships with other professionals. The more complex the task, the more planning must go into the process. 'To do' lists represent a simple form of planning; calendars, schedules, and daily plans usually suffice for relatively simple routine goals, objectives and tasks. For more complex goals [like research project, for example] involve a great deal of conceptualizing, followed by written work, notes etc. then discussion and revision. I use a computerized daily schedule with open slots for planning. For longer term objectives [such as preparing a written description of program evaluation model] I list these larger goals every two or three months and work on them methodically, one step at a time.