

1995

The Participant's Summative Perceptions of the Quality Function Deployment (QFD) Process as Used to Review a School Policy

Les Tiede
Edith Cowan University

Follow this and additional works at: https://ro.ecu.edu.au/theses_hons



Part of the [Educational Administration and Supervision Commons](#)

Recommended Citation

Tiede, L. (1995). *The Participant's Summative Perceptions of the Quality Function Deployment (QFD) Process as Used to Review a School Policy*. https://ro.ecu.edu.au/theses_hons/662

This Thesis is posted at Research Online.
https://ro.ecu.edu.au/theses_hons/662

Edith Cowan University

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study.

The University does not authorize you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following:

- Copyright owners are entitled to take legal action against persons who infringe their copyright.
- A reproduction of material that is protected by copyright may be a copyright infringement. Where the reproduction of such material is done without attribution of authorship, with false attribution of authorship or the authorship is treated in a derogatory manner, this may be a breach of the author's moral rights contained in Part IX of the Copyright Act 1968 (Cth).
- Courts have the power to impose a wide range of civil and criminal sanctions for infringement of copyright, infringement of moral rights and other offences under the Copyright Act 1968 (Cth). Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

THE PARTICIPANTS' SUMMATIVE PERCEPTIONS OF THE
QUALITY FUNCTION DEPLOYMENT (QFD) PROCESS AS USED TO
REVIEW A SCHOOL POLICY

BY

Les Tiede



A Thesis Submitted in Partial Fulfilment of the
Requirements for the Award of

Bachelor of Education (Honours)

at the Faculty of Education, Edith Cowan University

Date of Submission : 30th November, 1994.

Attachment II


ABSTRACT

This study investigated a recent development in the quality management area, namely, quality function deployment (QFD) and its relevance to education. QFD has shown itself to be very useful as a tool for understanding, prioritising and planning the way in which organisations perform their functions; however, its application has, to date, been very limited in education. This study concerned itself with the use of the QFD process in a high school to review a behaviour management policy.

The literature is extensively examined to review the development of quality management leading up to the advent of QFD. The study explored QFD's benefits in industry and the complementary trends in education in an attempt to establish a link between the two. A detailed explanation of the concepts associated with QFD is provided along with the placement of QFD among curriculum planning models to orientate educators to this new development. Action research was used with a case study approach to clarify what could be expected if QFD was implemented in mainstream schools.

Part One of the study comprised of the steps followed in the application of the QFD process to review a school's Managing Student Behaviour (MSB) policy and includes a diagram of the procedure, a House of Quality matrix and a table of results. In Part Two the perceptions of the members of the QFD team about the QFD process were gathered and summarised. This study was the first time that Western Australian teachers had experienced the QFD process and their verbatim comments about the process are evaluated. The study found that QFD was a useful tool by which a school's behaviour management policy could be reviewed. According to the teachers who were in the QFD team, the QFD process was thorough and gave a good validation for the decisions which were made during the process. In addition to this, the QFD team thought that the QFD process provided for the input of all parts of the school community as well as showing the team what to do with the data which were gathered from this community.

"I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education; and that to the best of my knowledge and belief it does not contain any material previously published or written by another except where the due reference is made in the text."

Signature..........

Date.....*21/9/95*.....

ACKNOWLEDGEMENTS

A number of people were tolerant and supportive during the process of this study and for this I would like to thank my school colleagues, friends and my children, Dayna and Alex. Four people stand out for their constant support and help. Without my supervisor, Richard Berlach; Florence Maltby, for her insight; my computer laureate friend, Graham Killick; and my brother, Andrew, this task would not have been accomplished.

Table of Contents

	Page
Abstract	2
Declaration	3
Acknowledgements	4
List of Tables	8
List of Figures	9
List of Appendices	10
Chapter	
I INTRODUCTION	
The Background to the Study	11
Total Quality Management in Industry	11
Total Quality Management in Education	12
Antecedents of Quality Function Deployment as a Paradigm	13
Quality Function Deployment	14
Educational Applications of Quality Function Deployment	15
Changes to School Planning	16
The Significance and Purpose of the Present Study	17
Research Question and its Environment	18
Summary of the Study	20
II REVIEW OF LITERATURE	
The Picture from Industry	21
Overview of the Development of Quality Management	21
Total Quality Management	22
Introducing Quality Function Deployment	24
The Quality Function Deployment Process	27
The Strengths and Benefits of Quality Function Deployment	28
The Picture from Education	30
Overview of the Development of Quality Management	33
Trends Towards Third Generation Quality Management	33
Quality Management in Western Australian Education	35
The Advantages of QFD in the Educational Setting	38
Chapter Summary	39

Terms Associated with Quality Function Deployment and Total Quality Management	40
Quality	40
Process and Sub-process	41
Customer	42
Requirements	43
Focus Group	44
Voice of the Customer	44
Cross-functional Team	45
Quality Function Deployment	45
House of Quality	45
Proactive Planning	46
Decision Making Using QFD	46
Concurrent QFD	47
III	CONCEPTUAL FRAMEWORK
Quality Function Deployment as a Curriculum Planning Tool	48
Theoretical Framework	53
Method of Investigation	56
Summary	57
IV	DESIGN OF THE STUDY
Introduction	59
Rationale	59
Ethics	59
Part 1: The Implementation of QFD	
Sample	60
Procedure	60
Data Collection	65
House of Quality	72
House of Quality Outcomes	76
Part 2: The Perceptions of QFD by the Participants	
Procedure	77
Results	79
Validity and Reliability	83
Analysis of Perceptions	84
Summary of Results	92

V IMPLICATIONS AND CONCLUSION

Implications

98

Conclusion

102

References

103

Appendices

107

List of Tables

	Page
Table 1 Mean scores and standard deviations for importance and satisfaction ratings of each customer requirement by each customer group	67
Table 2 Participant's perceptions of the QFD process	79
Table 3 Participant's perceptions about how the process performed its function	85
Table 4 Participant's perceptions about how the participants felt towards the QFD process	87
Table 5 Participant's perceptions about difficulties the participants experienced with the QFD process	88
Table 6 Participant's perceptions about the way in which the QFD process ought to be undertaken	89
Table 7 Participant's perceptions of features of the QFD process in relation to its function	90
Table 8 Participant's perceptions about phenomena which developed during the QFD process	91
Table 9 Participant's perceptions about their overall evaluation of the QFD process	92

List of Figures

	Page
Figure 1 The expanded House of Quality	26
Figure 2 The location of QFD in relation to existing curriculum models	48
Figure 3 The Old Way and the New Way [of doing business]	50
Figure 4 Nicholls model of the curriculum process	51
Figure 5 Skilbeck model of the curriculum process	52
Figure 6 QFD as implemented for the review of the Managing Student Behaviour policy	63
Figure 7 The House of Quality matrix	66
Figure 8 The design of the study of the perceptions of the QFD process by the participants	78

List of Appendices

	Page
Appendix 1 Managing Student Behaviour questionnaire	107
Appendix 2 The report of the Managing Student Behaviour Policy Review Committee	109
Appendix 3 Comments made by participants about QFD after participation in the process	111
Appendix 4 Questionnaire of the participants' perceptions of the QFD process	115
Appendix 5 Participants' declaration	118

CHAPTER 1

Introduction

The Background to the Study

Across Australia in recent years the focus of decision making in education has been changing from a centralised perspective towards meeting the specific needs of the school and increasing the degree of collaboration between the school and the community (Chapman, 1987; Loudon, 1989; p.50). This trend seems to be moving towards schools becoming more autonomous (Beare, cited in McGowan, 1993, p.47); more able to respond to their individual situation (Louden, 1989; p.50) and so more accountable for their decisions (McGowan, 1993, p.50). In a study which looked at the role of principals in Western Australian schools McGowan (1993) concluded that "school management as a process of meeting organisational goals through others, requires processes which clearly establish intent, prioritise the utilisation of resources and emphasise the importance of gathering information or feedback on outcomes" (p.50). In their attempt to accommodate these trends, some schools are attempting to implement the features of a modern management approach known as Total Quality Management (TQM).

As TQM in education gained its impetus from an industrial milieu, it is important to examine these antecedents prior to engaging in a discussion about the relevance of TQM to education.

Total Quality Management in Industry

TQM can be defined as being "a strategic approach to producing the best products and services through a process of continuous improvement of every aspect of a company's operation" (Hand, 1992, p.26). TQM is a management approach which focuses an organisation on what its *customers* want rather than what its "experts" consider to be best for these customers. In the management terms of today, a customer is any person or event which is downstream of a particular process carried out by the

organisation (QFD Services, 1992). By adopting TQM, an organisation becomes committed to the continuous improvement of all of its functions through empowering each of its members to make whatever changes are necessary. Ideas for improvements usually come from the employees and their implementation is assisted by the organisation's ongoing recording and collection of data about its functions and customer perceptions. A team of appropriate people thoroughly examine the idea in the light of the facts available and this leads to the details of the design and implementation of that idea (King, 1987). It is worth noting that a concept basic to TQM is that it is processes which fail, not people (Hand, 1992). Thus the focus of the data collection is on the degree to which a process fulfils its function, not whether an employee is working as hard as is possible.

Total Quality Management in Education

Bell (1993) sees TQM as being the practice of following set procedures to meet precise specifications in all aspects of the work of a school in such a way that all the staff know what they have to do, how to do it (p.2) and why they are doing it. Under TQM the school is continuously endeavouring to improve the way in which it meets or exceeds, *externally*, the requirements of its students, parents, prospective employers, future educators of the students, government authorities and *internally*, its teachers, senior managers and non-teaching staff. Thus the specifications of each aspect of the school's work are not fixed, in fact, they are under constant review and the teachers and other staff are all empowered to implement improvements in the way they perform their own functions as well as being encouraged to suggest improvements elsewhere within the school. Under TQM, failure with the way a school performs its functions is not looked at as being the fault of a teacher or another staff member, but as being the result of a faulty process upon which the appropriate personnel work to improve (Murgatroyd & Morgan, 1992; Bell, 1993).

Antecedents of Quality Function Deployment as a Paradigm

In the Japan of the 1950's and 1960's, the works of Deming and a number of others led to the development of the total quality concept. The total quality concept involved viewing *quality* as being the attributes which meet customer requirements, or more simply, *fitness for use* (Juran, 1988). Feigenbaum (cited in Akao, 1988) defined a *quality system* as the administrative and technical procedures required to produce and deliver a product of specified quality standards. This was the basis of Total Quality Control.

The development of a *system* which would ensure that customer requirements would be met, continued and came to incorporate more functions than just administrative and technical procedures. Juran (cited in Akao, 1988) saw functions that contributed to quality, such as design, trial and manufacturing, as *quality functions*. To this, Akao added that *planning* and *design* contributed to quality and so they were also quality functions. Since a system could be seen as a logical sequence, then a *quality system* would be a *logical sequence of quality functions*. The work of Mizuno (cited in Akao, 1988) led to the idea that use of objective procedures to systematically arrange functions that form quality, in a step-by-step array and in greater detail, was the *deployment* of quality functions. Thus a *quality system* could be based on the *deployment of quality functions*.

Quality Function Deployment (QFD) arose from the Quality Control movement of the fifties and early sixties. Ishikawa or 'fishbone' charts were used to identify customer demands and to establish design quality. In 1966 Akao concluded that the critical points of Quality Assurance needed to be carried through design and manufacturing which meant that customer requirements needed to be *thoroughly* understood by more parts of the organisation and that this needed to be a *shared* understanding between the different parts of the organisation. The *communication* of customer demands and quality characteristics was improved by a *matrix* which was developed in the Kobe shipyards during 1972 by Mizuno and Furukawa (cited in Akao, 1988) who published their work in a paper called "Quality Control in Planning".

Two Years later Akao founded and chaired a research committee for Quality Function Deployment to improve the transition from design to manufacturing. He developed the matrix known as the *House of Quality* which enabled people from the different departments (and functional backgrounds) of an organisation to develop a thorough and shared understanding of their customer requirements and then to *identify* and *prioritise* the attributes which were the *most critical* to meeting (or exceeding) these.

The introduction of Quality Function Deployment to the United States was by means of a journal article written by Akao for the October 1983 edition of *Quality Progress* (King, in Akao, 1988, p.xv). Since then it has spread throughout the automotive industry and then to other manufacturing, and more recently, service industries. Quality Function Deployment reached Australia during 1989. By 1991, a significant number of influential organisations such as BHP, Westpac and IBM began to make use of it. So what is QFD?

Quality Function Deployment

QFD is a planning process by which members of a team who perform a cross-section of functions within an organisation use objective procedures to translate the requirements of customers into values which are then used within the process. After a very thorough analysis, QFD can prioritise these requirements and ultimately identify the features which will satisfy the most important customer requirements (King, 1987). With this information, an organisation can begin to implement TQM, *or some other forms* of quality management with a credible customer focus. This customer focus is supported by QFD's overview of the situation which, in turn, provides a "roadmap" of the decisions taken, as well as their justification and sequence (Conti, 1989). In this way QFD acts as the *interface* between an organisation and its customers to focus the organisations efforts on meeting or exceeding the requirements which are the most important to its customers.

QFD is based on "great attention to detail and a constant focus on the customer's needs" (Hand, 1992, p.56). The documentation which is part of the QFD process is a precisely and exhaustively detailed record of the decisions made. It includes the rationale which underpins the decisions made in prioritising and planning either a function, or the entire working of an organisation. As such, it is a valuable *data source* for employees performing their functions within a TQM or other customer-driven approaches.

QFD has been used mainly in manufacturing, but it has shown itself to be versatile enough to be successfully applied to service industries which have some functions in common with education. Some of the outcomes attributed to the use of QFD are improved customer satisfaction (Morrell, 1987; Kenny, 1988); better understanding of customers and their needs (Ealey, 1987; Cohen, 1988; Holusha, 1989); and improved morale, teamwork and communication (Ealey, 1987; Morrell, 1987).

Since its development in Japan over twenty years ago, QFD found its way to the United States in the mid-eighties. There it has spread from the automobile industry to other areas such as airlines, banks, hotels and hospitals. QFD was introduced to Australia during 1989 (QFD Services, 1992) and already Alcoa, Broken Hill Propriety, Commonwealth Serum Laboratories, Citibank, Gadsden Rheem, Hewlett Packard, International Business Machines, Imperial Chemical Industries Dulux, Portland Aluminium, South Eastern Queensland Energy Board, Shell, Telecom and Westpac have adopted its use (Gilmour & Hunt, 1993; QFD Services, 1992).

Educational Applications of Quality Function Deployment

A C.D. Rom search (ERIC, International ERIC, Austrom, Dissertation Abstracts, and ABI/Inform databases) and enquiries to private management consultants revealed that little has been written to date on the use of quality management in education and even less has been written about the use of QFD in schools, the exception being Murgatroyd and Morgan (1992) in Britain, who have written an excellent book titled *Total Quality Management and the School* which includes a comprehensive

section on QFD, and Tribus (1993), who bridges the gap between industry's perspective and education.

Educational applications of QFD include: the design of a programme to train linesmen for the South-Eastern Queensland Energy Board (cited in Walker, 1992); an undertaking to use QFD to define customer needs by Oregon State University as part of the Dean's decision to implement TQM (Coates, 1990); the planning of a large Mid-western high school's guidance programme (Stamm, 1992); the use of an adapted QFD matrix to attempt to improve the teaching process at Mt. Edgecumbe High School in Alaska (Tribus, 1993); and the use of QFD as an institutional planning tool at El Camino College in California where TQM was being implemented (Schauerman, Manno & Peachy, 1993).

In education, Murgatroyd and Morgan (1992) cited the development of *shared* understanding between team members and *identifying the most important areas for improvement* as being among the benefits of using QFD's House of Quality matrix process.

Changes to School Planning

Increasingly in Australia and overseas, schools are being asked to meet the needs of their *particular* community (Louden, 1989; Tribus, 1993). Louden (1989) at the time that he was the Chief Executive Officer of the Ministry of Education in Western Australia, combined the need for a *new approach to planning* in education with what was very close to being a *customer focus* when he wrote the Foreword for the policy and guidelines of *School Development Plans*:

In recent years the nature of educational planning has changed. Principals and teachers are now asked to plan collaboratively as schools are given increased responsibilities for educational decision making. Schools are also required to respond to, and wherever possible incorporate, the needs and desires of their local communities. All this means that, rather than taking on

more and more planning tasks, schools must change the ways in which they plan. (Foreword)

There is a need for a planning technique in education which is able to focus and align the functions carried out by the different people within a school towards the outcomes required of it by its clientele. This is especially so at a time when schools are undertaking school development plans and experiencing increased enrolments in the final two years of high school. These increased enrolments are made up of, in part, students who would not normally pursue established academic curricula, but who, because of high unemployment and age restrictions on social security payments have little choice, but to remain at school.

QFD ought to be considered as a possible new way of planning by educational organisations in Western Australia because it meets the criteria Loudon referred to above and because it has already experienced success in its embryonic phase in education elsewhere (Murgatroyd & Morgan, 1992; Tribus, 1993; Schauerman, Manno & Peachy, 1993). Further to this, Murgatroyd and Morgan (1992) say that *the most powerful tool* which helps a school in coming to understanding its processes *from their customer's perspective* so that it can design these processes to satisfy its customers, is the House of Quality.

The Significance and Purpose of the Present Study

This study is significant for a number of reasons. Firstly, QFD has already shown itself to be a very successful planning and prioritising tool in industry, but it is still only in its embryonic form in education, with early indications from the 'pioneers' of QFD in education showing promise. Secondly, there is a trend towards national curricula and testing/accountability requirements whose impetus came from non-educators such as Finn, Mayer and Carmichael (Hough, 1992). This trend places pressures on schools to perform their functions in demonstrably more efficient and accountable ways at a time when most teachers have yet to synthesise their educational

expertise with modern management paradigms. Thirdly, on a national scale, there is a need for "a paradigm shift in educational administration" (Hough, 1992, p.3) towards the thinking of the Total Quality movement. Fourthly, to assist the paradigm shift, the study provides an explanation of the concepts involved in QFD and its surrounding context. Fifthly, government schools in Western Australia have already begun the process of "devolution" which involves becoming *more autonomous and accountable*, particularly in the areas of operational decision making such as finance, management and administration (Hoffman, 1994). Finally, government school principals in Western Australia are already required to 'enable' staff and parents 'to participate' in school decision making with respect to the educational objectives and priorities of the school (Ministry of Education, 1992).

Thus, the general significance of the study arose from the challenges facing education and the potential of QFD to assist educators to meet them. Since there was no known experience of QFD in Australian schools by which to gauge its applicability to that context, the study sought to discover what teachers thought of the QFD process based on their own direct involvement in it.

Research Question and its Environment

What are the participants' perceptions of the QFD process after having used it to complete a review of the Managing Student Behaviour (MSB) policy?

The research question has been deliberately left broad and open because little, if anything, was known about QFD in the context of Western Australian schools and pre-empting the findings could reduce the effectiveness of the process. *Case study* was chosen as the framework for this study. This framework was preferred because it contained the attempt to understand a phenomenon in its natural setting and it did not impose any expectations on the researcher in terms of what *ought* to be found (Borg, 1989; Borg & Gall, 1989). This approach had the following advantages:

1. The focus of the researcher included *whatever* perceptions the participants had of the QFD process.

2. Since the researcher was only trying to find the genuine perceptions of *the participants* about the QFD process, the *nature* of these perceptions was immaterial to the success of the study. This meant that the researcher was less likely to convey to the participants a predetermined set of perceptions which were, for example, favourable towards the QFD process. Therefore, the likelihood of the researcher influencing the content of the participants' perceptions was minimised.

The research question sought to discover the thoughts of the teachers who could normally be expected to implement QFD in a school. This was done because any imminent applications of QFD in Western Australian schools would need to involve such teachers and currently, there was no known informed comment by teachers on this matter. Furthermore, the experiences of these teachers with the QFD process had the potential of providing educators with valuable insights regarding whether or not QFD should be considered for Western Australian education. To make the study more relevant to the current context in which QFD is largely unknown, an actual school application was preferred. This led to the selection of *action research* as the method of investigation.

Action research, is "the application of fact finding to practical problem solving in a social situation with a view to improving the quality of action within it" (Burns, 1994, p.252). This approach was used in the study because it provided the potential to find out what practising teachers thought about QFD after they had applied it to an actual situation in their school during the normal school year. Findings would therefore be at least potentially implementable in the school where the study was conducted. Stage One of Lewin's model of action research states that the problem should be considered broadly *so that too narrow a focus is not developed before more data from the situation becomes available* (Burns, 1994). This was a consideration in *both* the framing of the research question and the methodology devised.

Summary of the Study

This study traces the development of QFD from its antecedents in industry to its early applications to education. The study also provides an explanation of QFD and the concepts which underpin it. The study then looks at the trends in Western Australian schools which have implications for the application of QFD. During the study, QFD is implemented by teachers to review a school policy and their perceptions of the QFD process are gathered and analysed. The results are recorded and the implications are discussed. Since this is a descriptive and exploratory study utilising the situation-specific approach of action research, generalisability of results will not be considered.

CHAPTER 2

Review of Literature

The Picture from Industry

Before the educational implications of QFD can be considered, an historical overview of precursors of the technique needs to be mounted in order to place QFD in context. The implications of QFD for education come from the impetus given it by industry. A definition of significant terms is provided at the conclusion of this chapter to help orientate readers from the educational community, few of whom would be familiar with the theories and terminology associated with QFD.

Overview of the Development of Quality Management

The three generations of quality management.

Quality management has undergone a number of distinct phases during the twentieth century. From around the 1920's, industry sought to achieve quality by the rigorous inspection of the finished product (Walker, 1992). This was the method of the first generation of quality management. The key disadvantage with this system was that the supplier (the one who makes a product or delivers a service) had to succeed or fail *before* quality could be ensured. If the supplier succeeded the first time all was well and good, however, if there was failure, then there was also the wastage of the resources of the entire process already completed as well as the cost of creating something different.

During the 1940's the second generation of quality management evolved. Quality, it was thought, would be achieved through the monitoring of processes by the use of statistics (Walker, 1992). The time and motion studies in the work place were an example of this approach. In fact, many organisations still depend upon Statistical Process Control (SPC) to achieve the *quality* in their product or service (Walker, 1992). Industry found, however, that statistical controls could not address the problems which were inherent in the process being studied. They could only be used to monitor how well the intended process was working, not whether it would achieve the purpose for

which it was created (Walker, 1992). Furthermore, Deming (1991) revealed that 85 % cent of all problems are *process* problems; the remaining 15 % of problems Deming attributed to *other causes*, of which *people* were only an indeterminate part. Behind this was the thinking that it was *processes* which failed, not *people*.

In the late 1960's the limitations of second generation quality techniques such as SPC to ensure quality gave rise to the third, and current, generation of quality management techniques. These techniques concern themselves with the achievement of quality through *design improvement* (Walker, 1992). By identifying problems *during the design stage* of a product or service, the faults could be *designed out* and thus potentially prevented. This was a much cheaper and more efficient approach than waiting for problems to surface and then fixing them (O'Neal, 1989). This era saw the birth of TQM - Total Quality Management.

Total Quality Management

"Total Quality Management (TQM) is a strategic approach to producing the best products and services through a process of continuous improvement of every aspect of a company's operation" (Hand, 1992, p.26). TQM seeks to build a mutually beneficial relationship between suppliers and customers *throughout the organisation* and with its external customers. From the *understanding* gained in *listening to the voice of the customer* an organisation can employ its resources *in the areas which add value* rather than those which are wasteful. An example of this process cited a customer service employee in a computer company who was experiencing a large amount of wasted time on the telephone with customers because they could not name the model type numbers of the components which were causing them problems. Without the model number the employee could not help them and was feeling frustrated because of this and the amount of time spent trying to distinguish between components over the telephone. Meanwhile the customer was busy trying to get their complaint off their chest *and* get their computer fixed. Further, they were annoyed because they had trouble locating the identifying features asked for by the employee and demanded to know why the

identifying numbers were not clearly visible. The employee solved the problem by getting the manufacturing division to move the identification stickers from the *inside* of the machine to the *outside*! This simple example demonstrates some of the key features of TQM, namely: (a) all employees are empowered to initiate changes, (b) people need to work as a team across functions/departments, (c) quality is everyone's concern, (d) problems are *process* problems not *people* problems and (e) preventing problems is better than fixing them.

TQM takes a measured, thoughtful and logical approach to management. There is an ongoing collection of data which is used to update the way in which processes in the organisation operate. People in an organisation, understandably, often feel threatened by the collection of statistics relating to performance in their area. The truth of the matter is that people are rarely at fault (Deming, 1991). Hand (1992) states:

Hardly anyone goes to work to make mistakes. Yet every day in most companies between 20 and 40 per cent of all activity is wasted in resolving problems or fixing their effects, and redoing work. While people will occasionally make mistakes, the majority occur because the process has failed. For example because:

- * staff are working under constant pressure with little time to think about the quality of what they are doing;
- * people don't understand the effects their poor quality work has on other people;
- * people are not encouraged or even allowed to co-operate across functional boundaries;
- * people haven't been trained, or no documentation exists to help them do their tasks right;
- * the procedure being used is unnecessarily complex, or inconsistently adhered to.

(p.29)

The third generation of planning seeks to improve quality by designing problems out of a process *before they occur*. In the context of a process, TQM looks in detail at who is the customer; what that customer wants; and how that customer knows that they are getting what they want (QFD Services, 1992). Then the service provider (supplier) is in a position to try to design the process so that the customers *know* that they are getting what they want, which leads to customer satisfaction. During this design phase each detail of the supplier-customer relationship is examined, along with all the other details (e.g. the resources of the supplier; resources which could be diverted to the supplier etc.) which are relevant to the relationship, so that the process is designed *after* all of the relevant factors have been considered. To ensure that the designers have accurate information on which to base their decisions, TQM undertakes the ongoing collection of data about the performance of the organisation. This objective and *detailed* approach makes it possible to design a process so well that anything, *except what is intended*, is unlikely to occur (Hand, 1992).

One of the most powerful tools to appear under the TQM umbrella is QFD (Murgatroyd & Morgan, 1992). This tool has reaped rich rewards for those who have taken the trouble to understand its place in quality management.

Introducing Quality Function Deployment

In general, Quality Function Deployment (QFD) is a structured method which can be used to design a plan which is targeted at achieving specific outcomes. QFD is intended to be used by a team of people who, between them, cover the different parts and functions of their organisation. The structured process leads the team through a number of tasks in a pre-determined sequence which develops the understanding of customer requirements and the project being undertaken; makes prioritisation objective; bases the thinking in planning on prediction rather than reaction; ensures a thorough analysis of the situation and the planned project; and provides conditions for innovation in the ultimate design.

Quality function deployment (QFD) is a system for designing a product or service and the processes that go into its production based on customer needs and expectations, and involving all members of the producer or supplier organisation that have an effect on it. (Gilmour & Hunt, 1993, p.79)

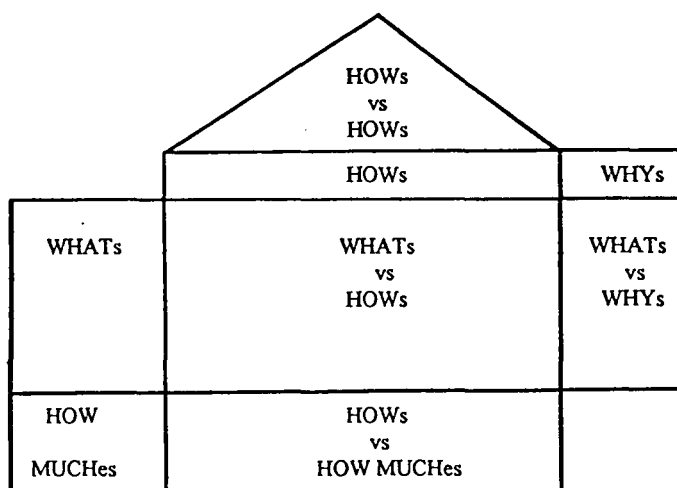
There are a number of versions of QFD and the one used in this study, *Concurrent QFD*, takes into account the view that people's perceptions *are* reality as far as *they* are concerned, meaning that people will act according to their perceptions even if they are contrary to facts. An example of this is that of Navistar (QFD Services, 1992), which was wondering why its trucks were not selling better. After research, the company found that their customers thought that their trucks did not have as much acceleration as those of their competitors. After exhaustive testing, which timed acceleration within all the significant categories, the company learnt that their trucks were, in fact, clearly faster in acceleration than their competitors. The company was baffled, so it sent its people out to talk to the farmers who had bought their competitors trucks. A number of farmers said that they could *feel* the greater acceleration of the truck they had bought. Navistar put in new seats with softer backs which increased the amount a person moved back during acceleration. Numerous independent tests of acceleration were conducted and the results widely publicised. Sales increased significantly. This serves to illustrate the value of listening to the voice of the customer and the importance of *communicating clearly* what a supplier is doing for the customer in the customer's language (*Have a test drive - you can really feel the acceleration!*).

King (1987) defines QFD as being "a system for designing product or service based on customer demands and involving all members of the producer or supplier organization" (p.1-9). The QFD process asks a series of questions which guide the planning decisions step by step with each step of the process being recorded on a matrix which resembles a house (see Figure 1), hence its name - *the House of Quality* . This matrix allows for the overview of both the process and its sub-processes, as well as for

the justification of each decision taken in the design of the new product or service (Conti, 1989; QFD Services, 1992).

Figure 1.

The Expanded House of Quality



(Note. From "Quality Function Deployment" (p. 36) by QFD Services, 1992, Sydney: QFD Services. Copyright: 1991 by ITI Inc, copyright 1992 by QFD Services. Reprinted by permission.)

All decisions during the QFD process are made from the perspective of satisfying the customer and are recorded within the *House of Quality*. The QFD process begins with the customer and their requirements then it works forward step by step, sub-process by sub-process, until it identifies what is needed to satisfy these requirements. Since each step of QFD is recorded, the criteria to guide each step of the new process being designed is readily available. In this way the voice of the customer drives the process being designed. QFD can be applied to one process, a group of processes, or to all the processes performed by an organisation.

QFD involves: (a) finding out which customer requirements are most important to the customer, (b) thinking of ways of satisfying each customer requirement, one by one (predictors or means or HOWs), (c) examining the impact of each of these HOWs on *each* requirement, (d) prioritising the HOWs according to which will satisfy the most important requirements, (e) considering each HOW in relation to each other HOW to foresee and contend with possible conflicts between them and (f) listing the HOWs which will be most effective in satisfying the customers' requirements.

Instead of having to wait for a process to run its course (succeed or fail), before an organisation can gather information about it to find out how to make necessary improvements, QFD focuses on the attributes that will *ensure* that customer requirements are met and deals with problems *before* the process has begun. In this regard QFD is a *proactive* planning process (QFD Services, 1992). As such, QFD can be regarded as a technique to guide the implementation of TQM. Cohen (1988) sees QFD as a structured method for planning which can translate vague, non-measurable customer requirements into specific product development activities.

The Quality Function Deployment Process

The QFD process begins by identifying the customers of the proposed product or service and finding out from them which requirements *they* consider to be most important to *them*. Then the process ranks these requirements in the customers' order of priority. Next, the process selects the means which the organisation can measure and control and by which it will know *in advance* that it will satisfy the customers' most important requirements.

Today QFD utilises both qualitative and quantitative techniques for data gathering. The focus groups (customer discussion groups) are an example of a qualitative approach to data gathering. In these groups, all members have equal status and are free to comment about the situation, as long as they do not offer solutions or make judgements about others' comments. In this way the focus group attempts to uncover the requirements of the customer *in the customer's own words*. *These*

requirements are then the content of a questionnaire, based on what the customers actually said. Here quantitative techniques take over. The questionnaire asks the respondents to rate each item in terms of its importance on a scale, usually from least important to most important with integer values from 1 to 5 inclusive. The *importance rating* of the customer requirements may be multiplied by the percentage importance of each customer group to obtain a weighted average for each item. These weighted averages are then used to prioritise the requirements which are of concern to the various customers. Then the customers' perceptions of the performance of the sponsor and the competitors in regard to each of these requirements is determined through a satisfaction rating. A rank order may then be assigned to the requirements. This is followed by placing further numerical values upon these requirements to express the desired outcomes. The outcome is a quantified, precisely detailed, sequential specification of the product qualities and of the values throughout the process which will create it (QFD Services, 1992).

QFD manages the complexity of the information it addresses by recording it on a matrix known as *the House of Quality*. Completing the House of Quality matrix allows the cross-functional team to follow a sequential set of tasks which (if properly done) ensure that all the team members have a thorough understanding of what the customers require and how to best satisfy or exceed those requirements. Upon completion, the House of Quality can be seen as being furnished with the information appropriate to each stage conveniently located in the appropriate room.

The Strength and Benefits of Quality Function Deployment

Perhaps the chief strength of QFD is that it bypasses no part of an organisation. It is a planning and prioritising technique which can be used on the global scale by the organisation as well as, separately, by each department. Global is meant to describe the perspective of looking at a situation as a whole. Whereas for a railway station worker, directing the flow of trains would be a process in itself, from the perspective of the *whole* network it would be a *sub-process* because it would be part of the process of

directing *all* the trains in the *entire* network. This means that if the station worker decided to change the points differently (perhaps to reduce the waiting time on board a particular train) so that he would satisfy the customers that *he* dealt with, he could well cause widespread disruption throughout the *network* because his actions could prevent many other trains from meeting *their* schedules.

Conti (1989) explained the situation by suggesting that a whole process is a set of sub-processes. Optimizing one sub-process may detract from or impede other sub-processes. Furthermore, the goals of sub-processes may vary or compete with each other. In addition to this, the effect of problems can be transmitted down the sequence to another sub-process. Thus the *point of occurrence* (where a problem occurs) is not necessarily the best place to solve the problem. A global approach to problem solving is needed, according to Conti (1989), because it can align the sub-processes at the interfaces (where one sub-process links with another). The global use of QFD (the organisation's attempt to satisfy its external customers) is then followed by its application to each sub-process (the organisation's attempt to satisfy its internal customers to ensure the efficient integration of all its functions). In this way the voice of the customer drives all parts of the organisation in harmony towards the same goal. QFD ensures that the voice of the customer is integrated into the design of the product or service being planned for them.

QFD is a planning tool which takes the customers' requirements and translates them into design features via a two dimensional matrix. Then these design features are, in turn, translated via further similar matrices for each stage of the production process until they become the products and services that satisfy the requirements which are most important to the customers (Francis, 1989). A more detailed explanation of QFD can be gained from reading Sullivan (1986) and Hauser and Clausing (1988).

Benefits attributed to QFD which have been recorded in the literature include:

- (a) improved customer satisfaction (Morrell, 1987; Kenny, 1988; Hand, 1992),
- (b) reduced design cycles (Sullivan, 1986; Kenny, 1988; Vasilash, 1989; Hand, 1992),
- (c) reduced scrap and re-work (Sullivan, 1986; Kenny, 1988; Vasilash, 1989),

- (d) reduced production costs (Holusha, 1989),
- (e) better understanding of customers and their needs (Ealey, 1987; Cohen, 1988; Holusha, 1989),
- (f) improved customers' perception of the product or service (Ealey, 1987),
- (g) improved morale (Ealey, 1987),
- (h) improved teamwork (Ealey, 1987),
- (i) improved communication (Ealey, 1987; Morrell, 1987),
- (j) improved data base (Morrell, 1987; Cohen, 1988; Holusha, 1989),
- (k) unravelling complex, interdependent factors in new product design (Ealey, 1987) and
- (l) aligning a chain of processes so that they do not conflict with each other (Conti, 1989).

The Picture from Education

It has been shown by Murgatroyd and Morgan (1992) that the translation of business language from industry to education can cause concern at a conceptual level. Rather than create educational terminology for the QFD paradigm (a practice which Murgatroyd and Morgan discourage on the basis that schools are a part of the service industry), it is considered to be functionally more consistent with and faithful to the QFD approach to simply retain and define these terms in a way which makes them relevant to education. These terms in their educational context can be found at the end of this section.

At this point it is necessary to consider the validity of applying the terminology and management thinking of industry to education. Consistent terminology will assist people from across the spectrum of educational concerns to gain access to the latest thinking on management practices throughout the world so that they are in a position to make an informed decision about how they will incorporate or reject these ideas; however, this transfer of terms and the thinking implicit in them, may well be a cause for concern. Murgatroyd and Morgan (1992) deal with the matter in the following way:

Many people do not like the wholesale importation of the language of business - 'customers' and 'suppliers' - into the practice of schooling. They claim that the ideological presuppositions such language implies are inappropriate to a public service such as education, and may in fact be harmful. In our view, this argument is weak in two respects. First, the language of business does indeed carry assumptions about the relationships between customers and suppliers - assumptions that are appropriate to the work of a public service for which the customers are paying and are being asked to pay more for (both in terms of taxation and user fees) over time. Second, the use of such language challenges a view of public service and the nature of devolved governance and resourcing for schools. Schools are a key part of the service economy and need to be seen as such.

(p.xi).

The point here is that although the use of business language in education, where appropriate, *adds* some assumptions about the nature of schools, it does not contain *all* of the assumptions. Tribus (1993), who supports the use of third generation quality management in education, argues *that it is possible not to lose sight of what education is all about in adopting business concepts* in his definition of quality:

Quality in education is what makes learning a pleasure and a joy. Some measures of student performance may be increased by threats, by competitions for grades or by prizes, but the attachment to learning will be unhealthy. It takes a quality experience to create an independent learner. But joy is ever changing. What is thrilling at one age is infantile at another. Teachers must be ever alert to engage the students in a discussion of what constitutes a quality experience. The

negotiations and discussions are never done. The lesson is this:
it takes constant engagement to wed a student to learning.

(p.13)

His timely reminder of some major differences between education and industry also stands as a case in point. The differences that he noted were:

1. The school is not a factory.
2. The students are not the product.
3. Their education is the product.
4. The customers for the product are several
 - a. The students themselves
 - b. Their parents
 - c. Their future employers
 - d. Society at large
5. Students need to be *co-managers* of their own education.

(p.12)

Further to this, Tribus (1993) advocates that we remain aware that education is *not* the same as industry. However, he does not suggest that we should avoid third generation quality management thinking and language in education. What he does state is that the differences between industry and education will simply mean that the *specifics* of the ways in which quality management is applied will differ, but the *principles* of quality management will be the same *and work well in education* (Tribus, 1993). Tribus bases this claim on the few experiences of the educational pioneers who have tried third generation quality management methods as well as the success of these methods in industry (1993). Support for this claim also comes from the work of others in the educational field who have used industry's experience and methods as a means of inspiring the future course of achieving quality in education (Hough, 1992; Murgatroyd & Morgan, 1992; Schauerman, Manno & Peachy, 1993).

Overview of the Development of Quality Management

There are examples in education of the three generations of thinking on quality. The rigorous inspection with intense attention to detail of the first generation of quality management techniques was reflected in education in the assessment of a student's work, even to the extent of including oral as well as written examinations, at the end of the year's or half-year's study (Murgatroyd & Morgan, 1992). The students found out whether or not they had succeeded or failed *after* they had completed a year or half-year study programme.

The second generation of thinking on quality (statistical process control by monitoring a statistic, e.g. the time spent on each activity and the sequencing of that activity) could be seen in education up until the 1970s in the person of a school inspector/district superintendent looking at his watch and knowing which lesson was being taught in each classroom throughout his inspectorate ("or there'd better be a good reason why not!"). This did ensure a high degree of adherence to the centrally planned curricula, but if the curricula were not appropriate for different students in different localities, quality education could not be ensured.

The process of asking students how well they thought different teaching methods would enable them to learn various concepts before, as well as after the teacher chose the teaching methods and recording this information on a QFD type matrix, is an example of the use of the third generation of quality management techniques in education (Tribus, 1993).

Trends Towards Third Generation Quality Management

There have been some trends recently which are creating a momentum for the widespread application of the third generation of quality management techniques in education. Schools in Europe and North America in the nineties have come under increasing pressure to deliver an education service that both represents value for money and reflects the increasing importance that has been placed on educational investment and performance to a nation's ability to successfully compete in a global economy

(Murgatroyd & Morgan, 1992). In the view of many governments, schools need to improve the quality of education within existing resources and thus accommodating the trends in Europe and North America has become a matter of the *quality* of performance by schools (Murgatroyd & Morgan, 1992). In Britain the management of schools has been devolved to the local authority along with a national core curriculum and a charter of the rights of parents and students. In North America, performance indicators and value for money audits have been part of these trends (Murgatroyd & Morgan, 1992).

In Australia, it was reported in *The Education Circular* (May, 1994) that the Federal Government's advisory body on school education, the Schools Commission, indicated that Australia's secondary education was "based on outdated assumptions about the labour market and suffers because of the influence of universities" (p.33). At the same time, the Schools Council made a report which called for "a radical overhaul of secondary education, with far greater emphasis to be placed on vocational training and preparations for the workforce" (The Education Circular, May, 1994, p.33).

QFD is primarily different to other planning models because it is a process which is customer *driven*, team based and repeatable. Its repeatability comes in no small part from the use of logical decisions which are based on the facts of the situation to which it is applied. QFD is also unique due to the *combination* and *sequence* of the steps in the House of Quality. This process better enables the team members to suspend their beliefs, theories, conceptions and points of view while the data concerning the customers' priority requirements and satisfaction are used to construct the all encompassing view of the situation (the 'big picture'). Then the process challenges the team members to use their expertise to choose and create the proactive means by which all of the requirements which are most important to the customers can be met or exceeded. The sequence of the process and the challenges of each step act to reduce the adverse effects of corporate politics and personal agendas. They also act as a catalyst for innovation.

Quality Management in Western Australian Education

In the main, quality management today concerns itself with ensuring that a product or service is fit for the purpose for which it was/will be created. This is in accord with the manner of planning referred to earlier by Loudon (1989). Currently, in Western Australia, the approach of depending largely upon the statistical control of the education process can be seen in the 'Assessment Structure' which the Secondary Education Authority (1994) has prescribed for the assessment of its mathematics curricula. The assessment structures are percentage ranges to which the various types of assessment items and tasks; the levels of content; and the actual content of the assessments must conform. Since the assessments have to conform to these parameters it is expected that teachers would reflect this emphasis in their teaching (Secondary Education Authority, 1994). Thus the assessment guidelines and moderation procedures are expected to assure some adherence to the planned curricula and thus ensure their quality. The limitation of the second generation of quality techniques in industry, however, has also surfaced in education, namely, any problems (lack of relevance, insufficient time allocation, lack of continuity, lack of resources, inappropriate teaching methods, etc.) which are already present in the actual design of the existing curricula would persist throughout the process of the implementation of these curricula, despite the use of statistical controls.

Western Australia's Education Department¹ has already adopted the TQM concept which was and still can be seen in embryonic form as School Development Plans which have been part of the process of devolution since 1990. More recently, the Education Department sent its schools a copy of the "Strategic Plan For The Education Department Of WA 1994 - 1996: An Overview". This plan sets out the Department's purpose and its performance indicators as well as the Department's strategic objectives. The strategic objectives focus on five areas: curriculum responsiveness, flexibility in schools, staff professionalism and working relationships, resource management and quality assurance in education. Each area has between five and seven actions to be carried out. The strategic plan establishes the extent of the implementation of a TQM

type of management in the Education Department of Western Australia and it incorporates objectives and actions which address the need for an overhaul of secondary education along the lines indicated by the Schools Council. According to Hamilton, director, Executive Support, the implementation of the Department's first strategic plan was progressing well and would be used as a basis for future plans. Black, the current Director General, wrote in *The Education Circular* (1994) that:

We need an Education Department owned by government schools people, where everybody is working towards the same goal. Anybody not teaching in a school has only one purpose - to support those who are.

We are not going backwards to the old Education Department, we are creating a new dynamic and student-centred government school system. (February, p.4).

Most recently, the Minister for Education announced that the government was undertaking to write a new Education Act which would enable the Department to meet the needs of students in today's rapidly changing society better than via the existing sixty year old legislation. Clearly a change to third generation quality management is currently in progress in Western Australian government education. This change, however, is not without its difficulties. An item in *The Education Circular* (May, 1994), stated that principals believed that "increasing decision-making powers have reduced their ability to provide educational leadership." (p.32). This concern was echoed by the State Schools' Teachers' Union (SSTU) (*Western Teacher*, 1994, July, p.4). In addition to this, the Union's view of devolution, in general, was that it was only "ONE WAY that can mean an improvement in student learning" (Lindberg, 1994, p.7).

Footnote 1 The Department's change of name from a ministry to a department, occurred in 1993 after the previous Labor government was replaced by a Coalition government.

The SSTU also expressed concern about the contents of a document which was leaked to its general secretary indicating that ideas foreshadowed were incompatible with a quality schools system. One of the items in this document was the performance management of staff in providing incentives for high performers and sanctions for poor performers (Western Teacher, 1994, July, p.4). It is an easy step to link the achievement of student outcomes to the performance of teachers with an overly simplified and erroneous belief that those outcomes are merely the results of teacher performance. It is significant to note that Murgatroyd and Morgan (1992) and Tribus (1993) stressed the importance of concentrating on *improving processes* in order to improve outcomes and that the genuine input and participation required from teachers in order to achieve this is unlikely if the teachers feel insecure due to a perception that outcomes might be used to judge them. Tribus (1993) cites one of Deming's quality principles, the perversity principle, which makes the point that:

If you try to improve the performance of a system of people, procedures, practices and machines by setting goals and targets for the individual parts of the system, the system will defeat you every time and you will pay a price where you least expect it.

(p.16).

The Education Department of Western Australia is committed to the implementation of TQM in schools. According to Pickles and Dean (1991), nearly all organisations which have attempted to implement TQM experience a cycle which is positive at the beginning, but in most cases ends with waning enthusiasm, management pressure for proof of improvement, faded impetus and the death throes of the project! This does not augur well for Government schools! Among the remedies proposed by Pickles and Dean (1991) are the need for the people in the organisation to learn other ways of behaving at their work and to develop a clear and shared understanding of behaviour and problem areas. The implementation of TQM in schools would be a very complex task given the range of processes that are carried out by them. In accord with

the remedy proposed by Pickles and Dean (1991), schools could better understand these processes by the use of QFD to see the 'big picture' and integrate all of their processes as a whole. Added support for the use of QFD by schools implementing TQM comes from the Dean of Oregon State University who specified QFD as the tool to define customer needs in the university's implementation of TQM (Coates, 1990) and the success of the implementation of TQM at El Camino College which used QFD in their process of implementation (Schauerman, Manno & Peachy, 1993).

The Advantages of Quality Function Deployment in the Educational Setting

Already there have been some advantages attributed to QFD's application to education. Stamm (1992) for example, reported that adoption of the process to design a guidance programme at a large Midwestern high school led to:

- * An increase of 4200 usages on the computer guidance information system
- * A 70% increase in students meeting admissions deadlines
- * 100% of conference requests acknowledged by following school day
- * An 80% increase in student use of guidance library materials
- * 95% parent participation in orientation procedures (p.411).

Murgatroyd and Morgan (1992) saw the House of Quality tool as being the most powerful for developing a thorough *understanding* of the school's customer requirements and give an example of how it saved wasted effort and correctly directed future effort at a primary school. In this instance, the staff used QFD to assess the methods by which the school handled students who transferred from other schools. At the end of the QFD process the staff were surprised to discover that their customers placed the greater importance on 'mentoring', not on a handbook which had previously been believed to be the most useful method and had thus received most of the resources. As a result of their clearer understanding of their customer requirements, the staff

decided that the role of adult 'mentors' be strengthened and the effort put into the handbook be reduced. In this way they were allocating the major portion of their resources to the activities which were most important to satisfying their customers.

Schauerman, Manno and Peachy (1993), said that the QFD process shifts the leadership's planning focus from an inward orientation to one in which those in the leadership gather information from outside their functions and processes. The leadership then rate the information gathered from outside against their own processes and functions. Schauerman, Manno and Peachy (1993) reported an ongoing commitment to the use of QFD at El Camino College, California, where QFD acted as a database and improved communication and management of numerous details in the complex combination of managing a college.

Chapter Summary

QFD has shown itself to be a valuable tool in educational institutions which are focused on meeting their customer requirements. As schools become more focused on satisfying their customers they experience increased demands to be accountable for their performance across the full range of their functions. Schools can meet these demands by working harder, or working better, the latter usually involving a different approach. QFD is a different approach for educational pursuits and its early applications in education have shown promise for the future.

Terms Associated with Quality Function Deployment and Total Quality ManagementQuality

Akao (1988), the originator of QFD, says that "... *quality*, generally speaking, is the extent to which a product responds to the demands of the customer and the market place" (p.27). A simpler definition of *quality* is Juran's (1988) view that *quality is fitness for use*. For the purposes of this study, the definition used by Commonwealth departments, which is based on Juran's, is that *quality* combines both *fitness for purpose and satisfying the customer* (Department of the Arts and Administrative Services, circa 1991, p.2).

Tribus (1993) writes:

Quality in education is what makes learning a pleasure and a joy. Some measures of student performance may be increased by threats, by competitions for grades or by prizes, but the attachment to learning will be unhealthy. It takes a quality experience to create an independent learner. But joy is ever changing. What is thrilling at one age is infantile at another. Teachers must be ever alert to engage the students in a discussion of what constitutes a quality experience. The negotiations and discussions are never done. The lesson is this: it takes constant engagement to wed a student to learning.

(p.13).

In this definition, quality in the classroom comes from the students (the customers). Indeed, it is defined by them (fitness for purpose) and is ever changing. Tribus (1993) goes on to say that the students as customers need to be consulted, but that they are not in charge of the process nor do they make the decisions.

Process and sub-process

According to the Macquarie dictionary, a *process* is "a systematic series of actions directed to some end." In quality management, all the functions that are performed by members of an organisation are part of some process. A sub-process is a process which is part of a larger process.

In education, the term *process* refers to the way in which a teacher performs their work to achieve a result (Murgatroyd & Morgan, 1992). In the eyes of third generation quality management, the functions which are performed by teachers or other school personnel are all part of a process; for example, the process of teaching a number of statistical concepts may involve the activities of watching a video, reading the text, reading references, class discussions, listening to and asking questions of a guest lecturer, homework and a project (Tribus, 1993). It should be noted that each of these activities was a *sub-process* of the teaching process mentioned and as such needed to be properly integrated with the others for the best instruction to occur. Murgatroyd and Morgan (1992) refer to the combination of processes and sub-processes as a chain of customer-supplier relationships. In order to achieve quality in education *schools need to focus on managing their processes, not on achieving outcomes* (Murgatroyd & Morgan, 1992; Tribus, 1993). Tribus (1993) writes:

The perversity of outcome based education... It is possible to carry over into education the same harmful practices as occur in industry by thoughtlessly adopting a new approach called *outcome based education*. Outcome based education contains two parts: The setting of the goals and objectives of education, which is good, and a bad part, the use of outcomes only, as a basis to judge, reward and chastise, portions of the system of education. (p.16).

Murgatroyd and Morgan (1992) describe the need to focus on processes in the following way:

What is important here is that attention is given to the managing of *processes*, because processes produce outcomes. Far too much attention has been focused upon securing outcomes, no matter what the process looks like - yet it is process quality and effectiveness that leads to *sustainable* quality outcomes.

(p.60).

Understanding the outcomes is necessary in order to identify the processes which will lead to their achievement. Once the outcomes are understood, the focus of attention then needs to be given to the design and control of the processes so that they *will* produce the outcomes. This is not the same as simply focusing on *achieving* outcomes.

Customer.

In quality management terms, a *customer* is any downstream (the next in line) person, process or event. Customers can be *internal* or *external*. An *internal* customer is from within the organisation whilst an *external* customer is from outside the organisation. The physical requirements of a process (internal), the person who is to perform the next function (internal) and the recipient of a product or service (external) are some examples of customers. Under QFD the customers define the purpose of a process because unless the outcome of the process is fit for its purpose (the use to which a recipient intends to put it), the outcome is not a quality outcome.

If we consider the process of reporting on students' progress, the students and their parents are next in line as well as being outside the school so they are *external* customers. The superior to whom the teacher hands the reports as well as the administration staff who process the report are all *internal* customers.

Requirements.

A customer *requirement* is anything which the customer would like to receive from the supplier of the product or service. The *voice of the customer (VOC)* refers to getting what the customer requires in their own words. By considering customers' verbatim statements, an understanding can be developed of how the customer sees the relationship with their supplier. This understanding is used to understand and prioritise outcomes. In order to determine customer requirements it is useful to consider the three types referred to by Kano, Seraku, Takahashi and Tsuji (1984):

1. *Basic requirements* are known and expected. If met, they do not satisfy the customer, but if not met, make the customer annoyed. Customers consider these to be so obvious that they remain *unspoken*.

2. *Spoken requirements* are those requested by the customer and when met, satisfy the customer.

3. *Excitement requirements* are also *unspoken* because the customer does not know about them. They are 'surprises of value'. These requirements are usually developed by people in the supplier organisation from their own knowledge and their understanding of customer requirements.

A *spoken* requirement is one which the student states, for example, *students who fight should be expelled*. Like many requirements offered by customers this is actually a *solution*. The following questions can be used to consider the spoken requirement:

(a) What do they want? (b) Why do they want it? and (c) How do they know when they have it? (QFD Services, 1992). Then the spoken requirement as expressed by the student can be seen to be: *school should be a safe place*. This is a *basic* requirement which could be easily overlooked.

It is important to remember that different customers and different customer groups will have different requirements or attach different priorities to the same requirements (Hough, 1992; Schauerman, Manno & Peachy, 1993). The requirements which teachers have, for example, of a curriculum or School Development Plan or Managing Student Behaviour (MSB) Policy are different from those which students or

the school administration will have, and not all teachers will rank their requirements in the same order.

Focus group.

A *focus group* is a group of customers who talk freely about what they think of the product or service they receive from their supplier. A facilitator observes and interacts with the customers in order to determine what they require. The key questions to be answered are:

(a) What do they want? (b) Why do they want it? and (c) How do they know when they have it? (QFD Services, 1992). A class can be a *focus group*, as can a group of parents or teachers.

Voice of the customer (VOC).

The *voice of the customer* refers to the customer's actions which clearly show what they think. The most common form is a statement (recorded verbatim), but some organisations use audio-visual recordings of their customers (e.g. monitoring people having a look at a prototype in an automotive show) to gain insight into their customer's requirements.

The use of the VOC is a shift in the basis of decision making away from the pressures of corporate politics; the self-interest of executives' careers; and the "experts" of an organisation dictating what they consider to be the customers' requirements towards confronting the actual customer requirements *as the customers express them* (McElroy, 1987).

Teachers are not strangers to the *voice of the customer* - they have been listening to it for years! Indeed most teachers know the value of implementing the student's *sensible* suggestions and strive to maintain a good rapport with their students.

Cross-functional team.

A *cross-functional team* is comprised of people in an organisation who perform different tasks (e.g. design, manufacture, sales, accounting) and who operate at different levels (e.g. technician, supervisor, manager). All members of a team should be experienced, competent and as open-minded as possible and as a group, provide a broad view of the knowledge base of the organisation. Their task is to bring a broad range of experience and expertise to the QFD process.

The literature studied in education did not discuss the composition of cross-functional teams to the extent that it was covered in industry. However, the same concepts can be applied to education in that cross-functional teams would comprise people from different levels of management from classroom teachers to the principal. The team should also cover a range of the departments within the school. The team as a whole would also include teachers who are familiar with each of the student age groups in the school and non-teaching /clerical staff where appropriate.

Quality Function Deployment

QFD is a systematic process which seeks to make the designers of programmes, services, activities, curricula, organisations and learning experiences more thoroughly aware of exactly what the customer needs to receive so that the customer feels that his/her needs have been met (Murgatroyd & Morgan, 1992). QFD can act as the *interface* between the school and its customers because it systematically helps the people in schools to better understand their customer's point of view and the processes in question.

House of Quality

The *House of Quality* (Figure 1) is the matrix used in QFD. The shape of the matrix resembles a house and the different parts of the matrix are referred to as *rooms*, whilst the top part is the *roof*. Each room contains the specific information/data which is needed for the task to be performed at that stage of the QFD process. Following the

QFD process leads the cross-functional, decision-making team through the house, room by room and then to the roof. Before leaving each room, the information regarding what decisions were made is entered on the matrix. This information is then substituted into the formula which is to be then used at that stage of the process. The calculations can be done by using the QFD/CAPTURE™ software programme. This software programme enables the user to enter the information which is to be processed during the House of Quality process and it also performs the calculations which need to be made. The programme is designed so that the user updates the information at each stage of the process through to completion. Print-outs of the information are available at any stage and can be either in the form of the House of Quality matrix or in a range of its subsets. The finer details of the House of Quality will be examined later.

Proactive Planning

Proactive planning does not employ *lag indicators* which are measures of events which have already happened to analyse a process and then create measures to rectify problems or deficiencies which are already occurring. For example, the teach, test and re-teach cycle uses testing as a lag indicator. Proactive planning involves knowing the customers' requirements and putting in place the means which are known to ensure meeting those requirements.

Decision Making using QFD

Each step of the QFD process is directly linked to satisfying the requirements of the customers. The expertise of the people making the decisions is thus utilised outside of the paradigms in which it is often locked. This helps to overcome bias (intentional and unintentional) on the part of the decision makers from influencing the result. Each QFD project has the potential to create a new paradigm which is specific to that situation and which, in the perception of the customers, meets their requirements.

Concurrent QFD

Most QFD deals with one customer group in one situation at the same time. The form of QFD used in this study was adapted from what is known as *Concurrent QFD* which handles all the customer groups in the one situation at the same time in the *same* matrix (QFD Services, 1992). Concurrent QFD was adapted to suit the school situation because of a lack of available time and because handling students, parents and teachers in the one matrix would give the desired result.

CHAPTER 3

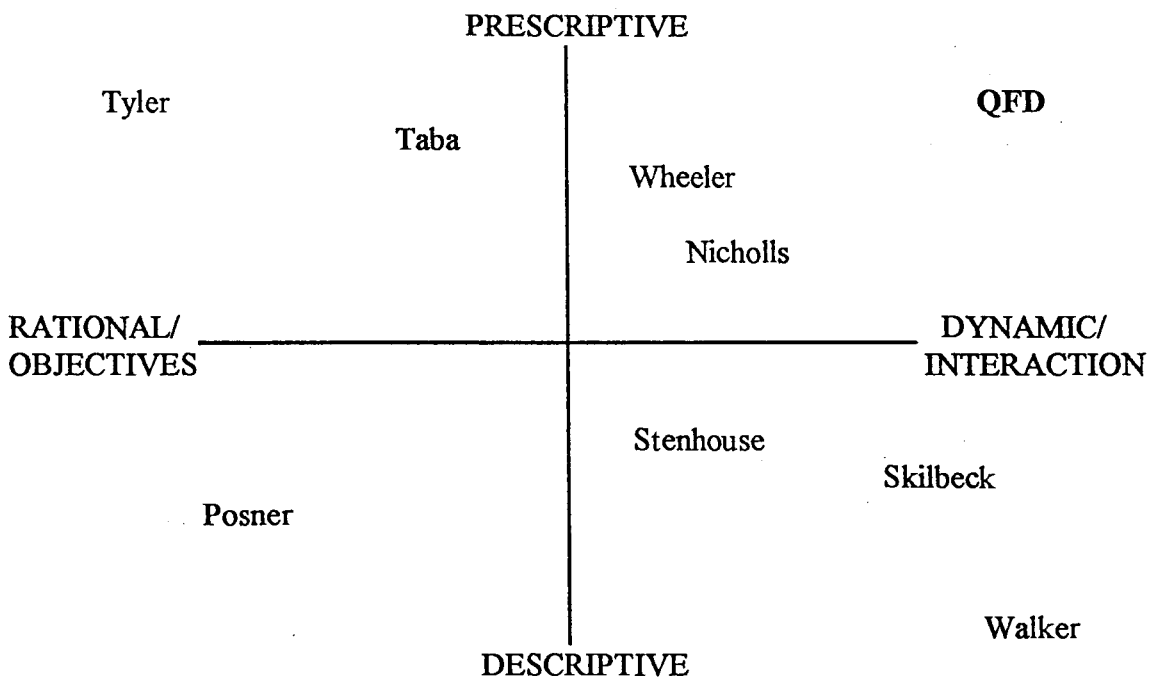
Conceptual Framework

Quality Function Deployment as a Curriculum Planning Tool

In order to try to place QFD among educational theories it is useful to focus upon the approaches of different curriculum planning models. This is so because QFD is not a management model, but a prioritising and planning tool. The use of QFD *with* existing curriculum models would move their location towards the top right corner of Print's (1989) continuum (Figure 2). The position of QFD reflects the responsiveness to the situation in which the curriculum is to be implemented and also the prescriptive, rational procedure utilised by QFD.

Figure 2.

The location of QFD in relation to existing curriculum models.



Source: Print (1989).

Taba's (1962) model of curriculum development was a logical, sequential process which was linear in form. The seven steps of her model were needs diagnosis

(an attempt to make the curriculum meet the requirements of its customers); formulation of objectives; content selection; content organisation; learning experience selection; learning experience organisation and determination of both the content and the means of the evaluation (Print, 1989). QFD is a tool which would make the task of creating a Taba style of curriculum accessible to teachers who are not naturally inclined to a logical, sequential approach. The QFD process is very prescriptive in that it forces its users to think through the entire project step by logical, sequential step. Furthermore, the personal biases of the team of curriculum developers are held in check because the voice of the customer is clear to the team and meeting the customer requirements drives the decisions at each point of the process.

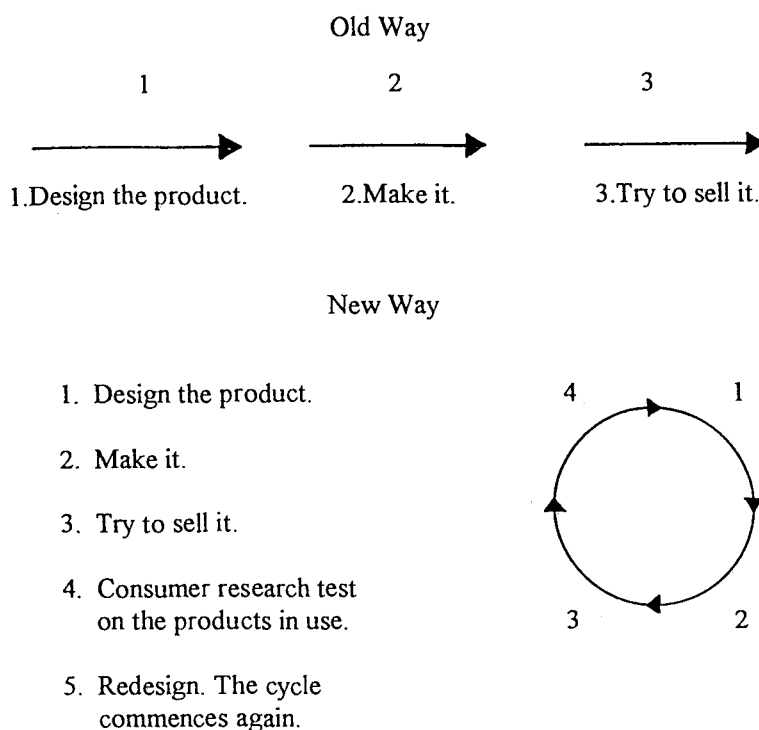
The first stage of Walker's (1972) model of curriculum development contains various "platform" statements (paradigms) which are an *ad hoc* combination of beliefs, theories, conceptions, points of view, values, aims and objectives which although not necessarily clearly and logically defined, are nevertheless the basis for future curriculum planning decisions (Print, 1989). Walker's model is, in part, a depiction of how the beliefs, values and ideas which are already held by each individual curriculum planner can bias the future planning decisions of the whole group. QFD assists individual planners to put their own paradigms 'on hold' and to use their pooled experience and expertise to create the curriculum which will satisfy the requirements of the customers for whom it is intended. The next phase of the Walker model involves the interaction of curriculum planners among themselves wherein they "defend their own platform statements and push 'spur of the moment' ideas" (Print, 1989, p. 34). This is at the descriptive end of Print's (1989) continuum. QFD is as interactive within the planning team as in the Walker model, but this interaction is based on the previous interaction with the customers of the curriculum.

In 1950 Deming showed the Japanese the New Way of doing business. The difference between the Old Way and the New Way can be seen in the diagram Deming used (Figure 3). Francis (1989) summed up the New Way as entailing the four steps of planning, doing, checking and acting. By starting at Step 1 of Figure 3 analytical

statistical methods (e.g. Statistical Process Control [SPC]) could be used repeatedly to improve an existing product or service (Francis, 1989). However, the number of times that such a cycle needs to be repeated can *vary* enormously until the product or service is fit for its purpose.

Figure 3.

The Old Way and the New Way [of doing business].



Source: Francis, 1989; (after Deming, 1950).

By starting at Step 4 of Figure 3, analytical planning methods could be used to design the product or service *so that it is fit for its purpose when it is first made or implemented*. Not only is the product or service designed to meet customer requirements, but the other processes involved in the entire cycle of the product or service (e.g. production, distribution, sales and customer feedback), can also be designed so as to create an integrated whole, where the sub-processes and processes do not detract from each other (Francis, 1989; Conti, 1989). Since the product or service is

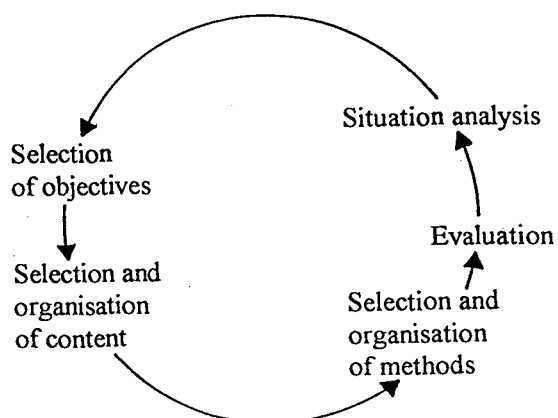
fit for its purpose from its launch, the number of cycles necessary to enable its improvement are significantly reduced. Should any response to customer requirements after the launch be desirable, it could be made with the added advantage of a data base, which is precisely detailed and also shows the inter-relationship of the details in a form which is easy to comprehend.

Cyclic curriculum models such as those proposed by Nicholls (cited in Print, 1989; Figure 4) bear a resemblance to the New Way of doing business of Figure 3 as they are sequential in their design process and also repeat these cycles. Significantly, they employ a situation analysis as a starting point which is a clear attempt to create a curriculum which satisfies the requirements of its customers.

QFD would provide a clear data base of the existing curriculum to which the changes could then be made, thus decisions could be made from an integrated perspective. QFD would enable the voice of the customer to flow through the existing curriculum thus making it clear whether a completely new curriculum would be needed or whether changes ought to be made to the existing one. This could well result in a curriculum which could be implemented sooner; meet the requirements of all of its customers; and do so with less work and fewer new problems than previous methods.

Figure 4.

Nicholls (1978) model of the curriculum process.



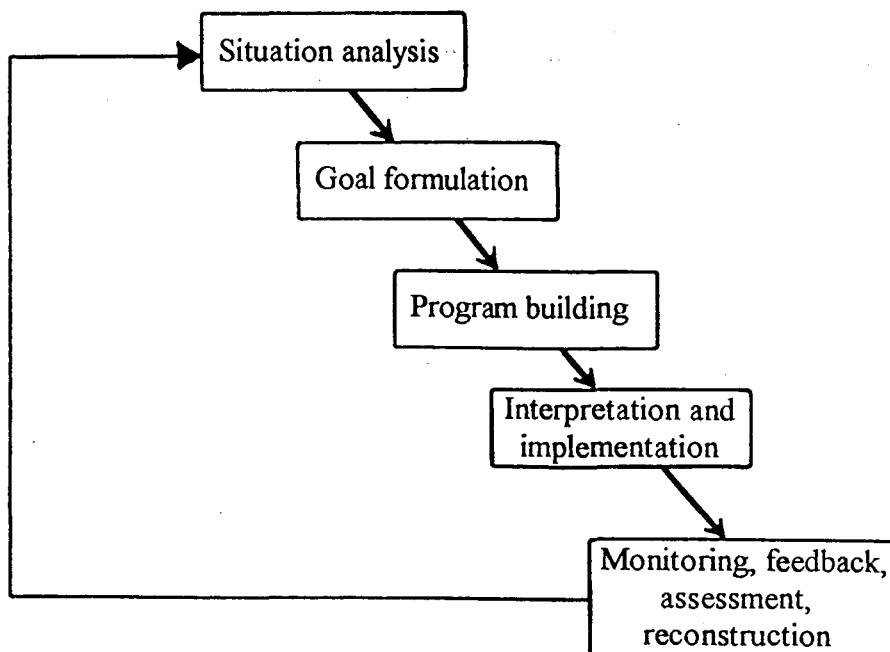
Source: Print (1989).

Clearly, the proponents of dynamic models such as Skilbeck seek to satisfy the requirements and attempt to be customer driven (Figure 5). Skilbeck encouraged teams of curriculum developers to regard the process holistically, to proceed in a moderately, but not prescriptively systematic way and contended that the design process could start at any point (Print, 1989).

In the Skilbeck model there are very close ties with QFD such as responsiveness to student requirements, use of teams and the integrated process perspective. However, the voice of the customer is not utilised, *only someone's perception of it is used*. As with other models, decisions are made according to what particular developers believe to be appropriate.

Figure 5.

Skilbeck model of the curriculum process.



Source: Print (1989).

QFD imposes a rigorous rational discipline upon the decision making process to ensure that it is the voice of the customer and *not the beliefs of the developers* which

drives the process. QFD focuses upon the specific factors which will predict the school's ability to meet the requirements which are most important to the *customers*. Furthermore, QFD caters for more than one customer group (e.g. teachers, parents, students, school administration, Secondary Education Authority and the Department of Education) and compares the existing curriculum to other curricula in terms of its ability to meet requirements.

Theoretical Framework

The case study approach underpins this study in that it is an expression of general QFD theory in a specific educational setting. This position can be justified by reference to the characteristics of case studies which are agreed upon by researchers in the area. According to Adelman, Jenkins and Kemmis (1976), "Case study is an umbrella term for a family of research methods having in common the decision to focus an enquiry around an instance." (p. 140). This definition is consistent with the views of other researchers (Borg, 1989 and McMillan & McMillan, 1993). This study fits Adelman, Jenkins and Kemmis' definition because it is an enquiry which is focused, in this instance, upon the use of QFD by a group of teachers in a government high school.

The basic characteristics of case studies are: the examination of a phenomenon in its natural setting; the setting of boundaries to focus the study; the provision of a clear description of the situation in which the phenomenon exists (including adequate access to unprocessed as well as processed data); the attempt to understand the phenomenon in its natural setting (including the understanding insiders have of the phenomenon); and the reporting of the findings to others which includes differing and conflicting views. (Adelman, Jenkins & Kemmis, 1976; Borg, 1989; Yin, 1989; Isaac & Michael, 1990 and McMillan & McMillan, 1993). This study satisfies these characteristics as is shown in what follows.

Firstly, the QFD process under examination in this study was implemented in a natural setting, namely, during the natural course of events at a government high school. Teachers who took part in this study still had to meet all of their existing responsibilities

and obligations. Further to this, the teachers who were participants in the study were members of the larger class of teachers who would be part of QFD teams in the event that schools adopt the use of QFD in the future. Secondly, the boundaries of the study were set by focusing upon the QFD process and using the teachers' summative perceptions. Thirdly, the situation of this study is clearly described in the next chapter. Fourthly, in an attempt to gain an understanding of the QFD process in its proposed natural setting which included the insiders' understanding, this study looked at the teachers' summative perceptions. Fifthly, the reported findings in this study include the differing and contrasting viewpoints of the teachers as well as providing access to unprocessed data in the form of verbatim comments and the number of teachers who expressed their own degree of agreement with each summative perception of QFD. In addition to this, each step in the methods of data collection and summary sections of this study is clearly described and the review of the literature and the explanation of QFD is provided so as to further orientate the reader. These five characteristics of this study serve to identify the current method as a case study approach.

Generalisation from case study is not the same as generalisation from experimental research. Adelman, Jenkins and Kemmis (1976) explained the difference in the following way:

Experimental research 'guarantees' the veracity of its generalisations by reference to formal theories and hands them on intact to the reader; case study research offers a surrogate experience and invites the reader to underwrite the account, by appealing to his *tacit* knowledge of human situations. The truths contained in a successful case study report, like those in literature, are 'guaranteed' by 'the shock of recognition'. (p. 143)

This viewpoint is consistent with other researchers such as Borg (1989), Isaac & Michael (1990) and McMillan & McMillan (1993).

Borg (1989) makes another point relating to the generalisability of case studies:

Most case studies are based on the premise that a case can be located that is typical of many other cases, that is, the case is viewed as an example of a class of events or a group of individuals. Once such a case has been located, it follows that in-depth observations and collection of other data about the single case can provide insights into the class of events from which the case has been drawn. (p. 402)

The instance in this study is one in which a school principal chose to use QFD to review a school policy with the review to be carried out as part of the normal course of events at the school and therefore, following Borg's (1989) reasoning, this study can provide insights into the applications of QFD for schools in the future. However, Borg (1989) cautions that it is dangerous to draw general conclusions from a single case study because there is no way of knowing how typical that case is, nevertheless, he does state that "...this problem can be greatly reduced by multiple-case studies involving several replications of the single case study, as recommended by Robert Yin." (p. 402).

The main benefit of case studies, which is widely agreed upon by researchers, is that succinctly expressed by Isaac & Michael (1990):

Case studies are particularly useful as background information for planning major investigations in the social sciences. Because they are intensive, they bring to light the important variables, processes, and interactions that deserve more extensive attention. They pioneer new ground and often are the source of fruitful hypotheses for further study. (p. 48)

This is central to the purpose of this study.

Method of Investigation

The methodology devised for the study can be considered as a *discovery mode* of action research. This is significant in that the usual mode of action research is a *problem solving mode* which uses fact finding with the intention of improving the quality of action in a social situation, as Burns (1994) makes clear:

Action-research is the application of fact finding to practical problem solving in a social situation with a view to improving the quality of action within it,...the validity of the 'theories' it generates depends not so much on 'scientific' tests of truth, as on their usefulness in helping people to function more intelligently and skilfully. In action-research, 'theories'...are validated through practice. (p.252.).

Improving the quality of action in a social situation does not always involve problem solving because this only addresses the situation *reactively*, after the actions in it are seen to be failing. The use of the discovery mode adapts action research to the *proactive* thinking of third generation quality management by which studying a situation in its normal context is undertaken so that ideas can be developed to *improve the quality* of action in it, even though no problem has been identified.

Chalmers (1993) combined the roles of researcher and facilitator, but saw this as 'participant observation'. This combination of roles can be adapted to create what could be In this study, QFD was chosen to carry out the review of the school's Managing Student Behaviour policy. The methods of action research which study a situation in its context to find facts about that situation were used as an umbrella under which the QFD process was investigated. The QFD process was implemented in the normal context of the school and upon completion, each participant's perceptions of it were gathered. Then the participants indicated the extent to which they agreed with each separate perception of the process (most of them in verbatim form) so that a group termed *facilitator observation* in the following way. Facilitator observation would involve the

researcher in: (a) facilitating the process competently, (b) *not* monitoring the participants during the process, (c) establishing rapport with the participants during the process, (d) avoiding the expression (verbal and non-verbal) of views about the process and (e) *upon completion of the process*, asking the participants what their perceptions were in regard to the process. The data gathered in this manner provides 'summative' perceptions of the process because the participants have *experienced the entire process* before they are asked to comment. In addition to this, the participants would experience the process without having to cope with being monitored (albeit ethically) and without having their natural perceptions of the process unduly influenced by a researcher, who was both facilitating the process and observing them.

The perceptions of the process by the participants which came from 'participant observation' as carried out by a facilitator (Chalmers, 1993), would be 'formative' in nature until the process was completed. Formative perceptions of a process are what the participant thinks about the process *up to that point*. Subsequent parts of the process would alter these perceptions by making them stronger, weaker, or by changing them in some way, perhaps even completely. Upon completion of the process, each part of it could be seen in its true context and the perceptions of it gathered from this point onwards would be 'summative' in nature. Summative perceptions would have the advantage of hindsight and would not have imminent tasks which are part of the process yet to be completed. Therefore these perceptions would not be as likely to change. Summative perceptions would also include the participant's formative perceptions *as processed by the participant*. For these reasons this study gathered summative perceptions and the researcher adopted the role of *facilitator observer*.

Summary

The methods of planning and management used in education in recent decades have developed along lines similar to those used in industry. If this pattern of development continues into the future, education will undergo a management paradigm shift wherein quality will become customer driven. QFD has proven to be a very useful

planning and prioritising tool in conjunction with this paradigm, but it has been as yet virtually untried in Western Australian schools. Hence, there is a need to find out more about what happens when it *is* applied in the educational setting and this forms the basis of the study.

CHAPTER 4

Design of the Study

Introduction

The study is designed in two parts. The first part is the implementation of QFD which begins by identifying the customers of the MSB policy, then listening to the voice of these customers in their separate customer focus groups and finishing with the action outcomes upon completion of the House of Quality. The second part of the study deals with gathering the perceptions of the QFD process as seen by the participants and analysing them. During this part the participants are asked individually to give the researcher their perceptions of the QFD process.

Rationale

There was some concern as to whether the MSB policy at one metropolitan government school needed to be changed so as to better achieve the purpose for which it existed, namely managing student behaviour. For this reason it was decided to review the policy. QFD was the methodology chosen for this task by the principal in conjunction with the researcher. The intention was to trial the QFD process to determine whether it had a positive impact as a policy review instrument.

Ethics

The researcher received co-operation from the teachers who gave up some of their own time freely, in order to carry out the QFD process. The participants only performed the tasks to which they agreed of their own volition, even though this resulted in a few parts of the QFD process not being completed as recommended by the QFD process. The behaviours of the participants were not studied because it was only their perceptions of the process which were sought in this study. These perceptions were gathered by the researcher from spoken and written comments made by each

participant to the researcher. Confidentiality was maintained by keeping all recorded comments anonymous.

The participants were given the right to veto the inclusion of any comments or any behaviours which they thought may present them in an unfavourable light. After having viewed the written material which was relevant to their participation in the study, all of the participants agreed to sign a declaration (Appendix 5) giving their consent to the publication of the material gathered.

Part 1: The Implementation of QFD

Sample

The population comprised 76 teachers, 826 students and 653 parents of a government metropolitan senior high school which was located in an area having higher than state average unemployment, single parent family, crime, truancy and non-English speaking background rates. In order to counter claims of lack of consultation by a group or an individual and to foster a feeling of involvement and ownership regarding the outcomes of the review of the policy sampling procedures were not implemented; that is, the entire school population comprised the sample.

Procedure

Typical QFD procedures were employed throughout the study. These included the use of software capable of analysing the collected data. What follows outlines the procedure adopted.

The original QFD team was a cross-functional team which was comprised of 8 of the 76 teachers at the school. The teachers in the team were selected to satisfy the criteria demanded by QFD, namely, that the group represented a cross-section of the functions carried out *within* the organisation as well as being individually competent and experienced in those functions and also being capable of tackling something new. The eighth member of the team was unable to attend any meetings until the penultimate one and therefore could not thus join the QFD team. The team included the principal

(non-teaching), 2 deputy-principals (non-teaching), 2 heads of department and two classroom teachers. The teaching faculties represented in the team were social studies, English, home economics and mathematics. There were 4 females and 3 males in the team that undertook the study. Parents and students were not included in the QFD team because it is not the usual practice for QFD teams to include *external* customers. This practice follows from the potential threat which is posed to corporate image by the presence of an outsider throughout all the deliberations of the QFD process.

The members of the team were selected by the principal in consultation with the researcher (who was also a member of the teaching staff) and invited to join the project by the principal. The researcher was to act as the facilitator for the project. The principal had read a few articles about QFD and discussed it with the facilitator over several months and one other member had heard the facilitator talk, from time to time, in general about QFD before the project. The other members were unaware of QFD before the project and were only told about each task as it arose. During the project, the facilitator limited his communication about QFD to what needed to be done at each step, how it was to be done and why it was to be done, so that the review could be performed according to the QFD process. During the life of the project, until the final responses were collected from the team members, the researcher did not express to the team members opinions about QFD. Thus, even with the knowledge that the principal and one other member had, the whole team was experiencing the QFD process for the first time.

During the first meeting the team was informed by the facilitator that the review was to be carried out using a new process, QFD, which was being researched by the facilitator. The team members were told that *they* were not being studied. The facilitator explained that it was the QFD process which was being studied as a tool for policy review. The team members were assured that they could view any written documentation to ensure that their perceptions had been accurately interpreted.

All the team members agreed to follow the QFD process and the facilitator undertook not to take part in decision making or to attempt to influence the group's

perceptions of the process in any way. The team was told that under QFD all members should be present for each meeting and that all decisions were to be made on the basis of consensus. The procedure followed in this study is outlined in Figure 6.

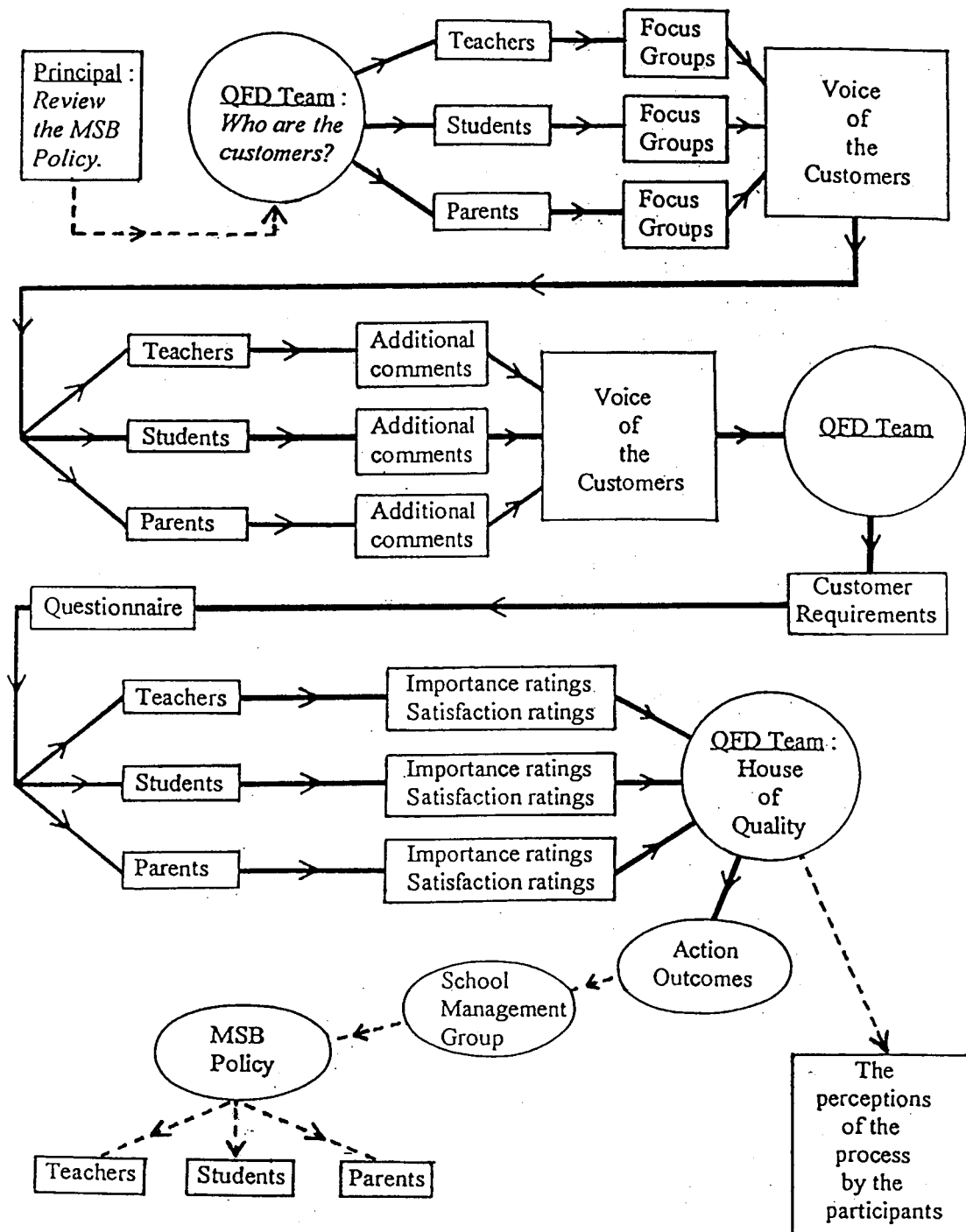
The first decision made by the group was that the customers of the MSB policy were the teachers, students and parents. Focus groups were formed for each customer group which included all the teachers who accepted the researcher's invitations to attend meetings; parents who accepted the invitations ; and the students who responded to their form teacher's invitation to express what they wanted from the MSB policy. The researcher facilitated the parents (2 groups) and teachers (2 groups) whilst form teachers facilitated their form classes (5 groups). The facilitation involved providing a non-judgemental and accepting atmosphere in which the focus group members were encouraged to speak freely (in the case of some form classes the students simply wrote their anonymous opinions on a piece of paper) about what they wanted from the MSB policy. All the comments gathered from all the groups (N=34) about what was wanted from the MSB policy were compiled in verbatim form by the researcher (Figure 6: the top 'Voice of the Customers') and a copy was given to each teacher, student and through them, to each parent.

Everyone was asked to read the comments and to anonymously add any they wished. All of these additional comments (N=56) were added verbatim to the original comments (N=34) and the resulting list (N=90) was analysed by the QFD team. The QFD team looked at each customer statement and extracted the customer requirement it expressed by considering what the customer wanted, why he/she wanted it and how the customer would know when he/she had acquired it. This procedure isolated the nineteen customer requirements which were the content of the questionnaire (Appendix 1).

A copy of the questionnaire was given to each teacher (placed in their pigeon hole), each student (distributed to them by their teacher during form class) and to each family. Student and parent questionnaires were differentiated by their colour. The

Figure 6

QFD as Implemented for the Review of the Managing Student Behaviour Policy



teachers differentiated their questionnaires by placing an 'S' on the front page. One copy per family was given rather than one copy to each parent so as not to weaken the voice of single parents when compared with two parent families.

The questionnaire was anonymous and asked the respondent to place a tick in one of five columns to indicate how *important* each requirement was to him/her on one page, and on the next page, to indicate on a similar 5 point Likert-type scale how *satisfied* he/she was with the school in regard to each requirement. A space was provided for comments (Appendix 1).

In order to manage the requirements of three different customer groups on the same matrix, the use of concurrent QFD requires that an importance weighting is assigned to each group. The QFD team used their collective professional judgement before the questionnaires were returned to decide that the weighting which would reflect the importance of each group, as customers of the MSB policy, was teachers 45%, students 30% and parents 25%. The rationale used by the QFD team referred to the proportional extent to which each group depended upon the MSB policy to carry out their functions.

The purpose of the questionnaires was to have the *customers decide* the level of importance of each requirement, relative to the other requirements, in order to rank these requirements according to the customers' priorities. Therefore, when the questionnaires were returned, the researcher only included in the data collection those which had responses across more than two adjacent columns. The other questionnaires were ignored because their respondents failed to prioritise their requirements beyond two adjoining levels of importance (e.g. everything was either most important or of above average importance). It is interesting to note that of the three groups, it was the students whose responses indicated the most discrimination between the requirements in terms of their importance.

Questionnaires were kept in their customer groups and an average score for each customer requirement (*importance rating*) was calculated on the basis that a '*most important*' scored a 5 and a '*least important*' scored a 1. The responses in between were

scored 4, 3 and 2 respectively. The occasional blank was not scored because the level of importance which this indicated was unclear and it was not included in the sum of responses for that item so as not to have a reducing effect on the average importance rating. The same scoring procedure was applied to the *satisfaction rating* for each item. The *satisfaction ratings* were included beside the *importance ratings* for each customer requirement.

Next, each importance and satisfaction rating was multiplied by each group's percentage importance weighting, to obtain weighted average importance and satisfaction ratings for each customer requirement. These were then entered into the House of Quality matrix (Figure 7). The weighted average importance and satisfaction ratings were both entered in the 'WHYs' room in the matrix. The customer requirements are 'WHATs' in the matrix and the value of each weighted average importance and satisfaction rating was entered in the 'WHATs vs WHYs' room so that it could be conveniently seen on the same line as its customer requirement (WHAT).

Data Collection

Responses.

54 of the 76 teachers, 540 of the 826 students and 263 of the 653 parents returned completed questionnaires. These questionnaires were examined to identify those in which all of the responses were contained in only one or two (usually the 'most important' and the 'above average importance') categories. These questionnaires were discarded because their respondents had failed to prioritise the requirements to the extent required by the QFD process. Ultimately, there were 49 questionnaires from the teachers, 285 from the students and 162 from the parents. This meant that 64.5% of the teachers, 34.5% of the students and 24.8% of the parents were included in the final sample which was used to gather the data for the House of Quality. Although an average daily student absentee rate of approximately 15% may have adversely affected the number of questionnaires returned by both students and parents, the final sample for each customer group was accepted as being representative of that group.

Questionnaire Results

Each group's mean scores and standard deviations for both importance and satisfaction were listed side by side (Table 1). These mean scores were then multiplied by the weighting given to each group to obtain weighted means which were needed for the House of Quality. These weighted means are the *Average Weighted Importance Rating* and *Average Weighted Satisfaction Rating* in the WHYs part of the House of Quality matrix (Figure 7) completed during the study.

Each group's mean importance rating (Imp), of each requirement, is shown above beside its mean satisfaction rating (Sat). The *mean importance* rating scale is as follows: 5 represents 'most important'; 4 represents 'above average importance'; 3 represents 'average importance'; 2 represents 'below average importance' and 1 represents 'least important'. The scale of values for the *mean satisfaction* rating starts at 5 which represents 'delighted', 4 represents 'very happy', 3 represents 'satisfied', 2 represents 'unhappy' and ends at 1 which represents 'angry'.

Table 1

Mean Scores and Standard Deviations for Importance and Satisfaction Ratings of Each Customer Requirement by Each Customer Group

Requirement	Teachers		Students		Parents	
	Imp	Sat	Imp	Sat	Imp	Sat
	n = 49		n = 285		n = 162	
School should be a safe place.						
<u>M</u>	4.7	3.1	4.6	3.3	4.8	3.6
<u>SD</u>	0.46	0.59	0.62	1.04	0.60	1.32

(table continues)

Requirement	Teachers		Students		Parents	
	Imp	Sat	Imp	Sat	Imp	Sat
	<u>n</u> = 49		<u>n</u> = 285		<u>n</u> = 162	
All students should be allowed to learn without disruption.						
<u>M</u>	4.8	2.5	4.0	3.4	4.5	3.5
<u>SD</u>	0.62	0.67	0.63	1.04	0.64	1.02
Individual circumstances should be taken into consideration in the interpretation of the MSB Policy.						
<u>M</u>	3.4	3.1	3.3	2.6	3.6	3.3
<u>SD</u>	1.17	0.72	1.12	0.79	0.85	0.74
Teachers must inform parents if their children's behaviour or work is of concern.						
<u>M</u>	3.9	2.8	3.0	2.9	4.1	3.4
<u>SD</u>	0.88	0.60	1.17	0.99	1.02	1.08
The MSB Policy should punish negative behaviour and reward positive behaviour.						
<u>M</u>	3.9	2.5	3.5	3.3	3.8	3.3
<u>SD</u>	1.17	0.89	1.13	1.07	0.97	0.86

(table continues)

Requirement	Teachers		Students		Parents	
	Imp	Sat	Imp	Sat	Imp	Sat
	n = 49		n = 285		n = 162	
Students must obey teachers.						
<u>M</u>	4.4	2.8	3.5	2.6	4.2	3.6
<u>SD</u>	0.75	0.59	1.12	1.10	1.15	1.18
School rules should be applied fairly.						
<u>M</u>	4.4	3.1	3.8	3.2	4.2	3.6
<u>SD</u>	0.86	0.67	1.28	1.10	0.92	1.03
Students should be aware that severe misbehaviours lead to suspension.						
<u>M</u>	3.9	3.2	3.3	3.2	4.1	3.4
<u>SD</u>	1.28	0.91	1.13	1.04	1.14	0.92
Conciliation and resolution are the desired outcomes of the MSB Policy.						
<u>M</u>	4.0	3.0	3.0	3.0	3.6	3.1
<u>SD</u>	1.02	0.91	1.23	0.92	1.00	0.95
All teachers should be able to teach without disruption.						
<u>M</u>	4.5	2.6	3.5	3.1	4.3	3.5
<u>SD</u>	0.96	0.65	1.06	1.13	1.00	0.91

(table continues)

Requirement	Teachers		Students		Parents	
	Imp	Sat	Imp	Sat	Imp	Sat
	<u>n</u> = 49		<u>n</u> = 285		<u>n</u> = 162	
Effective communication between members of the school community should occur.						
<u>M</u>	3.9	2.6	3.1	3.0	3.6	3.3
<u>SD</u>	0.91	0.96	1.17	0.98	0.95	0.87
Upon return from the Contract Room or suspension a student's behaviour should be monitored until appropriate behaviour is established.						
<u>M</u>	4.1	2.8	2.9	2.8	3.7	3.3
<u>SD</u>	0.99	0.94	1.13	1.05	0.99	0.97
Students must obey school rules.						
<u>M</u>	4.4	2.6	3.6	3.1	4.3	3.6
<u>SD</u>	0.92	0.71	0.99	1.05	0.93	1.09
MSB process ought to lead to personal growth.						
<u>M</u>	3.3	2.6	2.9	2.9	3.4	3.2
<u>SD</u>	0.91	0.80	1.11	0.94	1.07	0.74

(table continues)

Requirement	Teachers		Students		Parents	
	Imp	Sat	Imp	Sat	Imp	Sat
	n = 49		n = 285		n = 162	
School rules should be applied consistently.						
<u>M</u>	4.1	2.9	3.0	2.9	3.9	3.4
<u>SD</u>	1.08	0.78	1.18	1.09	0.89	0.85
Students should remain in the Contract Room until a resolution satisfactory to the school administration is reached.						
<u>M</u>	3.4	2.7	2.7	2.8	3.3	3.4
<u>SD</u>	1.23	0.91	1.18	0.98	0.98	0.71
Students have some responsibility for their learning.						
<u>M</u>	4.6	2.2	3.9	3.3	4.2	3.6
<u>SD</u>	0.67	0.74	0.77	0.96	1.05	1.04
There should be a clear statement of general principles regarding the behaviour of students.						
<u>M</u>	4.2	2.9	3.1	3.1	3.9	3.5
<u>SD</u>	1.01	0.77	1.19	0.98	1.04	0.71

(table continues)

Requirement	Teachers		Students		Parents	
	Imp	Sat	Imp	Sat	Imp	Sat
	n = 49		n = 285		n = 162	
Students should be responsible for their behaviour.						
<u>M</u>	4.4	2.1	3.8	3.3	4.3	3.6
<u>SD</u>	0.85	0.66	0.96	1.17	1.19	1.01

House of Quality

The computer software programme, *QFD/CAPTURE™* was used to perform the calculations for the House of Quality matrix. The *QFD/CAPTURE™* software uses the term 'average' instead of 'mean' in the House of Quality matrix. Print-outs were used to maintain an updated record of progress through the process and were distributed to each team member prior to the next task and also on completion of the process (Figure 7). In the WHATs vs WHYs room the first step was to use the *weighted mean importance ratings* to rank each customer requirement in terms of its importance to the customer. This yielded the list of prioritised customer requirements.

The QFD team then looked at the *weighted mean importance rating* and the current *weighted mean satisfaction rating* for each customer requirement. This provided the basis for the QFD team's decisions for the next step, which was to define the *desired satisfaction rating* for each important requirement. The *improvement factor* necessary to reach the *desired satisfaction rating* was determined, according to the QFD process, by finding the sum of the *desired satisfaction rating* less the existing *satisfaction rating*, multiplied by 0.2 and then added to 1. This calculation was performed by the software.

QFD recognises that there is a need to communicate the efforts made to meet the customer requirements *to the customers* so that their awareness of the organisation's

response would be increased. Therefore, the QFD Team decided to concentrate the future communication effort (or publicity campaign) on the few customer requirements with the highest importance which had satisfaction ratings that were in need of improvement. The *communication factors* which expressed this communication effort were obtained by deciding on the proportion of the school's communication effort that would be allocated for each of the selected customer requirements. Each of these proportions was then expressed as a decimal to which one was added. This was done because the *communication factors* for each customer requirement were to be multiplied by other values during the forthcoming steps of the House of Quality. By adding the decimal form of the intended proportion of communication effort to one, these customer requirements would have a *product* which was increased by these proportions according to the order of magnitude of the intended proportion. The customer requirements which were not selected for the future communication effort were given a *communication factor* of one, so that they would remain the same after multiplication.

The software was used to calculate the *overall importance* and *percentage importance* of the *customer requirements*. This calculation involved determining the product of the *weighted average importance*, *improvement factor* and *communication factor* for each *customer requirement*. The customer requirements with the highest products were those which were taken to be the most important. Thus, the *customer requirements* were prioritised in their order of overall importance, based on the requirements of the customers, in terms of their weighted average importance, improvement factor and communication factor. The *percentage importance* of each customer requirement was calculated by dividing the *overall importance* of each requirement by the *sum of the overall importance* and then multiplying this quotient by 100. The *percentage importance* was also shown as a bar graph on the matrix by the software (Figure 7).

The QFD Team then defined the internal process measures, or parameters, that could be measured and controlled and which would *predict* satisfying the customers, these have been referred to as *HOWs* by those in the QFD field. They were defined by

the team with a direction of improvement (either increase or decrease) for each of them because it depended on whether the HOW would have the desired effect by being increased or decreased. This information was entered into the software because target values couldn't yet be calculated. *Current values* and *target values* for each HOW were then defined by the QFD Team using their collective professional judgement. This task had to be performed without the benefit of benchmarking because there was no survey data available on the current values of these HOWs which could be used as a point of reference for each of them. The *current values* and *target values* were then entered into the software. The absence of proper benchmarking limits this study and therefore, the results ought to be viewed with caution.

The WHATs vs HOWs room recorded the strength of the *predictive* relationship between each means (HOW) and each customer requirement (WHAT) as determined by the QFD Team (see Figure 7), who defined whether the relationship was strong (usually denoted in the House of Quality matrix by a filled circle and given 9 points), moderate (empty circle = 3) or weak (empty triangle = 1). The usual method for performing this task is for the QFD Team to make the decisions based on the group's discussion of each relationship; however, the QFD Team decided to fill in their own decisions and have the facilitator average them because they considered that this would save valuable time and hasten the completion of the project. The facilitator then calculated these averages except in the case of polarised responses for which averages would not be appropriate. This information, including the fact that some responses were polarised, was then presented to the QFD Team who on a group consensus basis made the final decisions concerning the strength of the predictive relationships between the customer requirements and the HOWs.

The QFD team members then performed the next task which was to define whether a HOW would predict satisfying a WHAT either strongly (close to 100% of the time), moderately (around 50% of the time) or weakly (around 25% of the time). Usually when QFD has been used in the manufacturing or other industries, organisations have available to them quantified data about the HOWs which give them a

degree of precision (currently lacking in schools) in their determination of the effect that a HOW will have on a customer requirement. Steel manufacturers can, for example, precisely control the strength of the rods they make so that they are strong enough for their purpose without being so hard that they cause undue wear on the tools used to cut them. The QFD team were not dealing with such a precisely predictable product in their review of the Managing Student Behaviour policy so they were forced to use the best option available to them - their collective professional judgement, or expert opinion.

The WHATs vs HOWs data was entered into the software which calculated the product of the values of each relationship and the importance of the requirement and then applied a proportional distribution (or normalising) algorithm to eliminate any skewing. The process thus prioritised the HOWs in terms of their *normalised importance* which showed which HOW had the strongest predictive relationship with all the prioritised customer requirements.

The roof of the House of Quality was used to record the outcome of the QFD Team's examination of the correlations between each of the HOWs to determine any negative impact between them. This task was performed in order to get advance notice of possible trade-off decisions in the case of conflicting impacts between the HOWs which would occur if using one HOW more would lead to a nullifying effect on another HOW, but none were found.

Because there was no other data available concerning the HOWs, the next usual task of benchmarking with other MSB policies of good reputation was not carried out. The QFD Team drew on their experience to agree upon the likely current values for each HOW and then set target values for each of them in order to carry out the benchmarking internally. When these values were entered into the software the print-out showed what was needed to satisfy the most important customer requirements and this was available in order of implementation (Figure 7).

House of Quality Outcomes

The outcomes of the House of Quality were: (a) the prioritisation of the means (HOWs), (b) the formulation of an action plan comprised of the first action to be taken for each of the four most important means and (c) the choice of the person who was to be responsible for each of these first actions.

Action Outcomes

The QFD Team decided to target the top four HOWs which were:

1. Increase the percentage of staff with knowledge of how to apply the MSB policy.
2. Increase the percentage of students aware of the MSB process.
3. Increase the percentage of staff with conflict resolution skills.
4. Increase the percentage of parents with a positive attitude towards the school.

The team then decided on the first action to implement for each HOW and who was to be responsible for it. These actions were:

1. L.S. was to organise an inservice for all staff. The inservice was intended to increase the staff's confidence to use the MSB process and thoroughly cover levels one and two. It was also recommended that a credible outside facilitator be used (M.C.?).

2. A.P. to organise the means by which the following occurs:

S.G. and L.T. are to assist A.P. and relevant others in formulating a quiz on the MSB process which is to be given to form classes during Quiet Constructive Time (QCT) and supported by prizes. This is to be followed by year leaders communicating clear, strong messages about the MSB process to their students. A worksheet reinforcing the lesser known parts of the MSB process would be completed by students in their form classes during QCT. Finally a post test would be administered to evaluate the students' level of knowledge of the MSB process.

3. L.S. was to organise 2 or 3 after hours' workshops on developing conflict resolution skills conducted by an appropriate facilitator. Staff would be invited to attend and the deputies would ensure that all staff who needed the experience attended.

4. B.W. was to organise a newsletter devoted to the MSB process and highlighting courses about conflict resolution and surviving parenting to be circulated to parents. Further to this, parents were to be invited to attend school assemblies in which their children played a significant part. L.T. was to report back to the P and C about the process and findings of this review of the MSB Policy.

These action outcomes were presented to and accepted by the School Management Group as the recommendations from the review of the MSB policy. These recommendations were only a starting point and not meant to preclude other actions which could be implemented to bring about the desired changes in the factors which would be critical to the success of the MSB policy satisfying customer requirements.

Part Two: The Perceptions of QFD by the Participants

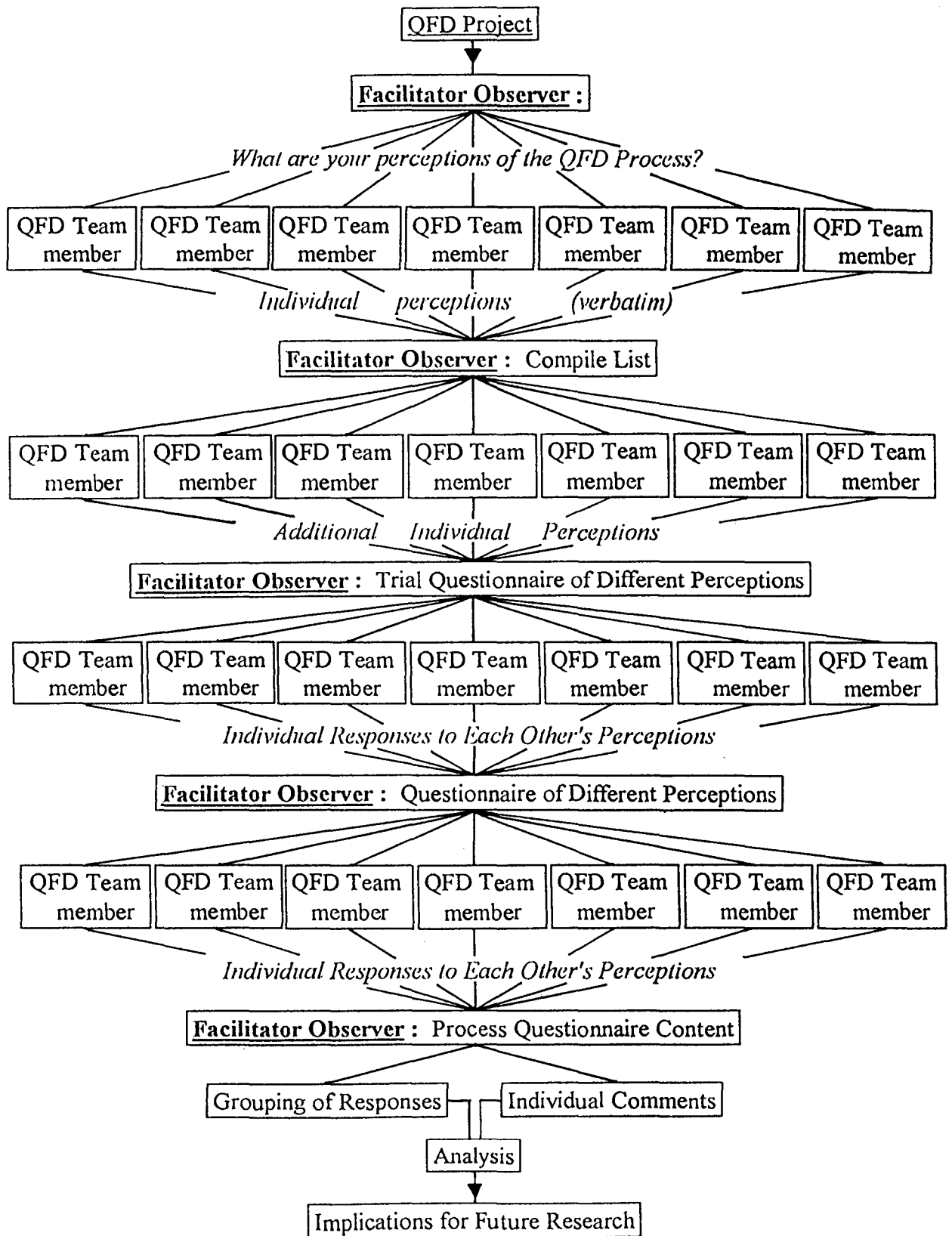
Procedure

After the House of Quality was completed, the researcher began the second part of the study (Figure 8) which was to find out what were the participants' perceptions of the QFD process. The members of the QFD Team were asked by the researcher, individually and in private, "*What are your perceptions of the [QFD] process?*" All of the verbal responses were jotted down during the interview and the written responses were collected. Both forms of response were compiled verbatim into a list, a copy of which was distributed to each team member for comment.

Additional perceptions were added to the original list and then examined for duplication to keep the questionnaire as brief as possible without excluding any constructs which were participant's perceptions. The types of duplication considered were repetitions; different extremes of the same construct (e.g. *I liked it / I hated it*); and comments which were subsumed under a more generic comment. After this step, the researcher compiled a trial questionnaire of the *different* perceptions of the participants.

Figure 8

The Design of the Study of the Perceptions of the QFD Process by the Participants



The items in the trial questionnaire were verbatim statements unless they were unnecessarily verbose in which case they were summarised. The participants were asked to respond to each statement on a Likert-type scale. A copy of the trial questionnaire was given to each participant and he or she was asked to complete the questionnaire and to check whether the items covered all of his or her perceptions of the QFD process. A space was provided for participants to write any of their perceptions of the QFD process which were not covered by the trial questionnaire.

A few modifications were made necessary by the responses to the trial questionnaire. These modifications were the separation of a verbatim comment which encompassed a number of different constructs into its component parts, and the addition of a perception which referred to a construct which had not been included in the trial questionnaire. The trial questionnaire was discarded and the modified questionnaire, which also included a space for a summary comment, was given to each participant to complete (Appendix 3).

The responses to each *perception of a participant* in the questionnaire were collated so that the number of individual responses for each item could be seen as part of a group (Table 2).

Results

Table 2

Participant's Perceptions of the QFD Process

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
The process was tedious.	0	1	0	5	1

(table continues)

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
The process was not significantly more tedious than other administration tasks.	0	3	1	3	0
The process took a long time.	0	0	0	2	5
The process should be done by using longer sessions which are closer together and free of all interruptions.	0	0	2	2	3
The maths in the process made it difficult to feel sure of oneself.	1	2	2	1	1
The process was intellectually demanding.	0	1	1	3	2
The group found it difficult to make decisions from the viewpoint demanded by the process.	1	2	1	3	0
The group needs a facilitator familiar with the process to do the process properly.	0	0	1	2	4
The process was overwhelming at first.	0	1	1	3	2
The process was generally overwhelming.	0	3	0	3	1

(table continues)

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
A brief practical introduction to the process would make would make it easier to do.	0	0	0	4	3
I didn't like leaving out the non-proactive bits when doing the HOWs.	0	2	3	1	1
The task of determining the strength of the relationship between the HOWs and the WHATs was difficult.	0	2	1	4	0
Some of the 'weak' HOWs v WHATs relationships would have been better as blanks with a value of zero.	0	2	0	4	1
The strength of the relationship between the HOWs and the WHATs (strong, medium or weak) was consistent for the purpose it was used.	0	1	3	3	0
The task of determining the strength of the relationship between the HOWs and the WHATs would be easier to do on a consensus basis as a group.	0	1	1	4	1
I did not feel committed to the process at the beginning.	0	4	0	3	0

(table continues)

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
The process became clearer as it unfolded.	0	1	1	4	1
The process provides a logical path to follow.	0	0	3	2	2
The process starts with client needs and builds from there.	0	0	0	2	5
There was opportunity for input by all relevant parts of the school community in the process.	0	0	0	2	5
When you follow the process you know what to do with all the data from the input of the school community.	0	1	1	3	2
The process gives a good validation for the decisions which were made during the process.	0	0	0	4	3
At the end the process justifies its means.	0	1	2	2	1
The formalised process guarantees a quality outcome agreeable to all parties.	0	0	1	3	3
The process could be said to leave no stone unturned.	0	0	2	4	1

(table continues)

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
The result will probably be superior to that which would have been gained from conventional committee approaches.	0	0	4	1	2
The process was worthwhile.	0	0	1	3	3
I liked the process overall.	1	1	1	2	2
The result of the process was quite acceptable.	0	0	0	6	1
The process brought the group together.	0	1	3	3	0
As the process developed people became better informed.	0	0	1	5	1
As the process developed consensus was easier to reach.	0	0	0	6	1
The group learnt from the process and would now be more sophisticated planners/decision makers.	0	0	4	2	1

Validity and Reliability

The items in the questionnaire were either verbatim or simplified perceptions of the process stated by the participants and checked by them. All of the participants agreed that the items and the Likert-type scale in the questionnaire enabled them to express all of the perceptions that they had of the QFD process. The number of

responses for each point on the scale was *strongly disagree*: 3, *disagree*: 30, *undecided*: 41, *agree*: 104 and *strongly agree*: 58. The greater number of responses at the right of the scale would be consistent with items which were expressed in the same terms in the questionnaire as they were by the participant who originally stated them, *if* the other participants shared that perception.

At the time of the completion of this study, the Action Outcomes had not yet been implemented in the school, so the participants were unable to see the results of implementation. Also, this study was the participants' first experience of the QFD process. These two factors may help to explain the 41 occasions where a participant was undecided about a perception. The study presents the perceptions of the QFD process by some teachers who are among the first in Western Australia to use it in a mainstream school.

Analysis of perceptions

Each perception which was stated by a participant was considered in relation to all the other perceptions (Table 2) in order to identify the constructs about which the participants had commented. The responses to each perception (Table 2) were then grouped according to these constructs, which were: the way in which the QFD process performed its function (Table 3); how the participants felt towards the QFD process (Table 4); difficulties the participants experienced with the QFD process (Table 5); the way in which the QFD process ought to be undertaken (Table 6); the features of the QFD process in relation to its function (Table 7); developments which occurred during the QFD process (Table 8); and overall evaluation of the QFD process (Table 9).

In order to discern the group's perception about the QFD process in relation to a particular construct, the pattern of agreement/disagreement of the responses to *each* perception was considered in relation to the responses to all of the *other* perceptions which also related to that same construct. Each perception was considered in relation to how many participants either agreed (including 'strongly agree'), disagreed (including 'strongly disagree') or remained undecided. Significance was attached to those

perceptions which had a minimum of 5 out of 7 (71.4%) of the responses in agreement and those perceptions which had 5 out of 7 (71.4%) of the responses in disagreement, in order to isolate the perceptions with which the majority of the group agreed. These perceptions were isolated because they were more likely to be experienced by others who undertook the QFD process for the first time. Finally, the individual summary comments were considered in conjunction with the responses to the perceptions as a means of gaining additional insight into the perceptions about each construct expressed by the group.

Table 3

Participant's Perceptions About the Way in Which the QFD Process Performed its Function

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
The process gives a good validation for the decisions which were made during the process.	0	0	0	4	3
The formalised process guarantees a quality outcome agreeable to all parties.*	0	0	1	3	3
The process could be said to leave no stone unturned.*	0	0	2	4	1
At the end the process justifies its means.*	0	1	2	2	1

(table continues)

Participants' Perceptions

SDD U A SA

The strength of the relationship between the HOWs and
the WHATs (strong, medium or weak) was
consistent for the purpose it was used.

Note. Each statement followed by an asterisk is a participant's verbatim perception.

Table 4

Participant's Perceptions About How the Participants Felt Towards the QFD Process

<u>Participants' Perceptions</u>	<u>SDD</u>	<u>U</u>	<u>A</u>	<u>SA</u>	
The process was tedious.*	0	1	0	5	1
The process was overwhelming at first.	0	1	1	3	2
The process was not significantly more tedious than other administration tasks.	0	3	1	3	0
The process was generally overwhelming.	0	3	0	3	1
I did not feel committed to the process at the beginning.	0	4	0	3	0
The maths in the process made it difficult to feel sure of oneself.	1	2	2	1	1
I didn't like leaving out the non-proactive bits when doing the HOWs.*	0	2	3	1	1
I liked the process overall.*	1	1	1	2	2

Note. Each statement followed by an asterisk is a participant's verbatim perception.

Table 5

Participant's Perceptions About Difficulties the Participants Experienced with the QFD Process

<u>Participants' Perceptions</u>	<u>SDD</u>	<u>U</u>	<u>A</u>	<u>SA</u>	
The process was intellectually demanding.*	0	1	1	3	2
The task of determining the strength of the relationship between the HOWs and the WHATs was difficult.	0	2	1	4	0
The group found it difficult to make decisions from the viewpoint demanded by the process.	1	2	1	3	0

Note. The statement followed by an asterisk is a participant's verbatim perception.

Table 6

Participant's Perceptions About the Way in Which the QFD Process Ought to be Undertaken

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
A brief practical introduction to the process would make it easier to do.	0	0	0	4	3
The group needs a facilitator familiar with the process to do the process properly.	0	0	1	2	4
The process should be done by using longer sessions which are closer together and free of all interruptions.	0	0	2	2	3
The task of determining the strength of the relationship between the HOWs and the WHATs would be easier to do on a consensus basis as a group.	0	1	1	4	1
Some of the 'weak' HOWs v WHATs relationships would have been better as blanks with a value of zero.	0	2	0	4	1

Table 7

Participant's Perceptions of Features of the QFD Process in Relation to its Function

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
There was opportunity for input by all relevant parts of the school community in the process.	0	0	0	2	5
The process starts with client needs and builds from there.*	0	0	0	2	5
When you follow the process you know what to do with all the data from the input of the school community.*	0	1	1	3	2
The process provides a logical path to follow.	0	0	3	2	2

Note. Each statement followed by an asterisk is a participant's verbatim perception.

Table 8

Participant's Perceptions of Developments Which Occurred During the QFD Process

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
As the process developed consensus was easier to reach.	0	0	0	6	1
As the process developed people became better informed.	0	0	1	5	1
The process became clearer as it unfolded.	0	1	1	4	1
The process brought the group together.	0	1	3	3	0

Table 9

Participant's Perceptions About Their Overall Evaluation of the QFD Process

<u>Participants' Perceptions</u>	<u>S</u>	<u>D</u>	<u>U</u>	<u>A</u>	<u>SA</u>
The process took a long time.*	0	0	0	2	5
The result of the process was quite acceptable.*	0	0	0	6	1
The process was worthwhile.*	0	0	1	3	3
The result will probably be superior to that which would have been gained from conventional committee approaches.*	0	0	4	1	2
The group learnt from the process and would now be more sophisticated planners/decision makers.*	0	0	4	2	1

Note. Each statement followed by an asterisk is a participant's verbatim perception.

Summary of Results

The fact that the QFD team was able to perform the QFD process in this study shows that the teachers in the study were able to operate outside their existing paradigms relating to education and planning. In doing so, the QFD team performed their functions in accord with the new wave of third generation quality management. This was achieved despite a number of factors which did not make it easier for them to learn and perform new things in a new way. The first of these was that the participants had had *no previous training in QFD* and very little exposure to the concepts which underpin it - especially those concerning proactive planning, the nature of quality, who

defines quality and what it means to be customer driven. This led, in part, to the group overriding the facilitator to depart from the QFD process in the way in which a task was performed. Secondly, the project itself was seen as a trial and within the overall view of the operations of the school only limited resources were available. This meant that it was neither possible to schedule the meetings close together, nor to devote sufficient time to them on each occasion.

The participants in the study were in a position to comment on their experience of QFD in their school. There were 20 perceptions with which a clear majority (at least 5 of the 7, or 71.4%) of the participants both agreed and disagreed and these were considered to be the group's perceptions of the QFD process. These perceptions are consistent with the attributes of QFD as experienced in industry (Ealey, 1987; Morrell, 1987; Cohen, 1988). Examples of group majority perceptions with comment (where available), together with the constructs to which they refer, included:

The way in which the QFD process performed its function

The group were unanimously in agreement with the perception that the process gave a good validation for the decisions which were made during the process. One participant stated, "...I think this process does validate the decisions made. Very good from an accountability point of view." The group also thought that the QFD process was thorough and guaranteed a quality outcome agreeable to all parties. A participant stated, "The process will give good outcomes."

How the participants felt towards the process

The group thought that the process was overwhelming at first and tedious. One participant made the following comments:

"Tedious - never again!"

"The process was boring."

"The process was terrible."

Another participant stated, "I felt it worked quite well, though there were times when it felt 'drawn out' (e.g. when allocating likelihood of HOWs influencing outcomes)." This statement refers to when the group decided to depart from QFD procedure and instead of making the HOWs v WHATs decisions on a consensus basis following group discussions of each decision, they made each of the 228 decisions individually! This may, in part, have led to the perception that the process was tedious. Another possible reason for this perception could lie in the nature of the tasks performed, as stated in the following comment, "Like most administration tasks (e.g. timetabling, organising relief teachers, etc.) the process was boring and lacking in excitement." However, the group was evenly divided on this particular point.

Difficulties the participants experienced with the process

The group found the QFD process to be intellectually demanding. One participant stated, "I couldn't quite follow some of the steps in the procedure. I'm not mathematically/statistically minded and at times I really felt at a loss as to why we were doing things and what we were actually doing and where they would lead us."

The way in which the process ought to be undertaken

The group had a number of perceptions about how the QFD process ought to be carried out. They were unanimous in their perception that a brief practical introduction to the process would make it easier to do. The majority of the group thought that a facilitator familiar with the QFD process was needed to do the process properly. Two comments made by participants refer to these majority group perceptions:

"I realise that the group had to make the decisions but at times I felt you needed to take control (which you tended to do more towards the end of the process)."

"Perhaps a chat at the beginning explaining what and how the process was going to work would help to focus group members."

The group also thought that the task of determining the strength of the relationship between the HOWs and the WHATs would be easier to do on a consensus

basis as a group and that some of the 'weak' HOWs v WHATs relationships would have been better as blanks with a value of zero. This is worthy of note because both of these summative perceptions are in accord with the recommended QFD procedure and *different* to the way in which the group decided to carry out these tasks when they had to perform them during the process.

Most of the QFD meetings were of half an hour to an hour in duration and were held at school during school hours and at times, a team member had to leave the meeting in order to deal with a matter of urgency which had arisen. The cancellation of a meeting due to a team member's absence usually meant a postponement of about week because of the team members' existing commitments. These factors may account for the group's perception that the QFD process should be undertaken by using longer sessions which are closer together and free of all interruptions. Most participants commented on this:

"...[the process] needed to be done over a shorter time frame (tended to forget [the] significance of each previous step due to long gaps between each task)."

"I was concerned that we extended the process over a long period of time and would try to compress this for any future QFD exercise."

"In man hours it [the process] is very expensive and therefore it would need to be streamlined to ensure efficient decision making processes and quick data turn around."

"Key people were often unavailable causing the meetings to be shorter and longer apart."

"The time allocation should create longer sessions which are close together."

"In future years the process should be scheduled for term 2 or 3 (less demands on key people)."

"A continuous set of time should be booked (e.g. successive half-days off-site) for the process."

"Because of the time pressure of doing my current job, I did not feel like thrashing out some issues during some of the meetings which were held on site during the school day."

Features of the QFD process in relation to its function

The group was unanimous in the view that the QFD process started with client needs and built from there. The group also thought that they knew what to do with all the data from the input of the school community when they followed the QFD process. The participants were unanimous in their opinion that there was opportunity for input by all relevant parts of the school community in the QFD process. One participant stated that, "There was input from all parts of the school community." Another participant made the comment that, "The process involved the consultation of all the parts of the school community."

Developments which occurred during the QFD process

The group were of the opinion that the process became clearer as it unfolded. There were four participant comments relating to this perception:

"At the end the process justifies its means."

"The participants didn't understand the merits of the process at the start so it was seen as just another task."

"It was interesting to see some members of the working group, sceptical at first, become more involved as their confidence in the process increased."

"It must have been really irritating for you in the beginning when we couldn't see the point. Thanks for persevering."

All of the participants agreed that as the process developed consensus was easier to reach. They also thought that people became better informed as the process developed. One participant stated that, "QFD brought the group together; people became better informed and consensus was easier to reach."

Overall evaluation of the process

The participants were unanimous in their view that the process took a long time and some of the comments in relation to this were:

"Very time consuming."

"I was concerned that we extended the process over a long period of time..."

"The process is very time consuming..."

"...a large effort in time and energy"

The participants were also unanimous in their opinion that the result of the QFD process was quite acceptable. This result refers to the outcomes from the review of the MSB policy. The group were also of the opinion that the process was worthwhile. An indication of how worthwhile the process was can be seen in the following comment by one of the participants:

"...the importance of the process not acknowledged in making time available to do the job (rather had to be squeezed in when everybody was available)."

CHAPTER 5

Implications and Conclusion

Implications

There are several implications from this study for the school's managing student behaviour policy. In the first place there was a clear prioritisation of teacher, student and parent requirements which was supported by a substantial body of quantified data. Secondly, the focus of the MSB policy review was upon how to ensure that the customers' priorities would be met, rather than dwelling on past mistakes. The four recommendations of the review (Appendix 2) were an outcome of this focus. The awareness of the need to increase the percentage of parents with a positive attitude towards the school has led to a greater communication effort towards the parents. This has resulted in more parents attending school assemblies and the production of a brochure which explains to parents what to do when their child is in serious trouble at school.

Although the purpose of the MSB questionnaire was to obtain the customer's importance and satisfaction ratings for use in the House of Quality, there were some unexpected outcomes from the questionnaire itself. The importance ratings of each customer group which had been ranked during the House of Quality process were communicated to the school community via the regular newsletter and at a staff meeting. It was significant that each customer group ranked the *same* two requirements as their two most important requirements. These requirements were:

1. School should be a safe place.
2. All students should be able to learn without disruption.

Both of these requirements have been used by the school administration to justify and support various procedures relating to the MSB and Uniform policies. The importance of school being a safe place was linked to both persuading the students to conform to the dress code (as it made the identification of intruders on campus easier for teachers) and to the stoppage of 'play fighting' (as it had frequently led to real fights in

the past). In addition to this, the school psychologist, in a private conversation, agreed that the results of the MSB questionnaire helped to get approval and funding to implement an anti-bullying programme in the school.

From the perspective that government schools in Western Australia are expected to respond to and accommodate the needs of their particular community, the QFD process, according to the participants of this study: (a) provided for input by all parts of the school community (Table 7), (b) started with client needs and built from there (Table 7), (c) *showed* what to do with the data from the input of the school community (Table 7) and (d) was a formalised process which *guaranteed* a quality outcome acceptable to all parties (Table 3). These factors also have benefits in terms of the way in which schools could demonstrate their accountability.

For schools concerned with meeting accountability requirements, the participants in this study (Table 3) thought that the QFD process was very thorough and validated the decisions which were made during the process. In addition to this, the House of Quality matrix provided a record or "map" which contained not only the decisions made and the reasons underpinning them, but it also delivered these in the context of an overview of the whole situation to which they related. The matrix would enable accountability to be demonstrated from a 'big picture' perspective. To date, the House of Quality has provided explanations for MSB policy decisions which have been sufficiently clear and thorough so as to be accepted by the vast majority of the school community without significant dissent.

According to the participants (Table 8), the QFD process became clearer as it developed and the QFD team became better informed about their customers' requirements and how to meet them. There are implications for the professional development of teachers here because the process which became clearer was a *proactive* planning, prioritising and understanding one which was *customer driven*. Therefore, it may prove to be that teachers who use QFD will undergo a paradigm shift from being task oriented towards being customer driven and proactive in their prioritising and planning approach. Another implication, for teachers considering action research as a

means to solve problems or to simply improve a situation, is that QFD offers a *structured* planning method to follow whereby the solution or response is *developed from the data* gathered from the customers in that specific situation.

The QFD process followed in this study offers parents and students a means whereby meaningful consultation with teachers can occur and lead to their requirements being *understood* by the people who provide them their educational services and make the decisions concerning those services. Furthermore, QFD is a process which can translate their requirements into the design features of the products and services that the school provides. QFD can also show the parents and students how the school has planned to satisfy their requirements in a clear way. There is even scope for schools to include parents and students in appropriate QFD teams (e.g. planning units of study, school beautification programmes and overall school management) which would enable them to play a more active and influential role in school planning than at present. In addition to this, the relationships between the customers and the providers in the school community are likely to improve as a result of the improved understanding of customer requirements and the customers' recognition of how their requirements are being met, both of which flow from the use of QFD.

Although the group of participants thought that the QFD process was tedious and took a long time, they also thought that it *was* worthwhile (Table 9). In terms of what the QFD process delivers, the group thought that the formalised process guaranteed a quality outcome agreeable to all parties (Table 3) and that the result of the process was quite acceptable to the relevant parties (Table 9). This implies that educators may stand to make substantial gains from applying QFD in terms of improved customer satisfaction.

There are a number of implications from this study for the Education Department of Western Australia as well as for the State Schools Teachers' Union of Western Australia (SSTUWA). The Department and the SSTUWA are at a stage in the current enterprise bargaining negotiations regarding devolution where both sides are experiencing difficulty finding common ground. In the current climate of enterprise

bargaining, both sides stand to gain from thinking through the concepts of quality and customers utilising the QFD approach. While the Education Department has been making considerable effort to implement devolution, very little publicity has been devoted to "fitness for purpose" - the concept of quality which underpins the third generation of quality management, even though the Department's strategic plan demonstrates an appreciation of this. A greater understanding of this concept of quality is necessary before people can make the paradigm shift towards being customer driven. Similarly, the concept of the "internal customer" could be used to reassure teachers that *their* most important requirements would be met because that would be necessary to remain consistent to the thinking of third generation quality management. Another implication for the Department is that QFD would provide it with a thorough and structured approach by which schools can manage the complex details that they have to face in order to implement devolution. The use of QFD would be consistent with the TQM philosophy which the Department is already considering.

The SSTUWA has not yet exploited the implications of the fundamental concepts within the new generation of quality management to ensure quality working conditions for its members whilst ensuring that their concerns for the welfare of their pupils are also met. The QFD process used in this study would provide a means whereby the requirements of the different clients and stakeholders of a school could be managed according to their importance. Part of this management would include teachers, who would have a clear place as the *internal* customers of the school. QFD offers a structured method which meets the requirements that are most important to the customers of the school in a manner which gives each customer group its due recognition, as well as providing the means by which these requirements can be satisfied. It is worth noting that SSTUWA members would be among the decision makers in the QFD teams which would perform the planning and prioritising tasks in their own schools. The willingness of teachers to be involved in worthwhile and relevant planning at their school was implied in the first part of this study, wherein the teachers gave their highest average satisfaction rating to being able to take part in the

process of deciding the importance of each requirement and stating their degree of satisfaction with the school's current performance in regard to each of those requirements.

It is significant to note that the QFD process makes all the thinking about the project, which is being undertaken, clear to the QFD team and that all this thinking is shared by them. This and the improved understanding of their customers' requirements could well result in making consensus easier to reach during the prioritising and planning process as well as developing a sense of group cohesion and building team morale. A further potential benefit of the QFD process is that the elements of the situation under consideration are presented to the group in a way which challenges them to create a model which combines these elements so that they *will* satisfy the customers and this challenge can lead to breakthroughs in the way in which schools and the people in them perform their functions.

This study only gathered the perceptions of the seven teachers who implemented QFD in the normal course of events at their school. However, their perceptions of the process were made in the light of their first hand experience of the QFD process and as such stand as indicators of what could be reasonably anticipated if QFD was used in schools. Future research with teachers who *have* had introductory training in QFD could prove to be very fruitful.

Conclusion

The teachers who used QFD in this study found that the QFD process was worthwhile. They also thought that better training in QFD should be provided for the QFD team members in future studies of QFD in schools. These results form the basis of implementable action research. Furthermore, following Borg's (1989) suggestion, there would be value in replicating this study in an attempt to gauge the extent of generalisability. Future research into QFD in an educational context may benefit from the application of the QFD process to curriculum planning, problem solving, policies, programmes and the design of school development plans.

REFERENCES

- Adelman, C., Jenkins, D. & Kemmis, S. (1976). Rethinking case-study: notes from the second Cambridge Conference. *Cambridge Journal of Education*. pp. 139-150.
- Akao, Y. (1988). *Quality function deployment*. Cambridge, Massachusetts: Productivity Press.
- Bell, L. (1993). *Managing teams and developing quality in education*. (Available from Department of Education, University of Warwick, Coventry, England).
- Black, G. (1994, February). Putting education first. *The Education Circular*. 94(1), 4. (Available from Education Department of Western Australia, 151 Royal Street, East Perth, 6004.)
- Borg, W.R. (1989). *Educational research: an introduction*. (5th ed.). New York: Longman.
- Borg, W.R. & Gall, M.D. (1989). *Educational research: an introduction*. New York: Longman.
- Burns, R.B. (1994). *Introduction to research methods in education*. (2nd ed.). Melbourne, Australia: Longman Cheshire.
- Chalmers, R. (1993). *An evaluation of the deputy principals' leadership development program*. Unpublished Masters Thesis, Edith Cowan University, Western Australia.
- Chapman, J.D. (1987, November). The nature of the primary principalship. *The W.A. Primary Principal*, pp. 29-52.
- Coates, L.E. (1990, December). TQM at Oregon State University. *Journal for Quality and Participation*. pp. 90-101.
- Cohen, L. (1988, Summer). Quality function deployment: An application perspective from Digital Equipment Corporation. *National Productivity Review*. pp. 197-208.
- Conti, T. (1989, December). Process management and quality function deployment. *Quality Progress*. pp. 45-48.
- Deming, W.Edwards. (1991, May 20-23). *Out of the crisis* Proceedings from seminar entitled "Out Of The Crisis", Sydney. N.S.W.
- Department of the Arts and Administrative Services. (circa 1991). *Quality assurance for suppliers: A quick guide to the Commonwealth's quality assurance policy*. Canberra: Purchasing Australia.

- Department of Education of Western Australia. (1994). *Strategic plan for the Department of Education of WA 1994-1996: An overview*. (Available from Education Department of Western Australia, 151 Royal Street, East Perth, 6004.)
- Ealey, L. (1987, July). QFD- bad name for a great system. *Automotive Industries*. p.21.
- Francis, I. (1989, August 10-11). *Good enough or best of the best?* Paper presented at the First National Total Quality Management Institute Conference, Sydney, N.S.W. pp. 45-65.
- Gilmour, P., & Hunt, R.A. (1993). *The management of technology*. Melbourne: Longman Cheshire.
- Hand, M. (1992). *Quality management handbook*. Oxford: Butterworth-Heinemann.
- Hauser, J.R., & Clausing, D. (1988). The house of quality. *Harvard Business Review*. 66(3), 63-73.
- Holusha, J. (1989, January 5). Raising quality: Consumers star. *New York Times: Business Day*.
- Hoffman, N. (Chairman). (1994, May). *Devolution in the Western Australian government school system*. Issues paper. Minister's Independent Assessment Group (IAG) on Devolution. (Available from Education Department of Western Australia, 151 Royal Street, East Perth, 6004.)
- Hough, M.J. (1992, July). *A paradigm shift for educational administrators: The total quality movement*. Paper presented at the Annual Meeting of the Australian Council for Educational Administration, Darwin.
- Isaac, S. & Michael, W. (1990). (2nd ed.). *Handbook in research and evaluation*. San Diego. California. Edits Publishers.
- Juran, J.M. (1988). *Juran on planning for quality*. New York: The Free Press, Macmillan.
- Kano, N., Seraku, N., Takahashi, F., & Tsuji, S. (1984). Attractive quality and must be quality. *Quality*. 14(2), 39-42.
- Kenny, A.A. (1988, June). A new paradigm for quality assurance. *Quality Progress*. pp. 30-32.
- King, R. (1987). *Better designs in half the time*. Methuen, MA: GOAL/QPC.

- Lindberg, B. (1994). *Make your opinion on devolution count*. Correspondence from a union president to members seeking their responses to an Issues Paper. (Available from State School Teachers Union of Western Australia, SSTUWA Building, 150 Adelaide Terrace, Perth.)
- Lindberg, B. (1994, July). From the president. *Western Teacher*. 23(34), 2. (Available from The Western Teacher, P.O. Box 6040, East Perth. 6892. Phone: 09 325 5311)
- Louden, L.W. (1989). *School development plans*. (Policy and Guidelines) Perth, Western Australia: Ministry of Education.
- McElroy, J. (1987, June). For whom are we building cars? *Automotive Industries*. pp. 68-70.
- McGowan, W.S. (1993). *An evaluation of a professional development for primary school administrators*. Unpublished master's thesis, Edith Cowan University. Perth.
- McMillan, J.H., & McMillam, S.S. (1993). *Research in education: a conceptual introduction*. (3rd ed.). New York. HarperCollins.
- Miles, M.B., & Huberman, A.M. (1984, May). Drawing valid meaning from qualitative data: Toward a shared craft. *Educational Researcher*. pp. 20-30.
- Ministry of Education, Western Australia. (1992). *School decision making - Policy and guidelines*. (Available from Education Department of Western Australia, 151 Royal Street, East Perth, 6004.)
- Morrell, N.E. (1987, February 23-27). *Quality function deployment*. Paper presented at the International Congress and Exposition, Detroit, Michigan. pp.1-8.
- Murgatroyd, S., & Morgan, C. (1992) *Total quality management and the school*. Buckingham [England]; Philadelphia: Open University Press.
- O'Neal, C.R. (1991, March). It's what's up front that counts. *Marketing News*. 25(5), 9-28.
- Pickles, F., & Dean, G. (1991, December). TQM and people - the TQM cycle. *Quality Australia*. pp. 46-47.
- Print, M. (1989). *Curriculum development and design*. (2nd ed.). Sydney: Allen & Unwin.
- QFD Services. (1992). *Quality Function Deployment 3 day implementation seminar-workshop*. Perth, June 8-10. (Available from The Total Quality Group Pty Ltd, 50A Cabbage Tree Road, Bayview, NSW. 2104.)

- Schauerman, S., Manno, D., & Peachy, B. (1993, February). *Listening to the voice of the customer*. Paper presented to the CCBIA/League For Innovation in Community Colleges Conference, California.
- Secondary Education Authority. (1994). *Syllabus manual year 11 and 12, 1994. Volume IV Mathematics. Certificate of Secondary Education*. (Available from Secondary Education Authority, 27 Walters Drive, Herdsman Business Park, Osborne Park, Western Australia. 6017.)
- Stamm, G. (1992). *Flowing customer demanded quality from service planning to service design*. Paper presented at the Fourth Symposium on Quality Function Deployment. Cincinnati, Ohio: Educational Services Institute. pp. 395-411.
- Sullivan, L.P. (1986, June). Quality Function Deployment. *Quality Progress*. pp. 39-50.
- The Education Circular. (1994, May). 96(4). (Available from Education Department of Western Australia, 151 Royal Street, East Perth, 6004.)
- Tribus, M. (1993, January/February). Quality management in education. *Journal for Quality and Participation*. pp. 12-21.
- Vasilash, G. (1989, February). Hearing the voice of the customer. *Production*. pp. 66-68.
- Walker, M. (1992, April). Quality Function Deployment. *Quality Magazine*. pp. 17-21.
- Western Teacher. (1994, July). 23(34), 4. (Available from The Western Teacher, P.O. Box 6040, East Perth. 6892. Phone: 09 325 5311)
- Yin, R.K. (1989). *Case study research: design and methods*. (Rev. ed.). London. Sage Publications.

Appendix 1

Managing Student Behaviour Questionnaire

INSTRUCTIONS Which of the following list of requirements are the *most important* to you? Which of the following list are the *least important* to you?

Tick the appropriate box.

LEAST IMPORTANT	BELOW AVERAGE IMPORTANCE	AVERAGE IMPORTANCE	ABOVE AVERAGE IMPORTANCE	MOST IMPORTANT	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	School should be a safe place.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All students should be allowed to learn without disruption.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Individual circumstances should be taken into consideration in the interpretation of the MSB Policy.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Teachers must inform parents if their children's behaviour or work is of concern.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The MSB Policy should punish negative behaviour and reward positive behaviour.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students must obey teachers.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	School rules should be applied fairly.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students should be aware that severe misbehaviours lead to suspension.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conciliation and resolution are the desired outcomes of the MSB Policy.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All teachers should be able to teach without disruption.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Effective communication between members of the school community ought to occur.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Upon return from the Contract Room or suspension a student's behaviour should be monitored until appropriate behaviour is established.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students must obey school rules.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MSB process ought to lead to personal growth.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	School rules should be applied consistently.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students should remain in the Contract Room until a resolution satisfactory to the school administration is reached.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students have some responsibility for their learning.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There should be a clear statement of general principles regarding the behaviour of students.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students should be responsible for their behaviour.

(Appendix continues)

INSTRUCTIONS How satisfied are you with the school in regard to each of the following requirements?
Tick the appropriate box.

ANGRY	UNHAPPY	SATISFIED	VERY HAPPY	DELIGHTED	<i>Requirements</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	School should be a safe place.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All students should be allowed to learn without disruption.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Individual circumstances should be taken into consideration in the interpretation of the MSB Policy.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Teachers must inform parents if their children's behaviour or work is of concern.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The MSB Policy should punish negative behaviour and reward positive behaviour.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students must obey teachers.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	School rules should be applied fairly.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students should be aware that severe misbehaviours lead to suspension.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conciliation and resolution are the desired outcomes of the MSB Policy.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All teachers should be able to teach without disruption.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Effective communication between members of the school community ought to occur.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Upon return from the Contract Room or suspension a student's behaviour should be monitored until appropriate behaviour is established.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students must obey school rules.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MSB process ought to lead to personal growth.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	School rules should be applied consistently.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students should remain in the Contract Room until a resolution satisfactory to the school administration is reached.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students have some responsibility for their learning.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There should be a clear statement of general principles regarding the behaviour of students.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Students should be responsible for their behaviour.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How do you feel about being able to take part in this process? (If you wish to make a further comment please write it below.)

Comment: _____

Appendix 2

The Report of the Managing Student Behaviour Policy Review Committee

Process

1. Groups of students, parents and teachers met and volunteered what they wanted from the MSB Policy.

2. All the stated requirements [verbatim] were circulated to the whole school community with an invitation to volunteer any other requirements.

3. The MSB Review Committee met and considered each of the 73 resulting requirements and found that there 19 separate requirements which had been expressed in various ways.

4. The 19 requirements were circulated to the school community in a questionnaire which asked each person to attach a level of importance to each [requirement].

5. The following are the percentages of each group which responded:

Parents 24.8%

Students 34.5%

Teachers 64.5%

6. Each group chose the same two requirements in the top two. They were:

School should be a safe place..

All students should be able to learn without disruption.

7. The MSB Review Committee thought of proactive ways in which to satisfy each of the most important [the top 40%] requirements. These are known as HOWs or more recently *critical success factors*

8. The committee then considered the relationship between each HOW and each requirement in terms of the ability of each HOW to satisfy each requirement.

(appendix continues)

9. From the previous step 4 HOWs emerged as the most influential in being able to satisfy the most important requirements of the school community (in relation to the MSB Policy). These **critical success factors** were (in order):

- i. Increase the percentage of staff with the knowledge of how to apply the MSB process.**
- ii. Increase the percentage of students aware of the MSB process.**
- iii. Increase the percentage staff with conflict resolution skills.**
- iv. Increase the percentage of parents with a positive attitude to the school.**

Recommendations

i. L.S. to organise an inservice for **all** staff. The inservice is to increase the staff's confidence to use the MSB process and thoroughly cover levels one and two. It is also recommended that a credible outside facilitator be used.

ii. A.P. to organise the means by which the following occurs:
S.G. and L.T. are to assist A.P. and relevant others in formulating a quiz on the MSB process which is to be given to form classes during QCT (supported by prizes). This is to be followed by year leaders communicating clear, strong messages about the MSB process to their students. Then a worksheet reinforcing the lesser known parts of the MSB process will be done during QCT by form classes. Finally a post test will be administered to evaluate the students' level of knowledge of the MSB process.

iii. L.S. to organise 2 or 3 after hours workshops on developing conflict resolution skills conducted by an appropriate facilitator (M.C.?). Staff are to be invited to attend and the deputies are to ensure that all staff who need the experience attend.

iv. B.W. to organise a newsletter devoted to the MSB process and highlighting courses about conflict resolution and surviving parenting to be circulated to parents. Further to this parents are to be invited to attend school assemblies in which their children play a significant part. L.T. to report back to the P&C about the process and findings of this review of the MSB Policy.

Appendix 3

Comments made by participants about QFD after participation in the process.

"QFD gives a good validation for decisions."

"Wait and see results before judging whether the process was worthwhile."

"Only the first and last parts should be done."

"The process took a long time."

"I didn't like leaving out non-proactive bits when doing the HOWs."

"The process was intellectually demanding."

"Because of the time pressure of doing my current job, I did not feel like thrashing out some issues during some of the meetings which were held on site during the school day."

"The process was worthwhile."

"I think that everyone learnt from the process and will perform their functions better in the future as a result. (Could you please elaborate?)"

"At the end the process justifies its means."

"In future years the process should be scheduled for term 2 or 3 (less demands on key people)."

(appendix continues)

"A continuous set of time should be booked (e.g. successive half-days off-site) for the process."

"The result of the process was quite acceptable."

"Like most administration tasks (e.g. timetabling, organising relief teachers, etc.) the process was boring and lacking in excitement."

"The process was boring."

"The process was terrible."

"Didn't like filling in the squares (HOWs v WHATs)."

"The process will give good outcomes."

"Could have got the same quality of result easier."

"The time allocation should create longer sessions which are close together."

"I felt it worked quite well, though there were times when it felt 'drawn out' (e.g. when allocating likelihood of HOWs influencing outcomes)."

"I couldn't quite follow some of the steps in the procedure. I'm not mathematically/statistically minded and at times I really felt at a loss as to why we were doing things and what we were actually doing and where they would lead us."

(appendix continues)

"I realise that the group had to make the decisions but at times I felt you needed to take control (which you tended to do more towards the end of the process)."

"Perhaps a chat at the beginning explaining what and how the process was going to work would help to focus group members."

"I liked the process overall."

"Liked how considering a HOW v each WHAT clearly lead to finding the HOWs with the most effect."

"The participants didn't understand the merits of the process at the start so it was seen as just another task."

"Many teachers are not driven by business efficiency/profit type motives, but by other more caring/idealistic type values. This made it hard for the group to think/make decisions from an efficiency viewpoint."

"The decisions by the group were more subjective rather than quantifiable."

Key people were often unavailable causing the meetings to be shorter and longer apart."

"The process involved the consultation of all the parts of the school community."

"There was input from all parts of the school community."

(appendix continues)

"When you follow the process you know what to do with all the data from the input of the school community."

"The formalised process guarantees a quality outcome agreeable to all parties."

"The result will probably be superior to that which would have been gained from conventional committee approaches."

"QFD brought the group together; people became better informed and consensus was easier to reach."

"I find this overwhelming."

"The process was tedious."

"The process could be said to leave no stone unturned."

"The process starts with client needs and builds from there."

"With QFD the next step is always clear and makes sense."

"There is always a way ahead."

"The group learnt from the QFD process and would now be more sophisticated planners/decision makers."

Appendix 4

Questionnaire of the Participants' Perceptions of the QFD Process

STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process was tedious.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process was not significantly more tedious than other administration tasks.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process took a long time.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process should be done by using longer sessions which are closer together and free of all interruptions.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The maths in the process made it difficult to feel sure of oneself.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process was intellectually demanding.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The group found it difficult to make decisions from the viewpoint demanded by the process.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The group needs a facilitator familiar with the process to do the process properly.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process was overwhelming at first.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process was generally overwhelming.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A brief practical introduction to the process would make it easier to do.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	I didn't like leaving out the non-proactive bits when doing the HOWs.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The task of determining the strength of the relationship between the HOWs and the WHATs was difficult.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Some of the 'weak' HOWs v WHATs relationships would have been better as blanks with a value of zero.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The strength of the relationship between the HOWs and the WHATs (strong, medium or weak) was consistent for the purpose it was used.

(appendix continues)

STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The task of determining the strength of the relationship between the HOWs and the WHATs would be easier to do on a consensus basis as a group.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	I did not feel committed to the process at the beginning.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process became clearer as it unfolded.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process provides a logical path to follow.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process starts with client needs and builds from there.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There was opportunity for input by all relevant parts of the school community in the process.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	When you follow the process you know what to do with all the data from the input of the school community.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process gives a good validation for the decisions which were made during the process.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	At the end the process justifies its means.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The formalised process guarantees a quality outcome agreeable to all parties.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process could be said to leave no stone unturned.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The result will probably be superior to that which would have been gained from conventional committee approaches.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process was worthwhile.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	I liked the process overall.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The result of the process was quite acceptable.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The process brought the group together.

(appendix continues)

STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	As the process developed people became better informed.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	As the process developed consensus was easier to reach.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The group learnt from the process and would now be more sophisticated planners/decision makers.

Could you please write a comment on the lines below which summarises your perception of the process.

***Thank you very much for your co-operation and your time.
Please return this to my pigeon hole***

Appendix 5

Participants' Declaration

I was a participant in the use of the QFD process to review the school's MSB Policy and I have read the sections titled 'The Implementation of QFD' and 'The Perceptions of QFD by the Participants.' Both sections are a true and accurate account of what occurred and I give my consent to their publication.

My responses to the questionnaire, 'The Quality Function Deployment Process (QFD) as used to Review the Managing Student Behaviour (MSB) Policy', and the comments I have made concerning QFD are my own genuine opinions. The facilitator did not attempt to influence my opinions nor was I pressured or coerced to give anything other than my own opinion. I give my consent to the publication of my opinions of QFD.

signed.....date / /1994.