UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

We are aware of Jones' (1999) critique of the use of structuration theory when technology is introduced. His critique, however, does give some merits to Orlikowski's work that we are using in this study.

4.2.3 The decision justification environment

The decision *justification environment* constitutes the *context* of the research framework while the decision-making group constitutes the *text-analogue*. The systemic whole includes both. Our aim through hermeneutic analysis is an attempt to make sense of the decision-making group in the context of a decision justification environment. The key question here is what does a decision-making group mean in a decision justification context? More specifically, what do the theories mean to the decision-making group? Next we give the details of the chosen theories and then attempt to relate them pair-wise to the two questions.

Toulmin *et al.'s schema of reasoning*

We will introduce what we will henceforth refer to as Toulmin *et al.'s schema of reasoning*. We do this in some detail as it forms the foundation of our analysis framework. In the next chapter, we will compare the elements of the schema with explanations from various theories presented in this chapter and earlier. Some of our research questions raised in chapter 3 which are answered during this comparison process are clearly identified and highlighted.

Reasoning and its goals

According to Toulmin *et al.* (1979), when certain types of utterances, assertions or claims are made, it is expected of us to support them by giving reasons. The process of giving reasons is called *reasoning*. The importance of reasoning is perhaps best introduced by the following example given by Toulmin *et al.*:

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

> ' a guest professor was directing a seminar when a student asked him, "Professor Black, the statement you just made is quite different from what you said this morning. Aren't you contradicting yourself?" The professor simply answered, "No", and proceeded to relight his pipe. The students waited, expecting him to add reasons in support of this negative response as soon as the pipe was going again. Instead the professor looked up and remained silent, as if waiting for the next question. The group shuffled nervously, and finally there was embarrassed laughter. Later on, the student who asked the question was heard to say he felt that the professor had put him down. He was angry. The professor had violated a strong social demand requiring him to provide reasons for disagreeing with his questioner' (Toulmin et al., 1979, p. 4).

It is evident from this example that reasoning - or at least the giving of reasons - is pervasive in our society. The practice of providing reasons for what we do, or think, or tell others we believe is built firmly into our accepted pattern of behaviour. This is so much the case that situations in which people fail to supply voluntarily the reasons we are expecting can be shocking or humorous as seen in the example above.

Varied use of language : The use of language in reasoning is a central theme of much of science and philosophy. People put language to use in innumerable ways and for innumerable purposes, and not all of these by any means involve the offering of and evaluation of "reasons". We use language to move, persuade, or convince one another; to exchange and compare perceptions, information, or reactions; to command, greet or to negotiate and arrive at understandings and so on. There are thousands of human transactions in everyday life that often put little, if any, emphasis on the giving and evaluating of reasons. So even though we put a high priority for many purposes on being able to supply reasons for claims, there are plenty of situations in which that demand is set aside. People are normally not asked to give reasons for things that they say they believe in. If they are, they often simply decline to engage in any further argument. For instance one may respond in the following way: " It is enough that I believe in it, and I do not care if you do". We treat many sensitive subjects in a similar way.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Toulmin *et al.* distinguish between two types of language uses. They call them *instrumental* and *argumentative* uses of language. *Instrumental* uses are those utterances that are supposed to achieve their purpose directly, as they stand, without the need to produce any additional "reasons" or "supporting arguments". For example, greeting a friend or giving a command. *Argumentative* uses are those utterances that succeed or fail only to the extent that they can be "supported" by arguments, reasons, evidence or the like, that are able to carry the reader or the hearer along with them only because they have such a "rational foundation". *Argumentative* utterances initiate *trains of reasoning*. These trains of reasoning are equivalent to various *justification contexts* of our research problem. The only difference is that in the justification contexts, we are looking at trains of reasoning in support of *decisions* rather than ordinary claims or utterances.

Reasoning varies with situations: Trains of reasoning varies from situation to situation. The kind of involvement that the participants have with the outcome of the reasoning is entirely different in the different situations and so also will be the way in which possible outcomes of the argument are tested and judged. However, in all these varied situations there are certain general features that are common which we will discuss in the second half of this chapter. According to Toulmin *et al.* (1979, p 8), initial claims resemble a kind of "building" whose reliability depends upon its being "supported" by sufficiently solid "foundations". In all the different kinds of situations and dealing with all the different kinds of problems, the same set of questions can, according to Toulmin *et al.*; always be raised:

What does the giving of reasons achieve?

How do the different statements embodied in any train of argumentation succeed in supporting one another?

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

What makes certain reasons or considerations relevant in supporting any particular claim, while other considerations would be beside the point?

How is it that some supporting reasons are strong, while others are shaky?

Toulmin *et al.* regard this family of questions as defining the topics involved in the critical study of argumentation or reasoning. They invite us to ask how we should embark on the task of setting out any such "argument" for analysis, so that we can recognise for ourselves:

How it is put together, what elements it is composed of, or how these different elements are related to one another? And

What bearing, if any, those relations have, either on the strength of the entire argument or on the acceptability of the claim under criticism.

There is a clear relationship here between some aspects of the research questions we have raised in chapter 3 and the above sets of questions raised by Toulmin *et al.* We will use these comparative sets of questions in the next chapter, after we have followed the entire *schema of reasoning* of Toulmin *et al.*

Reasoning as a critical transaction: The essential locus of reasoning is according to Toulmin *et al.*, seen to be *public, interpersonal, or social*. Wherever an idea or a thought may come from, it can be examined and criticised "rationally" - by the standards of "reason" - only if it is put into a position where it is open to public, collective criticism. Reasoning is thus not a way of *arriving at ideas* but rather a way of *testing ideas critically*. It is concerned less with how people think than with how they share their ideas and thoughts in situations that raise the question of whether those ideas are *worth* sharing. It is a collective and continuing human transaction, in which we present ideas or claims to particular sets of people within particular situations or contexts and offer the

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

appropriate kinds of "reasons" in their support. It involves dealing with claims with an eye to their contexts, to competing claims, and to people who hold them. It calls for the critical evaluation of these ideas by shared standards (without necessarily assuming universal/eternal standards); readiness to modify claims provisionally accepted and of any new ones that may be put forward subsequently.

Reasons and arguments that appear quite acceptable and proper to one group may be successfully challenged when discussed within other groups. Ideas which are strongly shared by all those with whom we are in immediate contact may not have needed to generate any substantial body of reasons in support of them. It is sufficient that those whom we respect have advocated them. When this happens, the result is that we deprive ourselves of an opportunity to prepare for a possible challenge to our most cherished ideas and beliefs, which according to psychologists, we are liable to either abandon rather quickly for lack of appropriate reasons, or fall back on some inflexible dogmatic position. According to Toulmin *et al.:*

> "In fact a suitable process of "inoculation", by which we expose our most cherished ideas to systematic attack and begin on the task of building up a more adequate body of reasons in advance of a serious challenge, may allow us to develop our critical faculties in a way that prepares us to deal more robustly with future attacks on our beliefs." (Toulmin *et al., op. cit.,* p.11).

Reasoning comes into play as a means of providing support for our ideas when they are open to challenge and criticism. This does not mean that procedures of reasoning always take place later in time than the formation of the ideas that call them forth. We often begin to test our ideas in a critical manner and think over the available reasons for or against them as soon as we first have the ideas. In a form of thinking that may be called *intrapersonal communication*, we imagine ourselves sharing an idea with other people and rehearse the questions they might ask and the challenges they might make to our supporting reasons. In the course of this rehearsal, we may be able to refine and improve

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

on the reasons in support of the idea, and so we finally arrive at a point where we can "go public", confident in our ability to justify it. Or alternatively we may find ourselves recognizing so many arguments against the idea that we decide to forget it altogether or never to make it public. In either case, the "*transactive*" character of reasoning is preserved.

Toulmin *et al.'s schema of reasoning : the 'basic pattern of analysis'*

According to Toulmin *et al.* (1979, p.v), the basic pattern of analysis as introduced here is suitable for application to arguments of all types and in all fields, including justification of claims made by groups.

We begin by adopting the following definitions from Toulmin *et al.*:

The term *argumentation* will be used to refer to the whole activity of making claims, challenging them, backing them up by producing reasons, criticizing those reasons, rebutting those criticism, and so on.

The term *reasoning* will be used, more narrowly, for the central activity of presenting the reasons in support of a claim, so as to show how those reasons succeed in giving strength to the claim.

An *argument*, in the sense of a *train of reasoning*, is a sequence of interlinked claims and reasons that, between them, establish the content and force of the position for which a particular speaker is arguing.

Anyone participating in an argument shows his *rationality*, or lack of it, by the manner in which he handles and responds to the offering of reasons for or against claims. If he is "open to argument", he will either acknowledge the force of those reasons or seek to reply

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

to them, and either way he will deal with them in a "rational" manner. If he is "deaf to argument", by contrast, he may either ignore contrary reasons or reply to them with dogmatic assertions, and either way he fails to deal with the issue "rationally".

With this vocabulary and terminology, we are now ready to embark on the "basic pattern of analysis" for identifying and describing the strengths and weaknesses of arguments.

The critical questions about an argument

At the outset of a fully reasoned argument, one of the parties involved - the *assertor*, or A - presents a "claim", C. The assertor (A), must do more than put forward his position as a bare assertion ("Take it or leave it") if he is to make the claim on a "rational" basis - as the opening move in a possible argument - rather than as a simple personal opinion. If his position is to be open to criticism and discussion by others, A must have further grounds, reasons, or other considerations, which can be added (if necessary) to demonstrate that the claim is "well founded", that it is a claim whose acceptability can be acknowledged reasonably by other people also. In the absence of further support and clarification, other parties to the discussion may be in no position to share the assertor's view of the matter.

On the other hand, the individual who leads the criticism of A's claim, the questioner (Q) will require A to bring to the surface, and make explicit, that set of supporting reasons by which he can explain, spell out, and/or justify his position. Q must press his questions clearly enough and in enough detail for other parties to judge whether A has made his case and given them reasons to acknowledge, for themselves, that his initial assertion was *sound* or *solid.* If Q's examination brings the discussion to a point at which all parties are in a position to acknowledge the force of A's reasons, then this particular "argument" will have been completed. At this point in the argument, *either* the other parties to the discussion will be ready to endorse A's claim, *or else* they will agree that, given A's

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

argument, the initial claim would be sound, provided that the supporting facts are really as A alleges.

The elements of any argument

Toulmin *et al.* identify six elements that can be found in any wholly explicit argument. These are:*Claims, Grounds, Warrants, Backing, Modal qualifications, Possible rebuttals.*

Claims: When we are asked to embark on an argument, there is always some 'destination' we are invited to arrive at, and the first step in analyzing and criticizing the argument is to make sure what the precise character of that destination is. So the first set of questions is

What exactly are you claiming? Where precisely do you stand on this issue? What position are you asking us to agree to as the outcome of your argument?

Grounds: Having clarified the claim, we must consider what kind of underlying foundation is required if a claim of this particular kind is to be accepted as solid and reliable. The next set of questions will therefore have do to with these foundations:

What information are you going on? What grounds is your claim based on? Where must we ourselves begin if we are to see whether we can take the step you propose and so end by agreeing to your claim?

Depending on the kind of claim that is under discussion, these grounds may comprise experimental observations, matters of common knowledge, statistical data, personal testimony, previously established claims, or other comparable "factual data". Thus *grounds* are *specific* facts relied on to support a given claim.

Warrants: Knowing on what grounds a claim is founded is, however, only the first step towards getting clear about its solidity and reliability. Next we must check whether these

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

grounds really do provide genuine support for this particular claim. So the next set of questions is:

Given that starting point, how do you justify the move from these grounds to that claim? What road do you take to get from this starting point to that destination?

The type of answers we may expect will depend on what kind of claim is under discussion. Steps from *grounds* to *claims* are "warranted" in different ways in law, science, in politics, and elsewhere. The resulting *warrants* take the form of laws of nature, legal principles, rules of thumb, engineering formulas, and so on.

Backing: Warrants themselves cannot be taken wholly on trust. Once we know what rule or law, formula or principle, is being relied on in any argument, the next set of questions can be raised:

Is this really a safe move to take? Does this route take us to the required destination securely and reliably? And what other general information do you have to back up your trust in this particular warrant?

The warrants relied on to authorize arguments in different fields of reasoning require correspondingly different kinds of backing. Aside from the *particular* facts that serve as grounds in any given argument, we therefore need to find out the *general* body of information, or *backing*, that is presupposed by the warrant appealed to in the argument.

Modal qualifiers: Not all arguments support their claims or conclusions with the same degree of certainty. Some warrants lead us to the required conclusion invariably; others do so frequently, but not with 100% reliability; others do so only conditionally, or with significant qualification -"usually", "possibly", "barring accidents", and so on. So, the next set of questions is:

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Just how reliable does this warrant lend weight to the given step from grounds to claim? Does it absolutely guarantee this step? Does it support it with qualifications? Or does it give us, at most, the basis for a more-or-less risky bet?

The degrees and kinds of strength with which warrants authorize us to argue vary greatly from one kind of case to another. Some lead to "probable" conclusions; others establish "presumptive" conclusions; and so on. Most practical reasoning is in fact concerned with what is "probably", "presumably", or "possibly" the case rather than with "certainties" alone.

Possible rebuttals: Unless we are faced by one of those rare arguments in which the central step from grounds to claim is presented as "certain" or "necessary", we shall also need to know under what circumstances the present argument might let us down. Hence the final set of questions:

What kinds of factors or conditions could throw us off the road? What possibilities might upset this argument? And what assumptions are we implicitly relying on in trusting such a step?

Any except a certain or necessary argument is open to *rebuttal*. Such rebuttals may in some cases be very unlikely and hard to foresee, but we can understand the rational merits of the arguments in question fully only if we recognize under what circumstances (rare but possible) they might prove reliable. The *claims* involved in real-life arguments are, accordingly, *well founded* only if sufficient *grounds* of an appropriate and relevant kind can be offered in their support. These grounds must be connected to the claims by reliable, applicable *warrants*, which are capable in turn of being justified by appeal to sufficient backing of the relevant kind. The entire structure of argument put together out of these elements must be capable of being recognized as having this or that kind and degree of certainty or probability and as being dependent for its reliability on the absence

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

of certain particular extraordinary, exceptional, or otherwise *rebutting* circumstances. The *basic pattern of analysis* as presented by Toulmin *et al.* (1979) is then summed up in Figure 4.6 (previously 2.4).

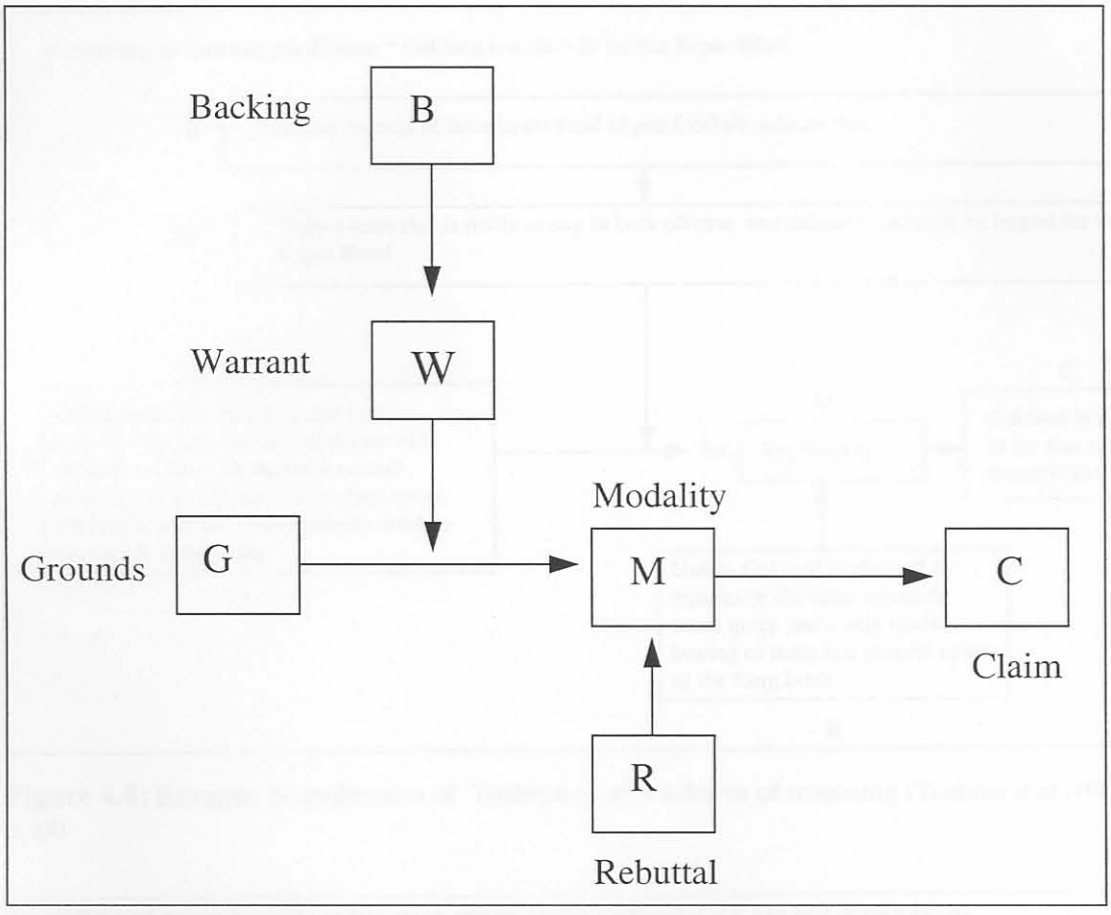

Figure 4.6 (previously 2.4): Logical Structure of Argument (Toulmin *et al.*, 1979, p. 78)

" Given grounds, **G**, we may appeal to warrant, **W** (which rests on backing **B**), to justify the claim that **C** - or at any rate, the presumption (**M**) that **C** - in the absence of some specific rebuttal or disqualification (**R**). "

We will henceforth refer to this Figure as Toulmin *et al.'s schema of reasoning*. In concluding this part of the chapter, we illustrate three examples showing how the schema is applied.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

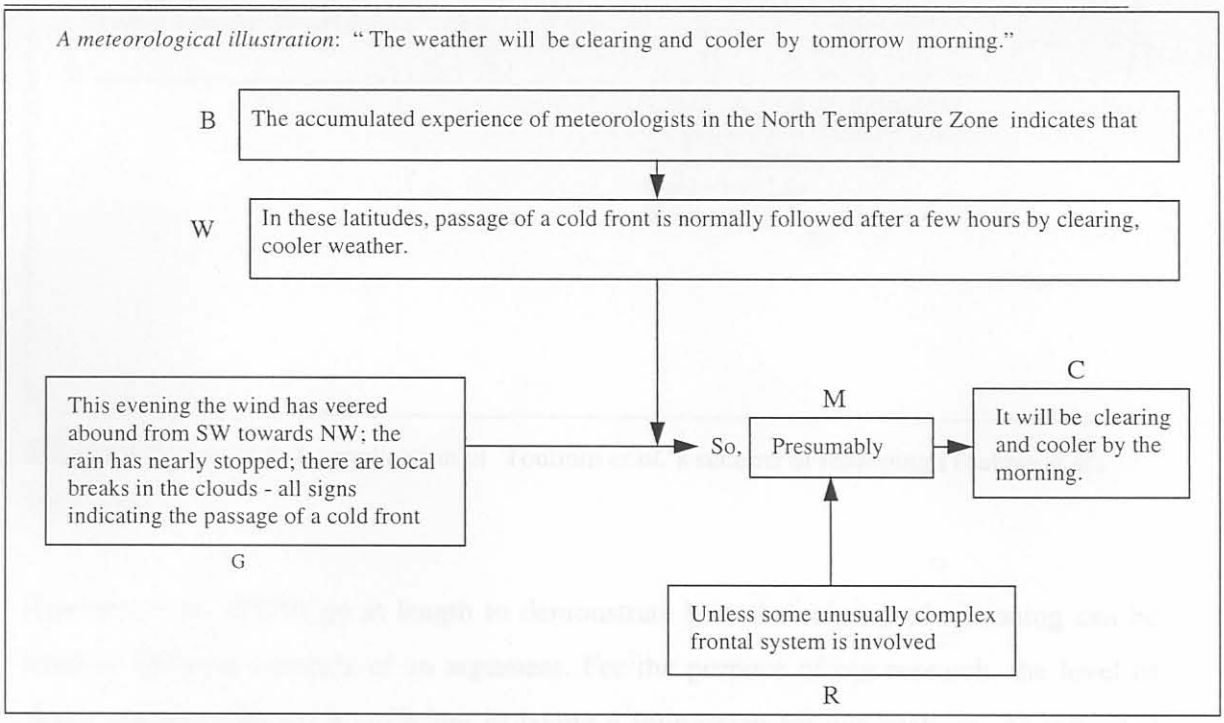

Figure 4.7: Example 1- application of Toulmin *et al.*'s schema of reasoning (Toulmin *et al.*, 1979, p. 87)

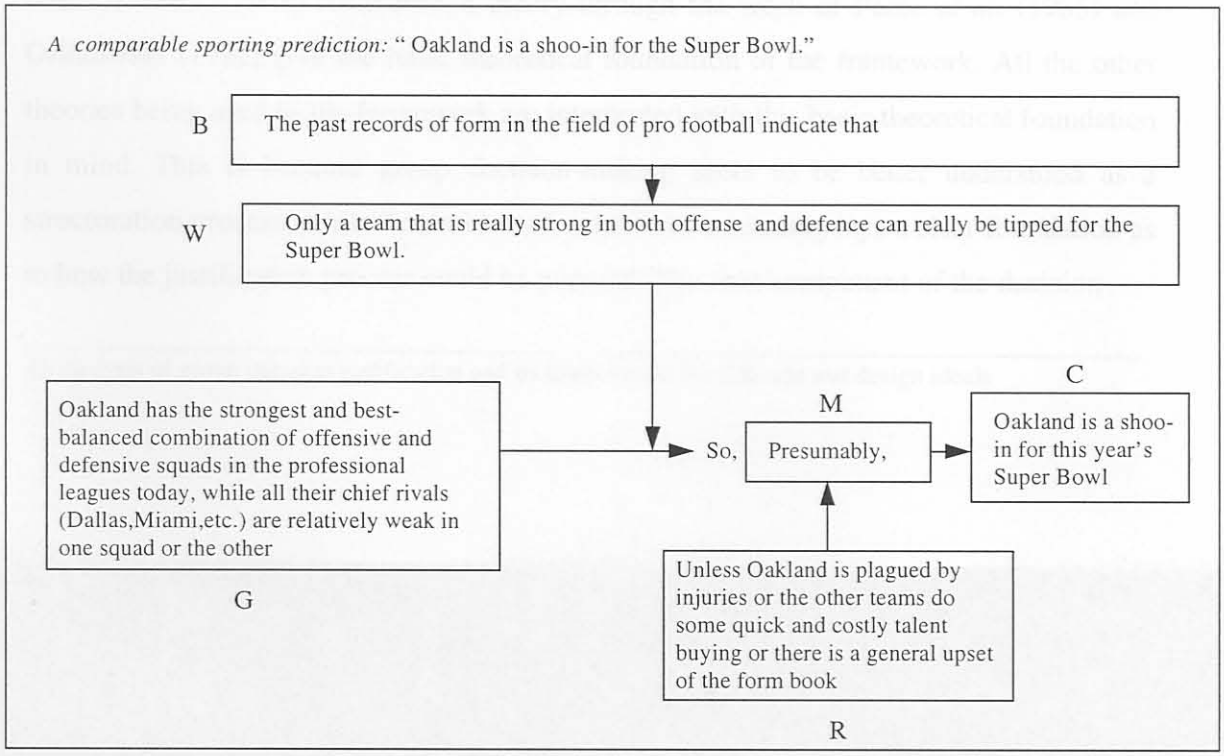

Figure 4.8: Example 2- application of Toulmin *et al.*'s schema of reasoning (Toulmin *et al.*,1979, p. 88)

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

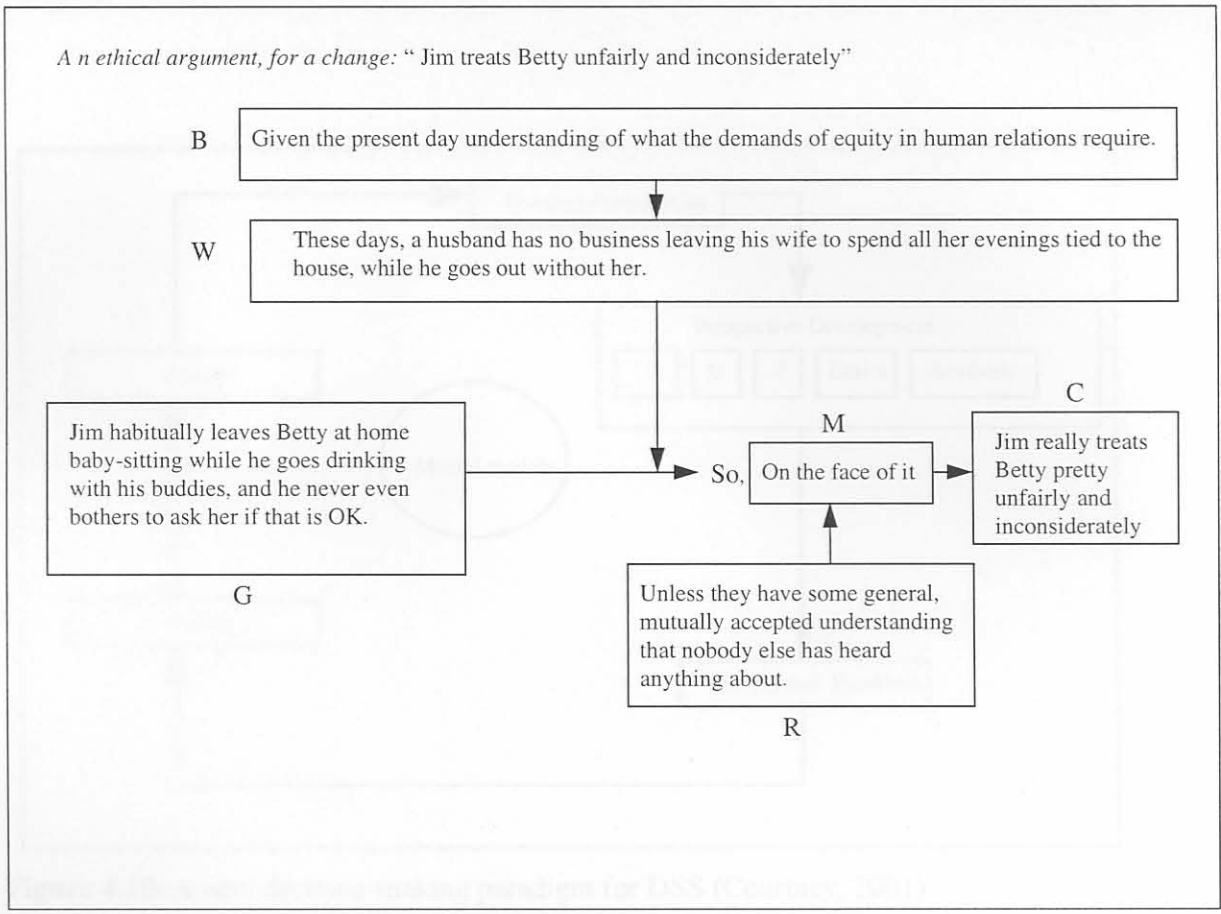

Figure 4.9: Example 3 - application of Toulmin *et al.*'s schema of reasoning (Toulmin *et al.*, 1979, p.88)

Toulmin *et al.* (1979) go at length to demonstrate how the schema of reasoning can be used in different contexts of an argument. For the purpose of our research, the level of detail presented above is sufficient in laying a foundation for our analysis. As indicated earlier already, Toulmin *et al.* (1979) schema of reasoning as presented here, together with Giddens' (1984) structuration theory through the work of Poole *et al.* (1985) and Orlikowski (1992) give the basic theoretical foundation of the framework. All the other theories being used in the framework are interpreted with this basic theoretical foundation in mind. This is because group decision-making seem to be better understood as a structuration process, while Toulmin *et al.* schema of reasoning lays a clear foundation as to how the justification process could be pursued. The next component of the decision

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

justification environment is the new decision-making paradigm proposed by Courtney (2001).

The new decision-making paradigm for decision support systems

We have presented an outline of the new decision-making paradigm for DSS as proposed by Courtney (2001) in chapter 2. We will concentrate here on how he used Mitroff and Linstone's (1993) ideas of Unbounded Systems Thinking (UST) and the Singerian approach to develop the new decision-making paradigm for DSS; and how this new paradigm relates to the research framework and its application. The reader will recall Courtney's framework, given in Figure 4.10 (previously labeled Figure 2.8) below.

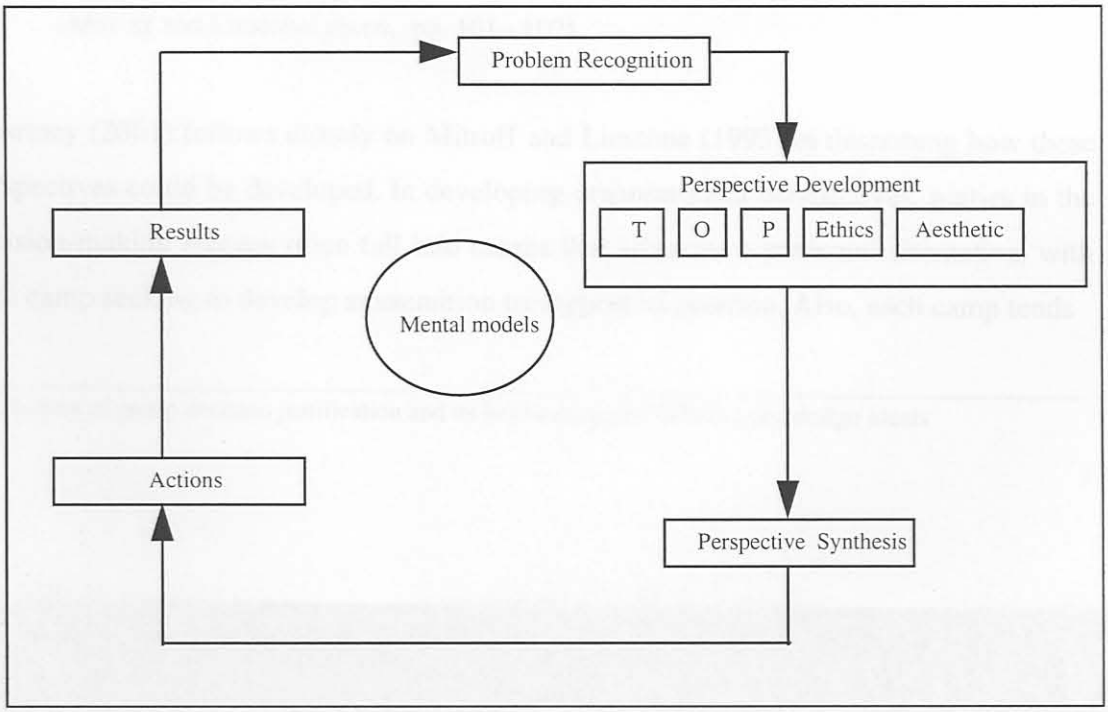

Figure 4.10: A new decision-making paradigm for DSS (Courtney, 2001)

The concept of multiple perspectives deriving from the Singerian approach and the UST underpin Courtney's (2001) new decision-making paradigm for DSS. According to

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Courtney, multiple perspectives are developed in several ways. First, the system "sweeps in" the other thinking styles (Leibnitzian, Lockean, Hegelian and Kantian) which means that it uses any or all of them where appropriate in decision-making processes, and may include any knowledge as needed from any discipline or profession to assist in understanding the problem. Courtney adopts Mitroff and Linstone's (1993) reference to the four non-Singerian models as reflecting a technical perspective (T). They are all mechanistic and analytical in nature. They all have limitations, and in order to overcome these limitations, UST sweeps in what Mitroff and Linstone (1993, p. 99) call organisational and social (O), and personal and individual (P) perspectives. Quoting Mitroff and Linstone (*op cit.*), Courtney notes that these perspectives "bring to the forefront human beings collectively and individually in all their complexity."

> ".... All complex problems - especially social ones - involve a multiplicity of actors, various scientific/technical disciplines, and various organisations and diverse individuals. In principle, each sees a problem differently and thus generates a distinct perspective on it." (Mitroff and Linstone, p. 99)

Furthermore,

> "In 'real-life' situations, managing problems consists of at least three activities: (a) analyzing alternatives, (b) making decisions about which alternative to choose, and (c) successfully implementing the chosen alternative. The T perspective focuses most strongly on (a) and least on (c); hence the "gap" so often deplored between analysis and action. Successful implementation depends first and foremost on the use of human resources and this means that O and P become crucial as we move from (a) to (c)". (Mitroff and Linstone, *op.cit.*, pp. 101 - 102).

Courtney (2001) follows closely on Mitroff and Linstone (1993) in describing how these perspectives could be developed. In developing organisational perspectives, parties in the decision-making process often fall into camps that advocate a preferred alternative, with each camp seeking to develop ammunition to support its position. Also, each camp tends

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

to base its position on unstated assumptions which, if left uncovered, often lead to circular debate that gets nowhere (Courtney, 2001). Surfacing such assumptions is a critical part of developing organisational perspectives. Mitroff and Linstone (1993) suggest that assumptions can be surfaced by first identifying all stakeholders (anyone or group affected by the decision) and then simply asking each camp what they have to assume is 'true' of a particular stakeholder such that *starting from* that assumption that camp's preferred policy or actions would be supported. According to Courtney (2001), the personal perspective is perhaps not as well developed as the organisational. It is based on individual experiences, intuition, personality factors, and attitudes about risk, among other things. Courtney refer to individuals as notoriously complex and varied in their decision-making styles. In a complex scenario, given the same external information, no two people might reach the same conclusion, as their background, training, experience, values, ethics and mores may differ. Sweeping in as wide a variety of individual perspectives as feasible is thus necessary for unstructured decisions.

Two other factors which "makes us human" (Courtney, 2001), have been neglected, but he sweeps them in through the multiple perspective approach. These are ethics and aesthetics in decision-making. He indicates that Churchman (1971) and many others have long called for much greater consideration of these factors in both our business and personal lives.

According to Courtney, UST and multiple perspectives approach bring many new factors into the picture for organisational knowledge management and decision-making. He posits that one might even consider this (his new decision-making paradigm for DSS, Figure 2.8) to be an alternative decision-making paradigm, or at least a major overhaul of the conventional DSS view of decision-making, which scarcely considers anything but the technical perspective. At the heart of the process is a *mental model*. Courtney say that actually, this could be several mental models, or a collective model of some sort. This model, according to Courtney (using Churchman; Mitroff and Linstone; *op cit.*), and the

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

data collected by it (and hence the problem selected for solution) are strongly inseparable. Courtney go on to say the following about the mental model:

> "Our mental model, either personally or collectively, determines what data and what perspectives we examine in a world of overabundant data sources and a plethora of ways of viewing that data. The mental models influence and are influenced by every step of the process. That is, the models determine what is examined and what perspectives are developed. As perspectives are developed, insight is gained, and the mental models are updated. That is, learning takes place. Tacit knowledge is created." (Courtney, 2001).

The decision process begins with the recognition that a problem exists; that is, a decision needs to be made. But rather than jumping simply into analysis (the technical perspective), the process consists of developing multiple perspectives of the various kinds described above. According to Courtney, the various perspectives provide much greater insight into the nature of the problem and its possible solutions than the heavy reliance on the technical perspective that DSS has advocated in the past. He suggests that diagramming tools such as cognitive maps, influence diagrams, entity-relationship diagrams and object diagrams as expressed for example by the Unified Modelling Language may be of great use both in showing the connectedness of elements in wicked systems, and in surfacing assumptions that people hold about wicked problems. He also highlights that it has been shown (Massey and Wallace, 1996) that having groups draw cognitive maps leads to surfacing of differences about variables and relationships in a problem and more effective communication during the decision-making process.

Courtney, using the work of Mitroff and Linstone suggest some guidelines for applying the multiple perspective approach to organisational environments conducive to the use of the Singerian, multiple perspective approach. The guidelines are the following:

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

1. Strike for a balance among technical, organisational and personal perspectives.

2. Use "good" judgment in selecting perspectives. Foster a dialectic among those holding various perspectives and draw out the most plausible elements of each.

3. In obtaining information, recognize that organisational and personal perspectives require greatly different methods than the technical. One-on-one interviews are the best source of information, but the interviewers must be good listeners and sensitive to nuances and nonverbal communication.

4. Pay attention to the mutual impact, interdependencies, and intergration of perspectives. "We cannot reiterate enough that we are dealing with UST. There is no formula or pat procedure to assure or guarantee that all interactions are taken into account." (Mitroff and Linstone, 1993, p. 108). Yet, this is a critical point, and the decision-maker must be careful to conceive of as many interactions as possible.

5. Beware of thinking statistically in dynamic environments. With the advent of globalization, the internet and electronic commerce, business environments change rapidly. Decision-makers must stay abreast of changing situations.

Next, we discuss how the new decision-making paradigm for DSS relate to the research framework, its implications and how it will be used.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

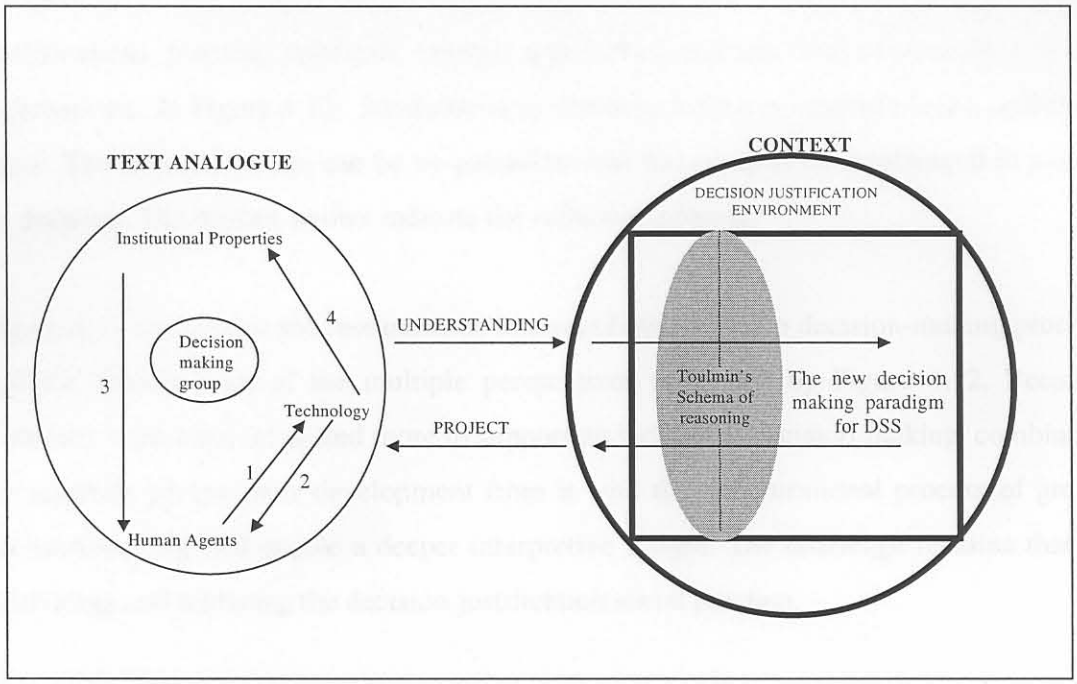

Figure 4.11: Group decision-making and the new decision-making paradigm for DSS.

The research framework and how it relates to the new decision-making paradigm for DSS

We will use Figures 4.10 and 4.11 as our reference diagrams. Unlike Toulmin *et al.'s* schema of reasoning, the new decision-making paradigm for DSS is placed under the decision justification environment for a different reason. We would like to understand how the paradigm could be applied within a group decision justification context.

Because we already know from our day-to-day lives and the literature that not all decisions need to be justified, we must start with an assumption that the decision-making group recognizes and value the *decision justification social practice*. So when the logics of Figure 4.10 outlining the new decision-making paradigm are unfolded, the decision-making group is at the same time preparing itself for a decision justification process. Consistent with UST, Toulmin *et al.*'s schema of reasoning is "swept in" in order to guide

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

the justification process. The sweeping in of Toulmin *et al.*'s schema of reasoning cannot be without implications on the new decision-making paradigm. Our view is that both the *mental models* of group members and the way in which they develop their *multiple perspectives* on the decision task would be affected in one way or another. This means that decision justification as a concept will become one of the perspectives, in addition to the T, O, P, Ethics and Aesthetics in Courtney's paradigm; while a particular way of thinking (let us call it an *Informing Pattern and Way of Thinking*) become one of the mental models of all group members. These implications can be summarized in Figure 4.12. The *Informing Pattern and Way of Thinking* emanates from the decision justification social practice and will be based on constitutive meanings each group member brings to the decision-making process. An example here could be the components of the schema of reasoning, Claims, Grounds, Warrants, Backings, Modal qualifications, possible Rebuttals; together with values, culture, level of training of group members etc. In Figure 4.12, justification is shown as both a *perspective* and a *reflection stage*. The reflection stage can be by-passed in case the group is not challenged to justify its decision. The broken arrows indicate the reflection process.

Figure 4.11 will enable the researcher to interpret both the group decision-making process and the development of the multiple perspectives suggested by Figure 4.12. Because Courtney's paradigm is geared more to supporting individual decision-making, combining the multiple perspectives development from it with the structurational process of group decision-making will enable a deeper interpretive insight. The challenge remains that of cultivating and nurturing the decision justification social practice.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

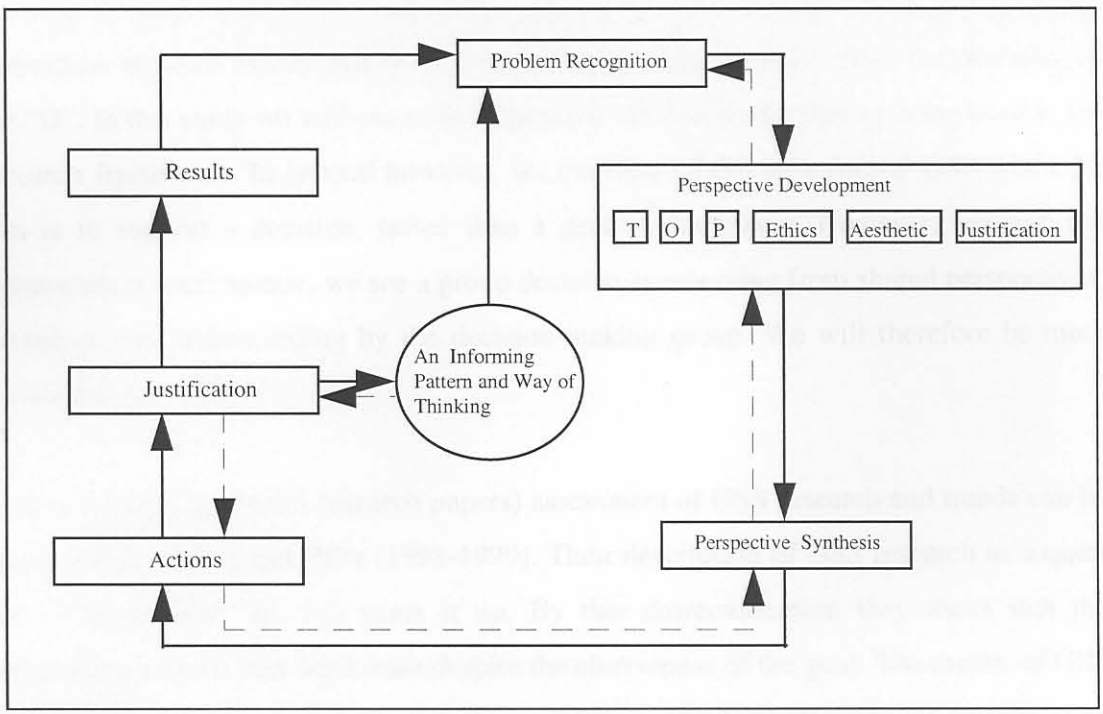

Figure 4.12: Implications for the decision justification social practice on the new decision-making paradigm for DSS (adapted from Courtney, 2001)

4.2.3 GSS research - trends and historical developments

Most of the recent literature does not distinguish between Group Decision Support Systems (GDSS) and Group Support Systems (GSS). DeVreede *et al.* (2000) point out that in the beginning, GSS were called GDSS and that the "D" was later dropped because in practice it turned out that these systems did not only support group decision-making, but also more general meeting processes focused on exchanging information and developing joint insight. This explanation partly addresses an issue which was raised by Walsham (2001, p. 109):

> "... There is a certain irony that this group decision support system (GDSS) seemed poorly suited to facilitating decision-making, but rather better suited to group discussion. Perhaps the term GDSS should stand for group discussion support system?...."

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Here Walsham (2001) was making an interpretation of a World Bank study conducted by Bikson (1996). Bikson was reporting the results of his study using GroupSystems, a software system designed to support same-time same-place interactions among many-person groups. He reported and argued that the software well supported divergent thinking - the generation of ideas, alternatives, plans, explanations, proposals. In contrast, convergent cognitive tasks - making decisions, resolving conflict, allocating scares resources were less well supported.

This is just a snapshot of typical results that are often reported in GSS research. There are as many of them as there are researchers. The point we are making here is to clarify the distinction between GDSS and GSS and the kinds of arguments behind the dropping of the "D". In this study we will use both, depending on a particular theory being used in the research framework. In general however, we consider GDSS as a special GSS when the aim is to support a decision, rather than a general discussion. However, because our framework is hermeneutic, we see a group decision as emerging from shared perspectives, meanings and understanding by the decision-making group. We will therefore be more inclined to use GSS.

A very detailed (230 GSS research papers) assessment of GSS research and trends can be found in Fjermestad and Hiltz (1998-1999). Their description of GSS research as a quest for a "Holy Grail" (p. 56) sums it up. By this characterization they mean that the undertaking remain very legitimate despite the elusiveness of the goal. The results of GSS remains contradictory, inconsistent and inconclusive. This, according to De Vreede *et al.* (2000), is despite the fact that already in the 1970s, the first GSS prototype was tested (Wagner *et al.,* 1993). Gopal and Prasad (2000) explored the GSS scholarship and emphasised a point which we share, together with others (Chin *et al.*, 1997; DeSanctis, 1993; Briggs *et al.*, 2001; Phahlamohlaka and Roode, 2001), that there has been too much focus on the technology itself, rather than on human interaction. DeSanctis and Poole (1994) point out that the assumption that a GDSS can have effects on its users and the

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

outcome of its use independently of the manner and context of its use is excessively technology-centered and inappropriate. We share the view that GDSS technology is social in nature and that the outcomes of its use vary with the context of its use by different groups.

Gopal and Prasad (2000) argue that the inherently social nature of GDSS use points to a rich contextuality and the virtual impossibility of being able to reproduce in "real" GDSS meetings the specific conditions or outcomes that obtain in our research settings. They go on to point out that the variables and models we specify begin to stand opposed to the models created or adopted by other researchers as means of understanding GDSS use, resulting in fragmentation when what we seek is consistency. They make a very valid statement which was also differently and independently made by Phahlamohlaka and Roode (2001):

> "Just as researchers bring with them alternative ways of characterizing GDSS use, those who use GDSS bring to it a variety of ways of understanding it, so that when a particular research model explains how a particular group experienced a GDSS, the way in which they actually experience it might have little to do with the researchers' explanation." (Gopal and Prasad, 2000).

The technocentrism is according to Gopal and Prasad very prevalent. Even as we recognize increasingly that technology cannot be studied outside its social context and that inconsistent results may be directly related to our lack of attention to this fact, we continue to study the effects of the technology while treating the context as just another variable rather than as something intrinsic to the technology. This brings us back to the quest of a Holy Grail of Fjermastan and Hiltz. As Jones (1994, p. 26) points out, "the 'system' that supports group decision-making needs to be viewed more widely than simply the technology and should include appropriate elements of the social context". For our purposes then, such a context is what we propose as the *decision justification social practice*.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Another potential reason for inconsistent results in GSS is the idea of a *meeting*. Gopal and Prasad quote Dennis *et al.* (1990-91) who note that "studies should focus not only on the meeting session as a unit of analysis, but also on the project as a unit of analysis, where a project may consist of a number of meetings" (p. 128). They indicate that unfortunately, even in recognizing the importance of the context of the meeting, studies appear to suggest that the context can be defined merely as other meetings. Gopal and Prasad also quote DeSanctis *et al.* (1993) who they say are more suggestive of the relationship between the concern with the meeting as the unit of analysis and inconsistent results when they say that " observation of ... team interactions outside the meeting room might lead to different conclusions" (p. 27).

Gopal and Prasad (2000) cautiously proceed from this background to make a claim that rather than the use of the prevalent mode of research to further our understanding of GDSS and run the risk of exacerbating the problem of inconsistency and fragmentation, it might be more useful at this stage to explore alternative epistemological approaches in the hope that these might be more helpful to us to get beyond these problems and look at the GDSS phenomenon from entirely different viewpoints. They then propose that the use of methodologies rooted in sociological paradigms employing field methods of thick description are likely to offer the kinds of rich and strongly-textured views of GDSS that we need to more fully appreciate how they are used. They conclude by proposing symbolic interaction as a methodology for studying group technologies, and continue to show the results of their work from using the methodology to study GDSS use by teachers in a western Canadian school. We will return to some of their observations, arguments and suggestions and relate them to our research framework later in this chapter.

Arguing along similar lines, Briggs *et al.* (2001) propose a GSS research approach that is based on the notion of ***thinkLets.*** According to Briggs *et al.* (2001), one cause of the conflict and ambiguity in GSS research results may be the result of focusing on what they say is a *less-than-useful level of abstraction*: GSS itself. They argue that in GSS research,

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

the thinkLet may be a more useful unit of comparison than the GSS. A thinkLet, according to the authors, encapsulates three components of a GSS stimulus: *The tool, its configuration, and the script*. They report on having documented about 60 thinkLets that map to seven basic patterns of thinking: Diverge, Converge, Organize, Elaborate, Abstract, Evaluate, and Build Consensus. Each thinkLet creates some unique variation on its basic pattern.

By focusing research on thinkLets, rather than GSS, they predict that field and laboratory research may be more controllable, more replicable, and better able to inform GSS development and use. They note that their field experience shows that thinkLets may be used to create repeatable, predictable patterns of thinking among people making an effort toward a goal.

The theoretical ideas behind the use of both symbolic interaction and thinkLets in GSS research have partly informed the construction of our research framework. Our aim in including them as part of the decision justification environment is to enable us not only to use them to analyse the empirical data, but also to investigate the extent to which a contribution could be made to their further enhancement and development, through combining them with other theories within the framework. We next focus on thinkLets, the main ideas behind them and how they relate to the research framework.

ThinkLets - towards a new research approach for GSS

It is our view that the notion of thinkLets relates closely to Toulmin *et al.*'s schema of reasoning as presented earlier. It seems possible that through the relationship between thinkLets and Toulmin *et al.*'s schema, one could better analyse how GSS could be used to support decision-making groups when justification of such decisions become necessary. Because of our belief that this thinkLets notion could be a more viable option for conducting GSS research, we present below the main ideas behind it. We then attempt

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

to draw some comparisons with Toulmin *et al.*'s schema of reasoning in order to investigate how this comparison could inform GSS use and design. Our reference diagram here is Figure 4.13.

Main ideas behind thinkLets

Like Gopal and Prasad (2000), Briggs *et al.* (2001) also start by making reference to the work of Fjermestad and Hiltz (1998-99), of inconclusive results on GSS research. According to Briggs *et al.*, conflicting results in GSS research mean that it is difficult for GSS research to inform GSS practice. GSS practitioners must look to research for guidelines on system design and implementation, collaborative processes and methodologies, etc. They argue that it is not sufficient for researchers to declare that GSS seems to lead to higher productivity, indicating that researchers have a real responsibility to make it clear how to transfer experiences from the research arena into the organisational arena.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

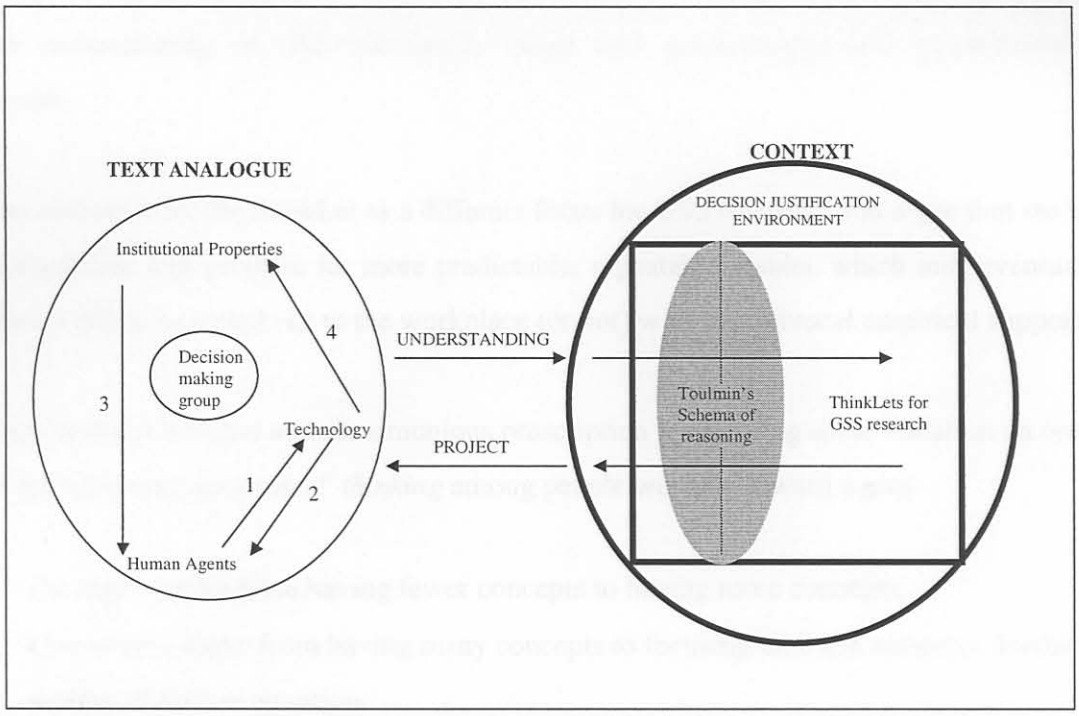

Figure 4.13: Group decision-making and thinkLets for GSS

They then argue that *thinkLets* may serve to facilitate that transfer, and stimulate the heretofore relatively slow transition of GSS from academia to the workplace. Although the tone of Briggs *et al.*, is similar to that of Gopal and Prasad in the sense that they both advocate for a shift in focus from the technology to human interaction, they seem to retain most of the quest for a "Holly Grail" (Fjermestad and Hiltz, 1998-99) as reflected in the following statement:

> "... conflicting results may also cast a pall over the academic rigor and reputation of the GSS research community. Finding a way to resolve these conflicts and to produce predictable, repeatable results could do much to stimulate GSS research, and redeem the reputation of the GSS research community." (Briggs *et al.*, 2001).

This may explain why Gopal and Prasad were cautious about the epistemological shift, despite their very well argued position which we share. Clearly, Briggs *et al.*, still believe

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

in the search for consistency of GSS research results, an idea which Gopal and Prasad suggest is no longer viable. We too do not necessarily buy into Briggs *et al.'s* quest for predictable and repeatable results. The reason we are pursuing Briggs *et al.'s* notion of thinkLets here is because they are in the process of developing this new concept from a practical point of view, with a focus on the thinking patterns of groups during decision-making. It is the emphasis on this pattern of thinking that is of interest to us, and not so much the predictability and repeatability of results themselves. Toulmin *et al.'s* schema of reasoning, upon which our analysis framework is based, is a thinking pattern aimed at guiding any form of argument, and for our purposes, the justification of claims which may be the bases for group decisions. There are therefore some virtues in the research pursuit along the notion of thinkLets, although for us it is the potential of the notion to enhance our understanding of GSS transcripts, rather than predictability and repeatability of results.

The authors offer the thinkLet as a different focus for GSS research, and argue that studies of thinkLets will produce far more predictable, repeatable results, which may eventually allow GSS to be rolled out to the workplace (or not) with unequivocal empirical support.

They define a *thinkLet* as a parsimonious prescription for creating some variation on one of the following *patterns of thinking* among people working toward a goal:

- *Diverge* – move from having fewer concepts to having more concepts.
- *Converge* – move from having many concepts to focusing on a few concepts deemed worthy of further attention.
- *Organize* – move from less understanding to more understanding of the relationships among concepts.
- *Elaborate* – move from having concepts expressed in less detail to having concepts expressed in more detail.
-

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

- *Abstract* – move from having concepts expressed in more detail to having concepts expressed in less detail.
- *Evaluate* – move from less understanding of the value of concepts for achieving a goal to more understanding of the value of concepts for achieving a goal.
- *Build Consensus* - Move from having less agreement among stakeholders to having more agreement among stakeholders.

A thinkLet has three components:

Tool – *The specific version of the specific hardware and software technology used to create a pattern of thinking.*

Configuration – *The specifics of how the hardware and software were configured to create a pattern of interaction.*

Script – *The sequence of events and instructions given to the group to create the pattern of thinking.*

According to the authors, these three components taken together constitute the stimulus that causes the pattern of thinking reported in a GSS research paper. They argue that lacking knowledge of any one of these components, others cannot recreate the stimulus, and so may not be able to reliably recreate the thinking pattern achieved with a GSS. Lacking knowledge of any one of these, they argue - a practitioner cannot recreate the stimulus used to produce an effect reported in a research paper. " That each component has an effect on outcomes with GSS can be inferred from the rich body of published GSS literature;" they claim.

The authors proceed to discuss each of the components, and amongst others present the following descriptions:

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Tool

- Any given GSS is not a single tool, but a collection of tools that differ widely from one another. One could not expect to obtain the same results with an electronic brainstorming tool as one obtains with a group outline or an electronic voting tool. Therefore, without knowing which tool a group used, one cannot reproduce the group's results.

- Further, GSS's are not a single system, but a category of systems, and the systems in that category differ widely. For example, the electronic brainstorming tool in some systems might require that all users contribute ideas to the same electronic page, while the electronic brainstorming tool in another system might require that all participants contribute to different pages, and that they swap the pages among themselves.

Thus, one must conclude that differences in technology can produce differences in outcome, and one must know the exact tool that was used in order to reproduce the results of others. However, just knowing which tool was used is not sufficient to assure replication of results.

Configuration

- Some GSS tools have many possible configurations, and different configurations may have different effects on group outcomes. The GroupSystems Electronic Brainstorming tool, for example, has more than 20 independently configurable features, for a total of 1,048,576 possible combinations. Those features are configurable precisely to allow teams to change their patterns of thinking and interaction.
- In order to understand how a group achieved its results, one must know exactly which tool was used, and exactly how that tool was configured. However, knowing both the tool and its configuration is still not sufficient if the goal is to create a repeatable, predictable pattern of thinking and interaction among the members of a team.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Script

- The very same GSS tool configured in the very same way can produce very different patterns of thought, depending on the script in which it is embedded. A script is the sequence of events and prompts given to a group as they use a GSS tool.

- Shepherd, et al. [1995] used a set of tightly scripted treatments to assess the effects of social comparison on brainstorming productivity. However, in one treatment, one of the three facilitators on the project changed just two phrases in a 10-page script. Instead of saying, "performing above average," he said, "kicking butt." Instead of saying, "performing below average" he said "brain dead." This slight variation produced laughter among the subjects, which raised the salience of the social comparison, which caused a double-digit improvement in their brainstorming productivity. When the researchers discovered the script anomaly, the facilitators reversed roles. All facilitators were able to produce double-digit improvements by assuming a jocular tone when making the social comparison to the group.

- Connolly, Jessup, and Valacich [1990] demonstrated that using a script with a critical evaluative tone caused anonymous GSS users to produce more ideas of higher quality than did those using a script with a positive evaluative tone.

Thus, by knowing the *tool*, the *configuration*, and the *script*, one may be able to recreate the stimulus used by others to produce a pattern of thinking. Lacking knowledge of any one of these components, it may not be possible to reproduce results achieved by others with a GSS. The tool, the configuration, and the script constitute the *thinkLet*.

ThinkLets as a Pattern Language

The authors cite their field experience as suggesting that thinkLets tend to create repeatable patterns of thought among people working toward a goal, and because thinkLets have names, and because the components of a thinkLet may be communicated,

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

thinkLets may serve as a useful pattern language for reasoning toward a goal. This is where the relationship between thinkLets and Toulmin *et al's* schema of reasoning lies; the useful pattern language for reasoning. One can think of the basic pattern of analysis as *a decision justification script* consisting of a claim, grounds, warrants, backings, modal qualifiers, and possible rebuttals. By prescribing the components of this script within a justification social practice, one could be able to recreate the stimulus used by others to produce a pattern of thought among people working towards a goal.

A key consideration for our purposes however, is not the repeatability of *results* by the researcher, but rather the repeatability of the *process* by the group itself. The group should only be able to explain to itself and others the process it has followed in arriving at its decision. Of course, in case a particular tool was used, it too and its configuration may have to be explained.

The authors use the following examples to demonstrate the importance of a script, with the tool and its configuration kept constant:

Consider, for example, Free Brainstorming and Comparative Brainstorming, two thinkLets that use the same tool and configuration, but different scripts to produce different patterns of divergence. Both thinkLets use the GroupSystems Electronic Brainstorming tool in its default configuration, which provides a separate electronic comment page for each participant. Participants may contribute one idea to a page, then they must send the page back to the group. The system randomly brings back a different page that contains ideas contributed by others. Each page gradually accretes a conversation as it moves from person to person.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

With Free Brainstorming the participants are told:

The system will bring you a new page with ideas contributed by somebody else. You may respond to the ideas of others in one of three ways:

- *You may argue with them*

- *You may elaborate on them by adding detail*
- *You may ignore them and contribute a completely new idea.*

- *As soon as you finish one idea, you will send the page back to the group and get a different page back. The goal is to produce as many different ideas as we can in a short time.*

They note that people respond to this thinkLet by moving quickly to the boundaries of their problem space and producing a number of creative ideas, but the conversation also tends to be filled with noise and digression. The group must then use another thinkLet to sift the gold nuggets from the sand.

With Comparative Brainstorming, the participants know in advance the criteria for judging the quality of a good idea. For example, in a competitive manufacturing setting, good solutions might be those that are more efficient, higher quality, and build customer loyalty. These criteria become prompts in the script, which run something like this:

Each of you has a different electronic page in front of you. Everybody please enter the single best solution that occurs to you, then cross your arms and wait for you next instruction.

Now swap pages. You should see a page with one idea on it contributed by somebody else.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Give me a new solution that will be more likely to cut costs than the idea in front of you.

Now swap pages again.

Give me a new solution that is likely to result in better customer relationships than either of the two you now see on the screen.

Now swap pages.

Give me a solution that is more likely to shorten our production cycles than any of the ideas you see...

According to Briggs *et al.*, people respond to this thinkLet by producing fewer solutions that conform to the known criteria for idea quality. They do not tend to explore the boundaries of their problem space, but they arrive at high quality solutions very quickly, and there is very little noise or digression. Thus, when time is of the essence and the criteria for a good outcome are known, one might choose Comparative Brainstorming, but when creativity is more important than speed, one might choose Free Brainstorming. Each of these two thinkLets creates its own variation of the divergence pattern; each has its own personality.

A third example they use is a thinkLet called Point-Counterpoint which also uses yet another script based on the same tool and configuration to create a consensus-building pattern instead of a divergence pattern. The claim they make is that this thinkLet can be used to help break an impasse in a badly conflicted or polarized group. We identify this thinkLet as being based on the Hegelian mode of inquiry. It runs something like this:

Each of you has a different electronic page in front of you. Everybody please enter your single strongest argument in favor of your position, then cross your arms and wait for your next instruction.

Now swap pages. You should see a page on the screen with an argument contributed by some other person.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Whatever the argument you see on your screen, demolish it. Make as strong an argument against it as you can, whether you agree with it or not.

Now swap pages. You should now see two arguments on the screen: one that argues very strongly in favor of some position, and a mutually exclusive argument that counters the first. Your task is to write an argument that bridges those two mutually exclusive positions.

Now swap pages. Let's talk about what you see on your screens.

The observation they make here is that when people participate in a Point-Counterpoint, their initial arguments are diverse, starting from many different premises. Likewise, the counter arguments also tend to be diverse. However, when they begin to grapple with bridging arguments, it is not uncommon for many participants to find the same bridging argument.

The mechanics of the three preceding thinkLets are similar, but the pattern of thinking produced by each is unique. When one becomes familiar with thinkLets and their effects on thinking patterns, one can speak of large, subtle, and powerful GSS process design issues using very few words.

Reflections on ThinkLets

In reflecting on thinkLets, the authors acknowledge that although the thinkLet as an identifiable concept is fairly new to the GSS research community, the thinkLets themselves have been around for a long time as tacit knowledge in the minds of GSS researchers and facilitators. They indicate that, all of the GSS facilitators whom they have interviewed have had a dozen or so favoured thinkLets in their repertoires - reliable ways to create predictable patterns in the groups with which they work. Sometimes they had names for their thinkLets, other times they simply executed them without explaining them, even to themselves. With questions like,

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

What do you do when you've got a group that's badly polarized, and they just can't move forward?

What do you do when you want to encourage people to break out of old thinking ruts to find new ideas?

the authors report that they have elicited thinkLets from facilitators. They posit that by formalizing the thinkLets concept, and by naming and documenting the thinkLets, the GSS research community may be able to:

- Create a common pool of useful thinkLets from what are now isolated puddles of valuable intellectual capital.

- Theorize about the underlying propositions of cause-and-effect that play out during goal attainment in an effort to explain why the known thinkLets work as they do.

- Provide a solid basis for analysis and comparison of field and laboratory studies of GSS research. Field studies become far more controllable if their GSS interventions are scripted and documented, and if measures are taken to determine whether the expected patterns of thinking do, in fact, emerge in GSS intervention. Laboratory studies become far more replicable when all components of the thinkLet stimulus are controlled and reported.

- Design new, more efficient and effective thinkLets based on theoretical foundations and empirical results of thinkLet-based studies.

- Produce new technologies even better suited to creating, sustaining, and then changing patterns of thinking among people working toward a goal.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

With a GSS, a beginner can learn all there is to know about how to make things happen on the screen, and still have no idea about how to use the GSS to move people toward a goal. By focusing beginners on patterns of thinking from the outset, they appear to have a better grasp of the possibilities a GSS presents. They can create useful patterns of thought without having to learn more than is necessary about the details of the technology.

ThinkLets as a cornerstone for repeatable methodologies

In concluding their study, the authors point out that a thinkLet isn't a methodology. It is a way to create a pattern of thinking; a methodology is a step-by-step way to accomplish a mission critical task like strategic planning or requirements negotiation. They indicate that in the end, a thinkLet only matters if it can make a difference on some important task. They caution that just because they can predictably create a pattern of thinking doesn't mean they can create a successful methodology. According to them, much work remains to be done to learn how thinkLets can be combined to create predictable, repeatable success on mission critical tasks. They quote Ashby's (1956) law of Requisite Variety and say that thinkLets may be thought of as a control system for patterns of reasoning, while a methodology may be considered a control system for accomplishing a mission critical task.

An important limitation pointed out is that although a thinkLet may create a predictable thinking pattern, the user of a thinkLet must assure that the pattern it creates will, in fact, be useful for the task at hand. A divergence thinkLet may block the success of people who need and want to converge.

Conclusions and call to action on thinkLet research

The authors note that because a thinkLet encapsulates the components of a stimulus used to create a single repeatable, predictable pattern of thinking among people working toward a goal, in GSS research, the thinkLet may be a more useful unit of comparison

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

than the GSS. By focusing on thinkLets instead of technologies, GSS researchers may be able to produce more replicable results, and may be able to broaden the scope of GSS research beyond its current focus on divergence, to embrace convergence, organisation, elaboration, and so on. A focus on the thinkLet, rather than on the GSS technology may lead eventually to a fundamental shift in the structure and purpose of the GSS. A GSS is commonly perceived as a collection of useful software tools for groups making a concerted effort. They report that no existing GSS yet supports directly the capture and delivery of all three components of a thinkLet for the purpose of creating a repeatable pattern of thinking. They conclude that because thinkLets demonstrably create repeatable patterns of thinking, they may provide a window to the cognitive, social, and other mechanisms that come into play as people work toward their goals.

As a call to action by the GSS research community, the authors say that many existing thinkLets are still embedded in the tacit knowledge of expert GSS users, and as such are unavailable to the GSS community. They point out that much work lies ahead to retrieve, document, and publish these thinkLets so they may become part of the GSS research and practice canon. They note further that today's thinkLets are parsimonious prescriptions, derived and tested in the field, indicating that to date, little theoretically rigorous study of the cognitive, social, political, and other principles underlying thinkLets has been done. According to them, much research must still be done to explain why these prescriptions work as they do. The authors say that many of the classic GSS research papers do not report procedures in sufficient detail to allow a reader to infer the thinkLet that gave rise to the effects, and as such much of that research should now be revisited and replicated with clearly scripted thinkLets, so we may learn what it is we should have learned from those ground-breaking studies. It is noted that the seven basic thinking patterns have all been defined in terms of movement and change – from fewer ideas to more ideas; from less detail to greater detail; from less agreement to more agreement, and so on, and that this framing of the categories points the way for empirical measures of thinkLet efficacy. According to the authors, if a thinkLet is to cause convergence, one can measure the

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

degree to which and the speed with which people were able to focus their attention on ideas worthy of further attention. If a thinkLet is to cause the building of consensus, one can use coefficients of concordance to measure the degree of consensus in a group. Their final call to action is that by focusing on measuring the kind of movement change a thinkLet is meant to induce, researchers can grapple with some important constructs that may have previously been hard to pin down.

On using the thinkLet concept within the research framework

Perhaps the best way to explain our thinking about how the thinkLet concept would be used in the framework is to construct an illustration. Our reference diagram in this regard is Figure 4.13 below. Our starting point is a *decision justification social practice* as described earlier. Group members starting a group decision-making process informed by the decision justification social practice would commence their task knowing and accepting that they will have to justify their decision to themselves and others.

A group decision justification thinkLet informed by Toulmin *et al.*'s schema of reasoning would then be constructed. Such a thinkLet could have a *script* containing all the elements of the basic pattern of analysis. A tool to be used to support this effort would be configured, and the group would be taken through a particular kind of training (outlined in the next chapter) aimed at enabling them to be aware of both the constraining and the enabling nature of the tool and its configuration. The decision-making process would then proceed hermeneutically, with multiple perspectives generated and interpreted as in Figures 4.3 and 4.13. The structurational processes presented by Poole *et al.* and Orlikowski would be used by the researcher as interpretive lenses. The results of the hermeneutic process by the group itself would be recorded in a format consistent with Toulmin *et al.*'s schema of reasoning, thus enabling the group to identify their decision making patterns and therefore the argumentative logics of their final decision.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Clearly, the notion of a script in a thinkLet would be helpful for our purposes. The concept of a thinkLet addresses key design aspects of GSS research which are very relevant to our study.

Focus on symbolic interaction - the interpretive approach for GSS research

We have introduced the basic ideas behind symbolic interaction in chapter 3 and gave the reason for its inclusion into the research framework. The question we are attempting to respond to here is in what way do these ideas assist us in pursuing our research purpose and goal. Because symbolic interaction is a long standing methodological tradition, let us first discuss its methodological principles before attempting the above question. Gopal and Prasad (2000) describe the principles as follows:

> "Symbolic interaction is part of the intellectual tradition best characterized as interpretivism. While sharing many of the influence and features of phenomenology, social construction, and dramatism, symbolic interaction is nevertheless a unique approach in its own right. It is rooted in the social constructionist position that views all social interaction as following from the meanings assigned by individuals and groups to objects and events in the course of everyday life and practice. It is based on the premise that human society is characterized by the use of symbols and meanings, and that the meanings of various social and non-social objects or symbols are derived through the interaction process. To a symbolic interactionist, any technology, including GDSS, acquires a certain symbolic reality only through the interpretations made by a number of people including designers, managers, facilitators, and various end-users. Symbolic interactionists recognize that people may symbolically sustain certain notions such as freedom, justice and leadership at a broad societal level, but that those notions contain very different images and meanings for people within particular institutional contexts." (Gopal and Prasad, 2000)

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

According to these authors, there are four key aspects underpinning symbolic interaction:

Roles - which are socially defined expectations of behaviour from individuals in particular social positions. These roles also provide individuals with a complex set of identities, which become the source for individual interpretations of social situations. Thus one's identity as an IS expert or as a school teacher will strongly influence one's interpretation of any circumstance, action or object.

Enactment - which refers to the process whereby symbolism in organisations shapes and influences everyday action by different organisation members. Thus, meanings attached to objects such as computers or GDSS exert considerable influence on how these technologies are received and used in any organisation.

"Self" and "Identity"- retained as ontological attachment which serve as a fundamental source of all sense making and interpretation. This means that research in this tradition looks for multiple rather than shares realities. From a symbolic interactionist standpoint, these multiple realities might be fragmented and even contradictory, but nevertheless form an integral part of the research account.

Dynamic and *Emergent* nature of social meanings - meaning and action are inextricably intertwined, each producing and being produced by the other. The term symbolic interaction itself refers to this inseparable connection between meaning and action.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Table 4.3: Criteria used to evaluate symbolic interactionist research (Gopal and Prasad, 2000)

Research stage	Guiding Principle	Description of Principle
Research design	Compatibility of research questions with symbolic interactionist assumptions and orientations	Questions need to focus primarily on the symbolic and emergent aspects of phenomena being studied with emphasis on multiplicity of meaning and the role of self and identity in mediating local interpretations
	Selection of appropriate field setting and methods	Research conducted only in a naturalistic field setting that permits researcher access to multiple standpoints in the situation. Choice of methods that permit access to everyday lifeworlds and experiences.
Data collection	Immersion	Depth of researcher involvement either through lengthy observational periods or through intense contact with subjects and situation
	Capture of multiple realities	Gathering viewpoints and interpretations that are shared, divergent, and even contradictory
	Familiarity with context(s)	Understanding the relevance of different contexts (organisational, professional, etc.) that are symbolic parts of the situation being studied.
Research description	Thick description	Presenting the connotational significance of the findings
	Maintaining narrative rather than scientific style	Telling a story that is relevant to the different actors in the field rather than the researcher's own story.
	Emphasizing the problematics of the research situation	Presenting the more complex dimensions of the findings, with an emphasis on the insightful rather than the generalizable

In conclusion, the authors indicate that the conduct of research within the symbolic interactionist tradition implies the adherence to certain principles that guide the research design, the data collection process, and the presentation of the study's findings. They give

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Table 4.3 as a summary of the criteria that would be used to evaluate sound symbolic interaction research.

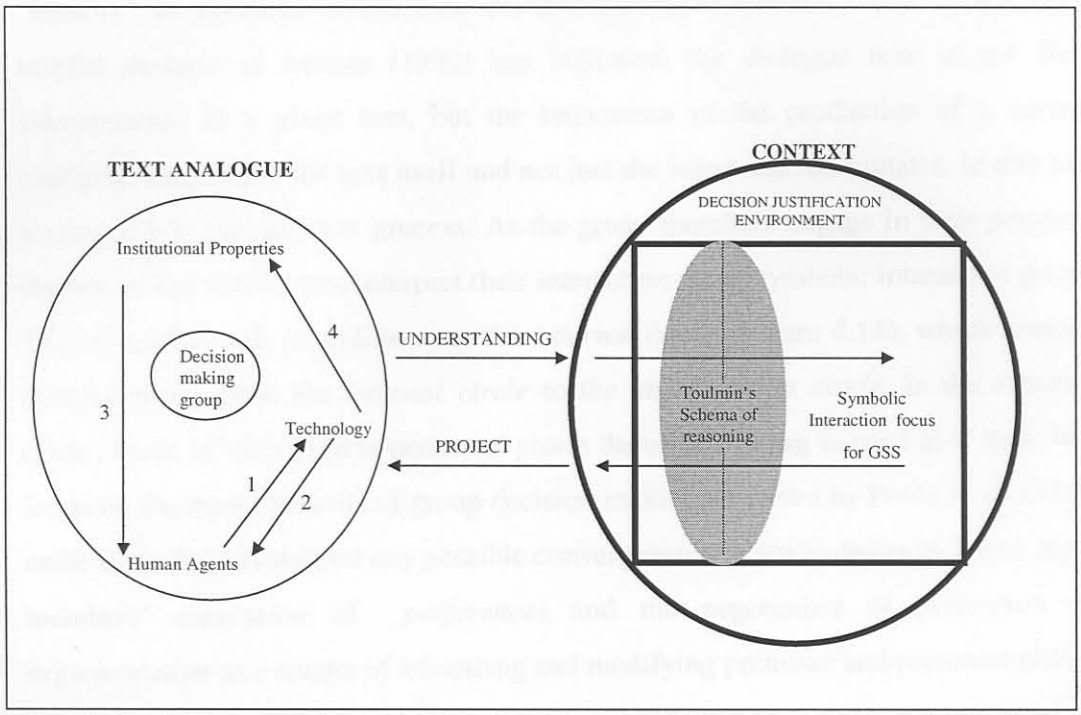

Figure 4.14: Group decision-making and Symbolic interaction research focus for GSS

We conclude by a brief description of how symbolic interaction ideas would be used in the research framework.

Firstly, like all the other theories included in the framework, we will use it as one of the lenses through which to look at and interpret empirical data. Secondly, because our analysis approach is interpretive, symbolic interaction naturally adds to our interpretive repertoire. Lastly, its principles strengthens our theoretical argument for a decision justification social practice, especially its notion of *roles,* which emphasizes socially defined expectations of behaviour for individuals in particular social positions. Assuming that the group members all agree that they will have to justify their decisions to themselves as a group and to others, and therefore seek to prepare themselves for this as they engage

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

they engage in the decision-making process; in other words, we assume that the group agrees to the *decision justification social practice*; then a more practical illustration could be constructed from Figure 4.14 as follows:

In line with symbolic interaction requirements, the multiple realities from each group member would be surfaced and discussed. Toulmin *et al.*'s schema of reasoning would serve as a procedural guide and repository for the ensuing discussion. Then the alternative description of the hermeneutic circle as presented in Figure 4.3 is "swept in" and the group enters into a dialogue as described earlier. Each group member in the dialogue would inject a new perspective and place the rest of the group in a hermeneutic circle. We will call the alternative hermeneutic circle the *internal circle*, meaning the *interpretive level* where the group members are sharing their individual perspectives amongst themselves around the decision problem at hand. Because of the principle of "self" and "identity" in symbolic interaction, the alternative hermeneutic circle would be more helpful because as Introna (1992) has indicated, the dialogue here is not the joint interpretation of a given text, but the interaction in the production of a continually changing text; where the text itself and not just the interpretation mutates. In this case the text would be the decision process. As the group members engage in their perspectives, the researcher will in turn interpret their interaction using symbolic interaction principles. The researcher will in addition use the *external circle* (Figure 4.14), which projects the interpretations from the *internal circle* to the *structuration circle.* In the structuration circle, Poole *et al.*'s (1985) notion of group decision making is used as a lens. We will focus on the three elements of group decision-making proposed by Poole *et al.*'s (1985) in order to track and interpret any possible convergence to a group decision. These are group members' *expression of preferences* and the negotiation of preference orders; *argumentation* as a means of advancing and modifying premises and preferred orders; and *strategic tactics* members employ to win assent for their proposals. A new understanding will then be returned, through Toulmin *et al.*'s schema of reasoning to the internal circle. The requirements of Toulmin *et al.*'s schema would assist in imposing a validity check on preferences and argumentation, which will be in the form of a series of claims, grounds,

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

warrants, backings, modal qualifiers and possible rebuttals, which in a way would have been used by the group to reach its decision. The work of Orlikowski will also be used to illuminate the interpretation. Through this interpretive process, we hope to be able to add both theoretically and practically to a better understanding of GSS use and research, while at the same time enabling the decision making group to justify their decisions when challenged to do so.

4.4 What to look for in assessing and evaluating this study

In this section, we give a brief overview of what we regard as indicators for the assessment and evaluation of this study based on the research framework we just described. A full discussion on the evaluation of the study will be made in chapter 6. Because our chosen research method is interpretive and of a hermeneutic nature, Klein and Myers' (1999) set of principles for conducting and evaluating interpretive field studies in IS research applies. Without discussing these principles here, we give a summary of the principles in Table 4.4. We also list in point form some of the key aspects which the evaluator of this research could consider. This is not an exhaustive list, but in the author's view, sufficiently significant to guide the evaluator on what to look for in evaluating this study. The aspects are discussed in some detail in chapter 6:

- *The significance of the problem being studied and the research purpose.*

- *The philosophical foundation, the appropriateness of the research method and the analysis approach.*

- *The extent to which the research framework enable both the researcher and the decision-making group to obtain a deeper insight in the decision justification process through interpretation.*

- *The extent to which the use of existing theories in combination illuminate various aspects of the decision justification process.*

- *The extent to which the framework enable the identification of areas where the theories in use are more helpful and where they are not, thus an enhanced understanding of the theories themselves.*

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

- *Whether the research questions raised have been satisfactorily responded to.*

Table 4.4: Summary of principles for the conduct and evaluation of interpretive field research (Klein and Myers, 1999)

1. The fundamental Principle of the Hermeneutic Circle This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles.
2. The Principle of Contextualization Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.
3. The Principle of Interaction Between the Researchers and the Subjects Requires critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and participants.
4. The Principle of Abstraction and Generalization Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action.
5. The Principle of Dialogical Reasoning Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision.
6. The Principle of Multiple Interpretations Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories on the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.
7. The Principle of Suspicion Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

4.5 Conclusion

We have presented a multi-theoretic analysis framework based on the hermeneutic philosophy. In order to operationalise the framework, it was decomposed into five interpretive schemes embedded in a hermeneutic circle. A brief description of how each scheme would be used to seek an understanding of both the group decision-making and the decision justification processes was presented. As Gopal and Prasad (2000) have said, ultimately, it may only be through the use of multiple lenses that we can develop a useful body of knowledge about GDSS and its use. The same can be said of the group decision justification process. Because it is multi-dimensional in nature, no single lens is sufficiently robust to illuminate all the aspects that could be at play in the process. Although the use of the interpretive schemes as constructed in this framework may still leave some aspect of the group decision justification unexplored, an enhanced understanding of the process as stated in the research purpose would have been attained.

A set of principles for conducting and evaluating interpretive field studies in information systems proposed by Klein and Myers (1999) applied within each pair of interpretive schemes would enable the researcher to make deep interpretations of empirical data.

In the next chapter, we present the research design, fully describing how the empirical data was obtained. We also present the "raw data" itself, before embarking on its analysis using the research framework. All the theoretical arsenal guided by the research questions and the research framework will then be pulled together to bring meanings to sets of data which have already been collected - hopefully, bringing a further illumination on the requirements of the decision justification process. The research questions raised in chapter 3 will be revisited, with a view to seeking some responses to them from within the fundamentals of the research framework, especially from Toulmin *et al.'s* (1979) schema of reasoning. In addition, a decision justification social practice, including a particular kind of training for GSS users will be proposed.