

**THE EVALUATION OF AN “ACCELERATED” DEVELOPMENT TRAINING
PROGRAMME**

by

ANNA ELIZABETH KLEINHANS

submitted in part fulfilment of the requirements for

the degree of

MASTER OF ARTS

in the subject

INDUSTRIAL AND ORGANISATIONAL PSYCHOLOGY

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: DR S E VOSLOO

JANUARY 2005

ACKNOWLEDGEMENTS

This study could not have been completed without the assistance of various companies.

Permission was granted by Bayside Aluminium to conduct the research and report the data.

Saville and Holdsworth Pty Ltd (Pretoria branch) granted permission to publish the Bayside competency profiles and provided assistance in analysing the data.

Two external consultants, with a great deal of expertise in the field, helped with the design and the facilitation of the accelerated development programme. Lynette Gouws and Brian Eyre Consulting facilitated the programme.

In the empirical study, Profiled Appointments were instrumental in administering the pre-test and posttest.

SUMMARY

THE EVALUATION OF AN “ACCELERATED” DEVELOPMENT TRAINING PROGRAMME

by

Anna Elizabeth Kleinhans

Supervisor : Dr S E Vosloo
Degree : Master of Arts
Subject : Industrial and Organisational
Psychology

The aim of this study is to investigate the effectiveness of the “accelerated” development training programme by using two specifically compiled in-basket exercises equivalent in complexity. A pre- and post-evaluation were performed to determine whether learning transfer actually took place—that is, whether competencies developed. The research focused on the following competencies: action orientation; planning and organising; analysis and problem solving; teamness; and impact.

From the statistical analysis conducted, significant differences were obtained for three competencies, impact, action orientation and problem solving. The separation of variables proved to be problematic and the results could not be attributed directly to the training programme.

The results are explained, the design of the evaluation critically reviewed and recommendations made to improve the design of the evaluation. The value of the study is discussed and directions for possible future research provided.

Key terms: competencies; learning; assessment centres; training evaluation; training design

TABLE OF CONTENTS

	Page
Title page	i
Acknowledgements	ii
Summary	iii
Table of contents	iv
List of tables	ix
List of figures	xi
List of appendices	xii
CHAPTER 1: INTRODUCTION	1
1.1 BACKGROUND TO AND INCENTIVE FOR RESEARCH	1
1.1.1 Changes in the world of work	1
1.1.2 The importance of human resource development	3
1.1.3 The concept of human resource development clarified	3
1.1.4 The importance of human resource development in the new world of work	5
1.1.5 Changes in training and development as part of human resource development.....	7
1.2 PROBLEM STATEMENT.....	8
1.2.1 Research Questions	9
1.3 AIMS OF THE RESEARCH.....	10
1.3.1 General aim.....	10
1.3.2 Specific theoretical aims	10
1.3.3 Empirical aims	10
1.4 PARADIGM PERSPECTIVE.....	11
1.4.1 Scope of the research.....	11
1.4.2 Metatheoretical concepts	11
1.4.2.1 Assessment centres.....	11
1.4.2.2 Competencies.....	12
1.4.2.3 Learning	13
1.4.2.4 Action learning	13
1.4.2.5 Training	14

1.4.2.6	Development	14
1.4.2.7	Human resource development	15
1.4.2.8	Education.....	15
1.4.3	APPLIED THEORY.....	15
1.4.3.1	Social cognitive learning theory.....	16
1.4.3.2	Learning from the social cognitive learning perspective	18
1.5	RESEARCH DESIGN.....	19
1.5.1	Research variables	19
1.5.2	Type of research.....	19
1.5.3	Unit of analysis	19
1.5.4	Validity and reliability	20
1.6	RESEARCH METHOD	21
1.6.1	Phase 1: literature review	21
1.6.2	Phase 2: empirical study.....	21
1.7	CHAPTER DIVISION.....	22
1.8	CHAPTER SUMMARY.....	23
CHAPTER 2: TRAINING DESIGN AND EVALUATION		24
2.1	TRANSFORMATION OF TRAINING AND DEVELOPMENT	24
2.2	DEFINITION OF TRAINING EVALUATION.....	28
2.3	WHY EVALUATE TRAINING?	30
2.4	PURPOSE OF TRAINING EVALUATION.....	31
2.5	WHAT SHOULD TRAINING EVALUATION EVALUATE?	32
2.6	USE OF MODELS DURING TRAINING DESIGN AND EVALUATION	35
2.6.1	Kirkpatrick's levels of training evaluation.....	36
2.6.1.1	Reaction.....	37
2.6.1.2	Learning	38
2.6.1.3	Behaviour	39
2.6.1.4	Results	41
2.6.1.5	Criticism and suggested improvements.....	42
2.6.2	General systems model for the evaluation and design of training	44

2.6.2.1	Phase 1: needs assessment	45
2.6.2.2	Phase 2: training.....	47
2.6.2.3	Phase 3: evaluation.....	51
2.6.2.4	Criticism of the general systems model.....	51
2.6.3	The business impact instructional design model.....	52
2.6.3.1	Phase 1: needs analysis	55
2.6.3.2	Phase 2: design.....	60
2.6.3.3	Phase 3: development.....	60
2.6.3.4	Phase 4: production.....	61
2.6.3.5	Phase 5: implementation.....	62
2.7	BARRIERS TO EFFECTIVE TRAINING EVALUATION.....	64
2.8	NEW TRENDS IN THE EVALUATION OF TRAINING PROGRAMMES.....	68
2.9	CHAPTER SUMMARY.....	69
CHAPTER 3: COMPETENCIES.....		70
3.1	CONCEPTUALISATION OF COMPETENCIES	70
3.2	IDENTIFICATION OF COMPETENCIES.....	71
3.3	APPLICATION OF COMPETENCY MODELS.....	73
3.4	APPLICATION OF COMPETENCIES IN TRAINING AND DEVELOPMENT ...	73
3.4.1	Use of assessment centres	75
3.5	INTEGRATION OF THE LITERATURE STUDY.....	79
3.6	CHAPTER SUMMARY.....	82
CHAPTER 4: METHODOLOGY.....		83
4.1	RESEARCH AIM	83
4.1.1	General aim.....	83
4.1.2	Theoretical aims	83
4.1.3	Empirical aims	83
4.2	FORMULATION OF HYPOTHESIS	84
4.2.1	Hypothesis.....	84

4.3	DETERMINATION AND DESCRIPTION OF POPULATION AND SAMPLE....	84
4.4	SELECTION OF MEASURING INSTRUMENTS	858
4.4.1	Learning Potential (Apil-B).....	88
4.4.1.1	Rationale for the use of the Apil-B.....	88
4.4.1.2	Description of the Apil-B.....	89
4.4.1.3	Administration of the Apil-B	90
4.4.1.4	Reliability and validity of the Apil-B	90
4.4.2	Assessment centre.....	90
4.4.2.1	Rationale for the assessment centre.....	92
4.4.2.2	Description of the assessment centre.....	93
4.4.2.3	Administration of the assessment centre	93
4.4.2.4	Reliability of the assessment centre.....	94
4.5	JOB ANALYSIS METHOD.....	92
4.5.1	Work profiling system (WPS)	92
4.5.1.1	Rationale for use of the WPS.....	90
4.5.1.2	Description of the WPS	93
4.5.1.3	Administration of the WPS.....	93
4.5.1.4	Reliability and validity of the WPS.....	92
4.6	COLLECTION OF INFORMATION	94
4.7	PROCESSING AND ANALYSIS OF INFORMATION.....	95
4.8	THE ACCELERATED DEVELOPMENT TRAINING PROGRAMME	95
4.8.1	Organisational design.....	96
4.8.2	Training and development in the organisation.....	97
4.9	DESIGN OF THE ACCELERATED DEVELOPMENT TRAINING PROGRAMME	99
4.9.1	Phase 1	99
4.9.2	Phase 2	100
4.9.3	Phase 3.....	104
4.10	DESCRIPTION OF THE CONTENT OF THE ACCELERATED DEVELOPMENT TRAINING PROGRAMME	106
4.11	CHAPTER SUMMARY.....	109

CHAPTER 5: RESEARCH RESULTS	110
5.1 DISCUSSION OF RESEARCH RESULTS	110
5.2 INTERPRETATION OF RESULTS	113
5.3 CHAPTER SUMMARY.....	119
CHAPTER 6: CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS	120
6.1 CONCLUSIONS	120
6.1.1 Overview of the study.....	120
6.1.2 Value of the study.....	121
6.2 LIMITATIONS OF THE STUDY.....	122
6.2.1 Pre-test/posttest, no control group design	122
6.2.2 Size of the research sample	123
6.2.3 Isolating the impact of the training programme	124
6.3 RECOMMENDATIONS	125
6.3.1 General recommendations	125
6.3.2 Theoretical aims	125
6.3.2.1 The meaning of training evaluation and theoretical models used	125
6.3.2.2 The meaning of competency.....	126
6.3.3 Empirical aims	127
6.3.3.1 The impact of the ADP on identified behavioural competencies required to function effectively in a supervisory or specialist role at Bayside Aluminium.....	127
6.3.3.2 The impact of the ADP, in terms of the overall growth in proficiency per competency.....	127
6.3.3.3 Recommendations for future research.....	127
6.3.3.4 Implications for future training programmes.....	128
6.4 CHAPTER SUMMARY.....	129
References	130

LIST OF TABLES

		Page
Table 2.1	Kirkpatrick's model of training evaluation	37
Table 2.2	Stratum of evaluation in the business impact (ISD) model	54
Table 4.1	Demographic characteristics	85
Table 4.2	Representation of departments (<i>n</i> =14)	86
Table 4.3	Biographical characteristics of sample population (<i>n</i> =14)	87
Table 4.4	Measurement of the effectiveness of the training programme identified during design	105
Table 4.5	Identified behavioural competencies	107
Table 4.6	Content of the training modules of the accelerated development training programme	108
Table 5.1	Descriptive statistics: pre-test and posttest	111
Table 5.2	Level of significance: pre-test and posttest	112
Table C.1	Analysis of the accelerated development training programme based on the stratum of evaluation of the business impact (ISD) model	147
Table C.2	Cost analysis of the accelerated development training programme	151
Table C.3	Cost analysis of the accelerated development training program continued	152

LIST OF FIGURES

		Page
Figure 2.1	General systems model	45
Figure 2.2	Business impact (ISD) model	55
Figure 4.1	Example of Bayside Aluminium organograms	97
Figure 4.2	Design of the accelerated development training programme	100
Figure C.1	Syndicate group reviewed by the panel	150

LIST OF APPENDICES

	Page
Appendix A Overview of the accelerated development programme overview	138
Appendix B Example of syndicate group project work	143
Appendix C Evaluation of the ADP conducted by Bayside Aluminium	146

CHAPTER 1: INTRODUCTION

In this chapter the background to the problem statement as well as the research questions are discussed. The general and specific aims are listed and the scope of the study outlined. Procedures for the empirical study are explained and the outline of the study discussed.

1.1 BACKGROUND TO AND INCENTIVE FOR RESEARCH

1.1.1 Changes in the world of work

In order to clearly understand the context of the research, changes in the world of work and the implications of these changes need to be understood.

The revolution of change occurring in organisations has been well documented in the extant literature over the past 20 years. The major source of this revolution, is the growing realisation that strict controls, greater work pressure, more clearly defined jobs, and tighter supervision have, in the last number of years, run their course in terms of their ability to give organisations productivity gains (Morley & Garavan, 1995).

Various authors state that the last decade may be remembered for experiencing more rapid changes than in the whole of the preceding years of the 20th century combined. Such changes have resulted in radical and widespread shifts in the global economy, allied with the emergence of communication, shorter product life cycles and information technology infrastructures, which have revolutionised the way businesses operate (Barnicle, Garavan & O'Suilleabhain, 1999; McCracken & Wallace, 2000).

Preskill and Torres (1999) argue that the above-mentioned changes, are all related to the emergence of the knowledge era, in which knowledge, not physical labour, has become the key raw material for wealth creation and is the foundation for organisational and personal power. Knowledge or intellectual capital is fast becoming the essential organisational asset. Harnessing the intellectual capital of

the organisation requires an ability to adapt with speed and flexibility, to learn and to remain open to change and new possibilities.

Kraut and Korman (1999) take this idea further, stating that the world of work in which human resource management operates has changed dramatically. The major forces affecting the world of work are (1) demographics, meaning the workforce make-up, age, education, gender as well as migration, immigration and the birth rate; (2) economics, which deals with the following issues: productivity, labour cost, inflation, an increase in importance of competition and participation in the global economy; (3) legal and regulatory issues, which include civil rights legislation, laws covering safety and health and the labour relationship; (4) technology, which involves the obvious and subtle shifts caused by new products, such as fibre optics and computers; and (5) attitudes and values, which refer to topics as varied as the psychological contract formed with employers, notions about careers and commitment.

All these changes affect the organisation in terms of organisation strategies, structures, culture and the nature of individual jobs. This, in turn, impacts on the individual employee in terms of the competencies required to achieve success in the changing world of work. These changes have created a world of work characterised by constant change, uncertainty, alternative work arrangements and employability (Kraut & Korman, 1999).

In South African organisations the change process is driven by key forces, namely globalisation, reduced technological cycles, shifted demographics, changing customer demands, worker expectations, international economic trends and international competition (Erasmus, Schenk, Swanepoel & Van Wyk, 2000).

Horwitz, Bowmaker-Falconer and Searll (1996) also include the process of economic and social reconstruction as part of the forces driving change in South African organisations.

For South African organisations therefore, change and transformation are management issues that have and will become a way of life. There can be no hiding or escaping from the intensity and frequency of events that will confront South African organisations (Erasmus et al, 2000).

According to Horwitz et al (1996), the task facing South Africa is to find creative solutions to integrate economic growth and development in parallel with overcoming deeply entrenched discriminatory practices and social division. Because of this, human resource development in South Africa is receiving increasing attention.

1.1.2 The importance of human resource development

As discussed in the previous section, the world of work is changing and external influences play a vital part in human resource development in the workplace.

Owing to the changes in the world of work, as mentioned in the previous section, there is a greater focus on understanding the ways in which human resources drive business, with a strong emphasis on developing entrepreneurs and management teams, as key elements of organisational success (Barnicle et al, 1999).

According to Horwitz (1999), changes in the world of work drive strategic human resource development. In a global economy, the transfer of learning, new knowledge and the notion of intellectual capital become as important to leveraging competitive success as do sensitivity to local conditions. Hence strategic human resource development concerns policies and practices, resulting from organisational strategies seeking competitive advantages in either domestic or international markets, or both.

1.1.3 The concept of human resource development clarified

According to various authors, recent years have witnessed major changes in the way human resource development (HRD) has evolved as a discipline and the literature on HRD is neither a homogeneous one, nor clearly defined. Various problems are encountered when one starts to survey research and literature on HRD (Barnicle et al, 1999; Garavan, Gunnigle & Morley, 2000; Horwitz, 1999).

Barnicle et al (1999) identify the following two problems: firstly, defining research and literature on HRD, and secondly, defining the boundaries. Various authors (Barnicle et al, 1999; Garavan et al, 2000; McCracken & Wallace, 2000), state that there is dissatisfaction with the theoretical foundation of HRD. It is difficult to define

universal or definitive statements of what should be included in the term HRD (Barnicle et al, 1999; Garavan et al, 2000; McCracken & Wallace, 2000).

Barnicle et al (1999) state that human resource development as a concept, model, approach, discourse or set of practices remains unclear and is both complex and problematic. Barnicle et al (1999) state that a number of similar dimensions do emerge from an analysis of different literature. These are as follows:

- HRD is intrinsically related to overall business strategy and competitive advantage.
- HRD is conceptualised as an investment in human resource capability rather than an employment cost.
- HRD is concerned with change at all levels, both organisational and personal.
- HRD views the employee in a “holistic” sense.
- HRD is concerned with identifying and enhancing core competencies required at each level to meet its present and future objectives.
- HRD focuses on the management and delivery of training activities in the organisation.
- HRD concerns itself with selecting the best delivery systems designed to enhance human resource competencies.
- HRD is concerned with organisational and individual learning.
- HRD consists of a set of generic activities associated with learning.
- HRD is a social and discursive construct.
- HRD is concerned with how well human resource development strategies are reinforced by and reinforce other human resource strategies.

Al-Khayyat and Elgamal (1997) state that the ultimate objective of human resource development is the production of desirable behaviour and/or organisational change. This is an end, not a means. Training is the organisational means to achieve this

end, and is the first and the most common HRD activity. However, a second and third activity are highlighted, namely education and development.

The concepts of training, development, learning and education are used. There is considerable debate in the HRD literature on the distinction, if any, between the activities or concepts involved. This will be the focus of the following section. However, in this study the focus will be on training, development and learning as distinctly different concepts.

1.1.4 The importance of human resource development in the new world of work

Based on the forces discussed in the previous section, the competitive force managers face today and will continue to confront in the future, demands organisational excellence. According to Al-Khayyat and Elgamal (1997), with the new emerging organisational reality, change, competition, workforce demographic changes and business upheavals are imminent. Training and development are becoming an increasingly important method to equip organisations with the flexibility, adaptability and durability required for survival.

Bryans and Smith (2000) elaborate on this view and include the concept of the knowledge economy. According to these authors, the Western world is rapidly moving towards a knowledge economy, in which development and application of knowledge replace capital, raw materials and labour as the main areas of production.

The effort to achieve such excellence, through the focus on learning, quality team work, and re-engineering, are driven by the way organisations get things done and the way they treat their employees. These are fundamental human resource issues. The achievement of organisational excellence should be the work of the human resource department. The human resource department should therefore not be defined by what it does, but by what it delivers - results that enrich the organisation's value to customers, investors and employees (Ulrich, 1998). According to Horwitz (1999), human resource development has become a critical part of human resource management as a means to improve performance and organisational effectiveness.

Therefore the focus on how training and development, as part of human resources, should be conducted in organisations has also changed. Training and training systems are no longer seen as being separate from business strategy. Organisations are recognising the significance needs that have increased the use of training systems and are becoming increasingly concerned about the evaluation of training programmes as a way of determining whether their goals are being met. The tremendous cost of instructional programmes has also resulted in questions about their actual effectiveness (Goldstein, 1993).

The training, development and education of employees at all levels in organisations are now regarded as a vital component in maintaining competitiveness in the international arena. This is supported by the view that training, development and education strategies are the key means to reduce the inefficiencies of the employment relationship and obtain a closer approximation of competitive labour market outcomes (Garavan, 1997).

Erasmus et al (2000) concur with the argument and state that the main focus of human resource development is learning, its principal aim being to realise the objectives of both the organisation and the individual. The importance of human resource development as a means of ensuring that organisations maintain their competitiveness in an ever-changing environment cannot be overemphasised.

Erasmus et al (2000) contend that in the South African context, the country's history, technological innovations, competitive pressures, restructuring and downsizing the low level of literacy and numeracy and the increasing diversity of the workforce are some of the critical issues that are compelling organisations to retrain employees. The greater the number of organisations that seek excellence, the greater the need for employee training and education (Erasmus et al, 2000).

In contemporary organisations information dissemination per se has few or no results. It is the organisation's ability to disseminate knowledge that leads to the development of employees' skills and abilities. What matters most is converting technology through people into better organisational performance (Al-Khayyat, 1998).

There is no doubt that in the 21st century the development of human resources is no longer an option, it is a must (Al-Khayyat, 1998).

1.1.5 Changes in training and development as part of human resource development

According to Phillips (1996), four important trends are visible on the human resource development horizon. Collectively, they provide evidence of the pressure for increased use of measurement and evaluation.

- *Training and development budgets are increasing.* As the budget increases, so too does the need for accountability. As the budget for human resource development increases, more questions will be asked about its ability to enhance organisational effectiveness.
- *Human resource development is linked to competitive strategies.* Many organisations are utilising human resource development as a competitive weapon to create a distinct or unique advantage. Whether the organisation is experiencing tremendous growth, restructuring, downsizing, or changing markets and locations, training is seen as a crucial vehicle to implement these changes. Human resource development has become a powerful change management tool to assist organisations to successfully meet the challenges of the future. When training takes on the highly visible role of implementing parts of the strategic plan, the pressure for accountability increases.
- *Accountability of all functions is increasing.* Virtually every function in an organisation is being subjected to increased accountability. Functions previously taken for granted as necessary and unmeasurable are now required to show their contribution. This is especially true of support functions. In this respect, HRD is just one of many functions responding to the pressures to show their contribution in measurable terms.
- *Top executives requiring training results.* Chief executives and top administrators who are struggling to make organisations lean, profitable and viable are demanding accountability in all expenditures. They encourage and sometimes

require the HRD function to measure training results. Horwitz (1999), who states that the measures for evaluating effectiveness and effort in this regard appear to have increased, supports this trend. The first level of evaluation is seen as reliance on informal feedback from line managers and trainees and formal course evaluations. The second level requires more systematic, objective measures for evaluating the transfer of learning from the classroom to the job. This level remains somewhat elusive in practice.

These four trends are recurring in all organisations and are placing renewed demands on the human resource development function to show its contribution in measurable quantitative terms (Horwitz, 1999; Phillips, 1996).

According to Axtell, Maitlis and Yearta (1997), limited research has examined the extent to which trainees effectively apply the knowledge, skills and attitudes required in a training context once they are back in the job. This is not only an essential criterion against which training effectiveness should be evaluated, but is also related to the concern raised by Patrick (cited in Axtell et al, 1997) that much of the training conducted in organisations fails to transfer to the work setting.

Clearly the success with which individuals apply new skills in the workplace is of importance both to those attending training programmes and to the employer which continue to invest heavily in such development activities. This is particularly pertinent given the emphasis on organisational learning which is currently regarded as being central to organisational effectiveness (Axtell et al, 1997).

By providing evidence of the effectiveness of an accelerated development training programme, the researcher aims to show its contribution in measurable and quantitative terms, to support the continuation of similar programmes.

1.2 PROBLEM STATEMENT

Training, as part of human resource development, is becoming increasingly important. Training requires a substantial allocation of financial, human and time resources. Yet despite the substantial investment of valuable resources, the

information and skills that are learned in training may never actually be applied in the workplace (Donovan, Hannigan & Crowe, 2001).

In the South African context, the process of economic and social reconstruction has harnessed capital, organised labour and state agencies. Increasingly more public policy on human resource development and diversity is being formulated. The task facing South Africa is to find creative solutions for integrating economic growth and human resource development (Horwitz et al, 1996). Thus the need to develop internal employees in line with South African labour legislation has required the organisation where research is conducted to develop a structured training programme. The purpose of the accelerated development training programme is to enable artisans and operators to gain entry into higher levels in the organisation. This programme is seen as a foundation for future learning, which will enable participants to decide at a later stage whether they would choose to focus on a supervisory or specialist career path.

Owing to the cost involved in this programme, the human resource development section is required to demonstrate the effectiveness of the programme in measurable terms, focusing on change in behaviour.

The results of the scientific research conducted on the effectiveness of the accelerated development training programme can justify the cost in terms of capital investment. The results of the research would determine the future use of similar training programmes.

1.2.1 Research questions

Based on the above problem statement, the research questions are as follows:

- Can the meaning of training evaluation be clarified?
- Can theoretical models used for training evaluation and design be clarified?
- Can the meaning of competency be clarified?

- Can the impact of the accelerated development training programme on the behavioural competencies required to function effectively in a supervisory or specialist role at Bayside Aluminium be determined?

1.3 AIMS OF THE RESEARCH

1.3.1 General aim

The general aim of this research is to examine the effectiveness of the 'accelerated' development training programme.

1.3.2 Specific theoretical aims

The specific theoretical aims of this study are

- to clarify the meaning of training evaluation
- to clarify theoretical models used for training evaluation and design
- to clarify the meaning of competency

1.3.3 Empirical aims

The specific empirical aims of this study are

- to determine the impact of the accelerated development training programme on the identified behavioural competencies required to function effectively in a supervisory or specialist role at Bayside Aluminium
- to determine the impact of the accelerated development training programme by determining the overall growth in proficiency per competency
- to make recommendations for future research
- to formulate implications for future training programmes

1.4 PARADIGM PERSPECTIVE

1.4.1 Scope of the research

In order to ensure that the findings of this study are practical and applicable, it was decided to demarcate the study as follows:

The study will focus on

- a literature review dealing with the design and evaluation of training programmes
- the use of competencies in the design and evaluation of training programmes
- the effectiveness of the accelerated development training programme, in the areas of the development of the identified competencies

1.4.2 Metatheoretical concepts

Metatheoretical concepts identify those concepts which are not measured or explained, but which are accepted on a metalevel and thus form part of the study. These concepts are defined in this section.

1.4.2.1 Assessment centres

An assessment centre is a work sample or simulation and usually includes the following techniques: in-basket exercises; leaderless group discussions; business games; and interviews (Avery & Faley, 1992). In addition, in an assessment centre, a battery of pencil-and-paper tests, measuring intelligence, personality and vocational interests are administered to participants (Avery & Faley, 1992).

Woodruffe (2000) states that an assessment centre refers to a method or approach. Assessment centres involve individuals participating in a set of job simulations. These simulations cover the essential components of the job upon which the centre is focused. Individual performance in the simulations is recorded against the qualities required for the job.

For the purpose of this study, “assessment centre” will be defined as work sample or simulation and includes the following techniques: in-basket exercises; leaderless group discussions, interviews and pencil-and-paper tests measuring intelligence and personality (Avery & Faley, 1992). This definition is similar to the current practices of the organisation where research is conducted.

1.4.2.2 *Competencies*

The word “competencies” has become the accepted label for what a development or assessment centre measures (Woodruffe, 2000). Boyatzis (cited in Woodruffe, 2000, p. 86) defines competency broadly as “an underlying characteristic of a person. It could be a motive, trait, skill or aspect of one’s self-image or social role or a body of knowledge, which he or she uses (Work profile system v1.1 Technical Manual, 1995).

Rothwell (1996), however, defines a competency as an area of knowledge or skill that is critical for producing key outputs. Competencies are internal capabilities that people bring to their jobs - capabilities which may be expressed in a broad, infinite array of on-the-job behaviours.

According to Woodruffe (2000), the words “competency” and “competence” have been used in two different ways. The former refers to an ability to do something, which has to do with areas of work or roles. This is the job related and dictionary meaning of the word. The second use of the word is to define what gives rise to that overall ability. In the second sense, the word “competency” refers to one of the sets of behaviour that the person must manifest in order to perform the tasks and functions of a job with competency. Each competency is a discrete dimension of behaviour. It is a dimension of behaviour that is relevant to performance in the job.

For the purpose of this study, the word “competency” will be defined as sets of behaviours that are instrumental in the delivery of desired results and/or outcomes. The focus here is on behaviours and not on results or personal attributes (Bartram, Callinan & Robertson, 2002). This definition is similar to the definition of competencies, as defined by the organisation where research is conducted.

1.4.2.3 *Learning*

Cascio (1991) defines learning as a relative permanent change in behaviour that occurs as a result of practice or experience, while Van Dyk, Nel, Loedolff and Haasbroek (1997) explain it as a change in behaviour as a result of experience or input. Goldstein (1993) defines it as a relatively permanent change in knowledge or skills produced by experience. This definition implies that change is relatively permanent, but does not assume that all changes lead to improvements in behaviour. Goldstein (1993) states that in some instances, learning becomes immediately observable through performance, while in others a considerable period of time lapses before learning becomes apparent.

Seifert (cited in Van Dyk et al, 1997) defines learning as a relatively permanent or lasting change in behavioural tendency, which is a result of specific experiences or repetitions of an experience. Erasmus et al (2000) define learning as the process in which relatively enduring changes in thought processes and behaviour or potential behaviour occur as a result of indirect or direct experience or learning.

For the purpose of this study, the aforementioned definition will be utilised, based on the empirical aim of this study. The aim is to determine the effectiveness of the Accelerated development training program (ADP), based on the impact of the ADP on identified behavioural competencies, thus if a change has taken place as a result of direct learning.

1.4.2.4 *Action learning*

Cusins (1995) defines action learning as a syndrome of four main activities which, when performed effectively, enhance and expand one another to create a context for creative decision making in uncertain situations, resulting in the learner feeling more confident of an effective outcome. The activities comprising the syndrome for action learning are experiential learning, creative problem solving, acquisition of relevant knowledge and co-learner support group.

Cusins (1995) also mentions that each activity can be regarded as necessary, but insufficient on its own, to be considered action learning. The core activities of

experiential learning and creative problem solving are supplemented - and enhanced - by the acquisition of relevant additional knowledge and a specific form of group support.

Bourner, Beaty, Lawson and O'Hara (1996), define action learning as a process of reflection and action, aimed at improving the effectiveness of action, where learning is an important outcome. Its purpose is to learn from experience in order to act more wisely. Bourner, Beaty, Lawson and O'Hara (1997) mention that action learning is essentially a group process, and is about the person in context. It assists the individual to explore his or her awareness of the features of the context and his or her place within it.

1.4.2.5 Training

Van Dyk et al (1997) define training as a learning experience in that it seeks a relatively permanent change in an individual that will improve his or her ability to perform on the job. According to Erasmus et al (2000), training is job-related learning provided by employers for their employees. The main aim is the improvement of employees' skills, knowledge and attitudes to enable them to perform their duties according to set standards.

Garavan (1997) defines training as having narrow goals, specifying the "right" way to do something.

According to Goldstein (1993), training is the systematic acquisition of skills, rules, concepts or attitudes that result in improved performance in another environment.

1.4.2.6 Development

Gerber, Nel and Van Dyk (cited in Van Dyk et al, 1997) refer to development as development possibilities within a job/position for a specific employee, with reference to his or her personal growth and personal goals.

De Cenzo and Robbins (cited in Van Dyk et al, 1997) further suggest that development focuses on future jobs in the organisation. As an individual's career progresses, he or she requires new skills and abilities.

Erasmus et al (2000) define development as a broad term, which relates to training, education and other intentional or unintentional learning which refers to general growth through learning.

1.4.2.7 Human resource development

Human resource development can be defined as a learning experience organised mainly by an employer, usually within a specified period of time, to bring about the possibility of performance improvement and/or personal growth (Erasmus et al, 2000).

1.4.2.8 Education

Van Dyk et al (1997) state that education is concerned with the development of sound reasoning processes to enhance one's ability to understand and interpret knowledge.

Erasmus et al (2000) refer to education in the general sense and in an organisational context. Education in the general sense refers to a broad educational process covering preschool, primary, secondary and tertiary education. This usually occurs outside the organisation (except for adult literacy, life skills and numeracy which occur within the organisation). Employee education in the organisational context concerns the preparation of an individual for a job different from the one he or she currently holds. Here the outcome of performance is clearly defined. This refers to the preparation of managers for higher-level jobs or for possible future changes.

1.4.3 Applied theory

Applied theory in this context refers to the applicable theory that will be used in the search for answers to achieve the theoretical and empirical aims of the study. Applied theory will be outlined in this section.

The focus of the research study is to demonstrate the effectiveness of the programme in measurable terms, focusing on change in behaviour. Considering the

design of the accelerated development program, as defined in chapter 4, utilising various methods of learning and training to develop behavioural competencies, taking into consideration, the person, the situation and the behaviour as the desired end result, the social cognitive learning theory will be used to achieve the aims of the research study.

1.4.3.1 *Social cognitive learning theory*

According to Meyer, Moore and Viljoen (1997), central to the cognitive learning theorists' view of humankind is the interactional view, also called "reciprocal determinism". According to this view, behaviour is determined by the interaction of three factors: the person, the situation and the behaviour that comes to the fore in the situation. In other words, behaviour is both the result and part of an ongoing process in which the individual, the situation and individual behaviour constantly influence one another. Phillips and Orton (1983) state that from the perspective of reciprocal determinism, environmental (E) factors, behaviour (B), and personal (P) or cognitive factors are regarded as interdependent.

Bandura (1978) contends that the term "determinism" is used here to signify the production of effects by events, rather than in the doctrinal sense that actions are completely determined by a prior sequence of causes independent of the individual.

According to this theory, in every situation the individual has a range of behaviour at his or her disposal. This is known as the response repertoire. Which of these behaviours people produce in a given situation is the result of an interaction between the following factors: (1) the precise nature of the situation, (2) previous learning experiences, (3) future expectations and goals, and (4) the behaviour actually produced in the situation. In this view, humans determine their own lives and development within certain limits. Humans can choose what they regard as valuable and rewarding (Meyer et al, 1997).

Meyer et al (1997) further mention that in this interaction, individuals are not regarded as passively interacting with environmental stimuli or internal drives. They are active participants who perceive and evaluate stimuli, strive towards goals and

devise plans to achieve them, plan their future behaviour and judge past behaviour, and replan and change their behaviour in the light of self-evaluation.

Bandura (1978) concludes that human behaviour can only be satisfactorily explained by taking into account the interaction between the environment and cognitive processes such as thinking, interpretation of stimuli and expectations of future events.

According to this theory, behaviour is motivated by its probable results. In other words, by individuals' expectations of the results of their behaviour. Whether or not an individual will carry out a particular behaviour will therefore depend on his or her expectations of whether it will bring valued benefits or no noticeable effects or feared disadvantages (Meyer et al, 1997).

Human expectations of the results of their behaviour are shaped mainly by two types of learning, namely (1) their experience of the results of their own behaviour, and (2) their observations of the results of the behaviour of others. However, it is important to note that Bandura (1978) does not think that these expectations are the automatic result of environmental influences. Individuals play an active role through interpreting and evaluating the results of their own and others' behaviour. According to Bandura's theory, one's previous behaviour is continuously used as the reference against which ongoing performance is judged (Bandura, 1978).

Individuals have standards against which they evaluate their own behaviour, hence their behaviour is not determined only by the immediate external circumstances of their expected circumstances (Bandura, 1978). This view is supported by Meyer et al (1997), who states that it is also important to note that behaviour is not motivated and regulated only by expectations of its external results, but also by individual self-evaluation

Bandura (1978) goes on to say that behavioural standards are established by precept, evaluative consequences accompanying different performances, and exposure to the self-evaluative standards modelled by others.

1.4.3.2 *Learning from the social cognitive learning perspective*

According to the social learning theory all behaviour, except for a few reflexes, is acquired through learning. Social learning theorists acknowledge three forms of learning, namely learning through direct experience (which includes conditioning), observational learning and learning through self-regulation (Luthans & Stadjkovic, 1998).

Luthans and Stadjkovic (1998) define learning in social cognitive learning theory, as knowledge acquisition through the cognitive processing of information. In other words, the social side acknowledges the social origins of much of human thought and action (what individuals learn by being part of a society), whereas the cognitive side recognises the influential contribution of thought process of human motivation, attitudes and action.

Social learning theorists further emphasise reinforcement as a vital part of the learning process. According to this theory, an external agent always links learning to reinforcement. Social learning theorists distinguish between direct reinforcement, vicarious reinforcement and self-reinforcement. Direct reinforcement occurs when individuals receive rewards for their behaviour from external agents or when something is taken away from them. Vicarious reinforcement refers to one person observing another being rewarded for his or her behaviour. Vicarious punishment takes place when a person observes someone else being punished for some behaviour. Vicarious reinforcement and punishment play a decisive role in observational learning. Self-reinforcement occurs when individuals reward their own behaviour by praising themselves or feeling proud, or by giving themselves a concrete reward. It is important to note that self-regulation (self reinforcement or self punishment) fulfils a significant part in all three types of learning (Meyer et al, 1997).

Thus on the basis of the design of the accelerated development training programme which focuses on the development of behavioural competencies, the researcher will be conducting the research within the framework of the social learning theory.

1.5 RESEARCH DESIGN

1.5.1 Research variables

The independent variable takes the form of an experimental stimulus which is either present or absent. The independent variable is the cause (Babbie, 1992).

For the purpose of this research, the accelerated development training programme is the independent variable.

The dependent variable is the effect. That is if the variable has been affected by the independent variable (Babbie, 1992). The variable may refer to characteristics or attributes of individuals or the conditions to which they are exposed (Huysamen, 1994).

The behavioural competencies as described in 4.6.3 are the dependent variables, that is, action orientation, planning and organising, problem solving, teamness and impact.

1.5.2 Type of research

An experimental research design was adopted in this study. Quantitative methods of data collection were employed. The researcher made use of a pre-test/posttest single group design. In this experimental design, the subjects are measured in terms of a dependent variable (pre-tested), exposed to a stimulus representing an independent variable, and then remeasured in terms of the dependant variable (post tested). Differences noted between the first and the last measurements are then attributed to the influence of the independent variable (Babbie, 1992).

1.5.3 Unit of analysis

The effectiveness of the accelerated development training programme (ADP) will be evaluated to determine if the programme has a significant impact on the identified behavioural competencies as described in chapter 4. The focus will be the

accelerated development programme, in order to test the general hypotheses as stated in 4.3.

A nonprobability sample was taken from operators and artisans at Bayside Aluminium. The sample consisted of the participants in the accelerated development training programme. The total population ($N=14$) of participants is included in the study.

The accelerated development programme was developed as a pilot training programme and depending on the outcome of the study, a decision will be made about whether or not to continue the use of the programme or not. Since this is referred to as a “pilot” study, the researcher was not permitted to use a control group or repeat the study.

1.5.4 Validity and reliability

Reliability of measurement has to do with the consistency of the measurement. Of particular concern is whether or not selection tests and job performance measures demonstrate consistency (Avery & Faley, 1992).

Validity has to do with whether or not a test or measuring instrument measures what it is supposed to measure. It refers to the kinds of inferences or decisions that can be made based on the strength of the test score. Decision makers using a test with “high” validity may be more confident than those using a test with relatively low validity (Avery & Faley, 1992).

Internal validity is of critical concern to the researcher. Internal validity refers to the causal relationship between the dependent and independent variable. The question arises about to whether this relationship can be interpreted as causal. The internal validity of a conclusion ascribing changes in the dependent variable to the independent variables involves the degree to which these changes are in fact caused by the latter rather than by other explanations (Huysamen, 1994). Constraints in the organisation in which research will be conducted, determine whether or not threats to internal validity may be difficult to control. The researcher

ensured the use of measuring instruments with high reliability and validity as discussed in 4.5.

1.6 RESEARCH METHOD

The research method used in this study, comprises of two phases, namely a literature review and an empirical research study.

1.6.1 Phase 1: literature review

In phase 1, different perspectives on the evaluation and design of training programmes are described and critically evaluated.

The use of competencies is also described as part of the process of designing and evaluating a training programme.

1.6.2 Phase 2: empirical study

- *Step 1.* The accelerated development training programme will be designed on the basis of competencies required in supervisory and specialist roles. This excludes leadership roles. A maximum of 15 nominations per department will be allowed, to a maximum of 60 nominations for the total organisation. This group of employees will undergo a briefing session clearly explaining the process of selection to all. After conducting the learning potential assessments, 14 employees will be chosen by a selected panel of representatives from the organisation to participate in the accelerated development training programme. This group should include both operators and artisans from both designated and nondesignated groups. Both operators and artisan fall within the employee group, operations maintenance expertise teams (OMET). Selection will be based on the Apil-B (Learning potential assessment), as well as the criteria stated above.

The 14 participants will attend an assessment centre, conducted by an external consultant. This assessment centre will measure abstract reasoning as well as

the following behavioural competencies: action orientation, coordinate and control, teamness, problem solving and impact.

- *Step 2.* Data will be obtained from the assessment centre and feedback given to the accelerated development training programme (ADP) participants.
- *Step 3.* Over a six-month period, following the administration of the pre-test, the population ($N=14$) was subjected to the following modules as part of the ADP: team development, self management, value diversity and business understanding.
- *Step 4.* On completion of the ADP, the total population ($N=14$) will complete an assessment centre. This will serve as a posttest and will be conducted six months after completion of the accelerated development training programme.
- *Step 5.* Data obtained from the pre-test and posttest will be statistically analysed and the results interpreted in order to determine whether the ADP resulted in the development of the following competencies: action orientation, coordinate and control, teamness, problem solving and impact.

1.7 CHAPTER DIVISION

The research will consist of the following six chapters:

Chapter 1: Introduction

Chapter 2: Training design and evaluation

Chapter 3: Competencies

Chapter 4: Methodology

Chapter 5: Research results

Chapter 6: Conclusions, limitations and recommendation

Chapters 1 to 3 will focus on a literature survey on the design and evaluation of training programmes and the use of competencies in the evaluation process.

Chapters 4 to 6 will focus on the research methodology followed, analysis of the research results and the final conclusion regarding the results, as well as recommendations for future research.

1.8 CHAPTER SUMMARY

In this chapter, the background to the study was discussed. Changes in the world of work were reviewed and the increasing importance of human resource development in this context discussed. The evaluation of training and development interventions was highlighted as one of the changes in the way human resource development is practised in organisations today. The research design and research method were defined for this study.

The next chapter investigates training design and evaluation and the models used for the design and evaluation in this study.

CHAPTER 2: TRAINING DESIGN AND EVALUATION

The focus of this chapter is on the literature study which was conducted to establish the current status of research on training design and evaluation and to again place emphasis on the importance of training design and evaluation. The need to evaluate training interventions or programmes and the purpose of training evaluation are discussed. The emphasis is on the use of models for the design and evaluation of training and development interventions.

This chapter will also highlight the theoretical aims in order to clarify the meaning of training evaluation and the theoretical models used for training evaluation and design.

2.1 TRANSFORMATION OF TRAINING AND DEVELOPMENT

For the purpose of this study, the history of training and development will be reviewed to clearly define the changes that have occurred in the approach to how training and development activities are designed and measured in the “new world of work”.

Historically, training and development activities have focused on creating and delivering classroom training to ensure that business has skilled employees to do the work. The implicit assumption behind classroom training has been that if employees are given enough insight and competencies through clever teaching methodologies they can acquire the necessary skills - training literally changes employees into more productive and committed workers. This view on classroom training implies that the skills required to succeed on the job are primarily individually based, can be codified, and transferred from faculty to student, and that lifelong learning will primarily continue through established schoolroom venues. This implicit assumption that with the right quantity and quality of training anyone can accomplish anything may at best be misleading and even dangerous (Greenfield & Ulrich, 1995).

Bryans and Smith (2000) state that there is a need to go beyond training and development, because neither is enough and it has its characteristic limitations. The

following can be regarded as limitations of training: training tends to presuppose that there is an answer - a problem that can be solved - rather than a difficulty that might be worked with, which the process of development by contrast, may acknowledge. Being oriented to skills - doing rather than being - does not address the affective and other dimensions of the personal. Training is individualistic and does not attempt to do justice to organisational, social or political areas of development (Bryans & Smith, 2000).

Development also has certain limitations, often referred to as “personal growth”. This shifts the focus of the concern from the organisation to the individual (Bryans & Smith, 2000). Banfield, Joy-Matthews and Megginson (1999) mention that development requires a learner to take individual responsibility and requires a start from the individual’s own purposes and values. This may require learners to look at what they are doing with their lives. The downside of this approach is that a high level of trust and basic ability on the part of the learner is required. This can also lead to aspects of development that fall outside the immediate operational needs of the organisation.

According to Greenfield and Ulrich (1995), there are many reasons for moving beyond the individual development training focus to a paradigm encompassing individual and organisational development and learning. Barnicle et al (1999) state that literature has adopted a narrow conception of the learning process and many of the definitions emphasise formal planned learning for both individuals and groups. However, learning is often an unplanned process, haphazard and accidental and there is evidence to suggest that it can be successful in meeting individual and organisational needs.

Watkins and Marsick (cited in Matthews, 1999), mentions that the current trend towards increased workplace learning is fuelled by rapid changes in the global marketplace. These changes has pushed organisations to work, organise, think and learn in very different ways. Horwitz (1999) supports this statement by saying that in a global economy, transfer of learning, new knowledge and the notion of intellectual capital become as important to leveraging competitive success as does sensitivity towards local conditions.

Matthews (1999) elaborates further by mentioning the focus on workplace learning. In this context, workplace learning is defined as the way in which individuals or groups acquire, interpret, reorganise, change or assimilate a related cluster of information, skills and feelings. It is also primary to the way in which people construct meaning. Workplace learning refers to the processes and outcomes of learning that individual employees and group of employees undertake under the auspices of a particular workforce. This definition draws attention to the need to examine both the processes and outcomes of learning.

Garavan et al (2000) state that individual and organisational learning processes are gradually replacing the traditional terms “training”, “development” and “education”. These processes are considered to be more comprehensive and integrated concepts. The literature makes a strong case for organisational effectiveness in the longer term requiring proficiency in learning at both organisational and individual level.

This view is supported by the reasons put forward for the rationale for the new paradigm cited in Greenfield and Ulrich (1995). The following are identified as the rationale for the new paradigm: (1) Individual competencies will not guarantee business success. Business is a team game. It requires cooperation and collaboration so that individuals with different skills come together to make the whole more than the parts. Training focuses on building individual talent. (2) With the increasing pace of change, competencies learned today will inevitably be outdated before they are implemented. (3) When managers are asked for their most significant learning experience, they seldom mention training courses. (4) Too often the results of training are linked to behaviours. In a competitive business, where cost/benefit analyses pervade, training must add value. It must be linked to business results. (5) Organisational capabilities are seen as sources of competitive advantage. Organisations that move faster, learn more and are more flexible, remove boundaries and can be more responsive to customers.

Bryans and Smith (2000) also mention that development is too open and training not open enough. Training cannot cope with a world of uncertainty, while development may accept it to the point of giving no guidance on how to shape the world. Training

cannot deal with a high degree of complexity, while development does too little to bring order to complexity.

According to Antonacopoulou (2000), education, development, training and learning are multiple components within the same hierarchy of systems. There are multiple levels of interpretation (industry, organisation, individual) where the same components assume a different role or identity for the system under analysis.

Education, training and development inform and shape individuals' attitudes to learning. This reconceptualisation of education, training, development and learning has several implications for both theory and practice. At the most basic level, it highlights more clearly the dangers of defining processes in too narrow terms and making superficial assumptions about their potential effects. Thus it is important that, in defining the nature and role of education, training and development, to also examine the role of learning (Antonacopoulou, 2000).

This view is supported in part by Greenfield and Ulrich (2000), who state that traditional training models are built around coursework and class activities, and individuals attending these sessions need change in order to develop a new paradigm. This paradigm is referred to as development and learning and focuses on all developmental activities which affect both individuals and organisations. The development and learning paradigm does not undermine what has been done, but goes beyond it.

The focus seems to have shifted away from the organisation of learning (eg through formal systems, structures and programmes) to learning itself. From an organisational perspective, this interest in learning suggests an increased focus on human resource development and a changing role for HRD practitioners. Training and development (T&D), HRD and strategic HRD could be described as interventions in learning - that is, an attempt to manage, steer or direct what is a natural, individual and continuous process (Sambrook & Stewart, 2000).

The key source of competitiveness among firms is the ability to develop and use the skills of their workforce. New forms of business structure and management are required to effectively exploit intellectual assets leading to a renewed focus on the development of human resources (Donovan et al, 2001).

According to McClelland (1994), one of the most neglected aspects of training is the evaluation phase. Often the value of conducting training evaluation is overshadowed by the necessity simply to gain participants' or students' immediate post-course reactions – the results of which are sometimes mistakenly viewed as indicating whether or not the overall course was successful.

Various authors (Goldstein, 1993; Mann,1996; Rowe, 1996; Sims,1993) support the statement that training is here to stay, and with the investment in developing training strategies, the question is no longer, “should we train?”, but rather, “is training worthwhile and effective?” It is extraordinary that so little time and effort is devoted to evaluating the suitability and success of training programmes. Too often training is done without any thought of measuring and evaluating how well it has worked. Yet, the training process is not complete until and unless evaluation has taken place, for it is evaluation, which informs training and gives it meaning (Goldstein, 1993; Mann,1996; Rowe, 1996; Sims,1993).

Based on the history discussed in this section, it is clear that the concepts “training”, “learning” and “development” are used interchangeably and that there is no one accepted definition of the terms. There is, however, consensus among the authors that training evaluation is a crucial aspect of human resource development. For this reason, the meaning of training evaluation will be explored in detail.

2.2 DEFINITION OF TRAINING EVALUATION

According to various authors (Goldstein, 1993; Horwitz, 1999; Lewis & Thornhill, 1994; Sims, 1993) evaluation of training means different things to different people. There does not seem to be a consistent definition of what training evaluation is amongst human resource professionals.

Kirkpatrick (1996) defines evaluation as determination of the effectiveness of a training programme. Hamblin (cited in Sims, 1993), defines evaluation of training as any attempt to obtain information (feedback) on the effects of a training programme, and to assess the value of the training in the light of that information. Put differently, evaluation attempts to answer the question: “did training work, and if not, why not?” (Sims, 1993).

Lewis and Thornhill (1994) elaborate on this definition and define training evaluation as the process of attempting to assess the total value of training - that is, the cost benefits and general outcomes which benefit the organisation as well as the value of the improved performance of those who have undertaken training.

Nadler (cited in Van Dyk et al, 1997) define training evaluation as the process of testing the appropriateness of each critical event in the design of training systems. He sees evaluation as part of the process of designing a training programme, and not simply happening at the end. Goldstein (1993, p.147) defines evaluation as the “systematic collection of descriptive and judgmental information necessary to make effective decisions related to selection, adoption, value and modification of various instructional activities”.

Banfield et al (1999) state that the definition restricts evaluation to the training process only. This definition implicitly excludes the importance of the application, working environments and seeing the individual participant as a trainee rather than a trainee and employee/worker. The authors provide a wider definition, and define evaluation as any attempt to obtain information on the effect or value of the training in order to make decisions about any aspect of the training programme, the persons who have been trained and the organisations that provided that training.

According to Van Dyk et al (1997), the above definitions of evaluation have several implications:

- Evaluation is an ongoing process. It is not done at the end of course only.
- The evaluation process is directed towards a specific goal and objectives.
- Evaluation requires the use of accurate and appropriate measuring instruments to collect information for decision making.
- Evaluation is a form of quality control.
- Evaluation is not only concerned with the evaluation of students but with the wider training system as a whole.

2.3 WHY EVALUATE TRAINING?

In the current climate of globalisation, heightened competition and the development of information technology, the paradigm for success has shifted towards intellectual assets. Increasingly, the key source of competitiveness in firms is the ability to develop and use the skills of the workforce. New forms of business and management structures are required to effectively exploit intellectual assets leading to a renewed focus on the development of human resources (Donovan et al, 2001). Training requires substantial allocation of financial, human and time resources. Whether or not transfer of learning takes place depends on many factors. It is therefore imperative to assess training needs and evaluate outcomes as comprehensively as possible (Donovan et al, 2001).

Horwitz (1999) states that the challenge facing human resource development practitioners is to ensure that all training and development activity meets the organisation's requirements for strategic functioning in order to give it centrality in organisational life. Van Dyk et al (1997) support the view that evaluation of human resource development is worthwhile because it provides information that can be used to improve planned learning, making it more effective in meeting needs, solving past performance problems and anticipating future opportunities for performance improvement.

Horwitz (1999) refers specifically to performance-related training designed to develop competencies which impact directly on the bottom line by promoting flexibility and supporting innovation. If the learning derived from training is not associated with enhanced job performance or raised capability, the credibility of human resource development specialists and the process is at risk.

It is therefore vital to identify and implement factors associated with human resource development effectiveness. A strategic approach to the transfer of learning raises an important, but often situational contingent question about roles, responsibility, accountability and performance management and reward systems for training (Horwitz, 1999).

The tendency to emphasise quantity of training - numbers trained and training expenditure - rather than the effectiveness of training and transfer remains problematic (Horwitz, 1999).

2.4 PURPOSE OF TRAINING EVALUATION

According to Bramley (cited in Van Dyk et al, 1997), evaluation completes the training cycle, is integral to the cycle and fulfils the key role of quality control of the cycle by providing feedback on the following: the effectiveness of the methods used; the achievement of the objectives by both students and trainers; and whether the need originally identified at both organisational and individual level has been satisfied.

According to Van Dyk et al (1997), evaluation has the following three purposes: it is performed to make decisions about individual learners (their needs, the instructional plan and sequence, their grouping and feedback); course improvement (deciding on the most appropriate methods and material, and where and how to revise the material); and how effective the system is.

Sims (1993) states that the goal of evaluation is to improve the training programme; provide feedback to the programme planners, managers and participants; and to assess employee skills levels. Training is evaluated because evaluation is one way in which trainers can assess their own effectiveness. From an administrative point of view, training is evaluated to justify the time and money spent on training.

Mann (1996) elaborates on this view and points out that training evaluation can serve as a diagnostic technique to permit the revision of programmes to meet the large number of goals and objectives. Thus the information can be used to select or revise programmes. This type of information can also demonstrate the benefits of training in terms of cost.

Mann (1996) mentions that effective training evaluation can have beneficial legal consequences. Legal issues have become important considerations in human resources, in order to answer questions on the job relatedness of the training programme. The author mentions that other benefits gained by evaluating training

affect decision making. Evaluations can help decide between alternative training programmes and who should participate, and also to decide who should participate in the future. If an evaluation can show which trainees are more likely to benefit most then it will be more cost effective to offer future programmes to those types of trainees. In addition, evaluations test the clarity and validity of tests, questions and exercises. They must measure the skills, knowledge and abilities the programme is designed to teach. Evaluation can provide a mechanism for the validation of instruments. Various authors (Axtell et al, 1997; Sims, 1993; Van Dyk et al, 1997) support this view.

Mann (1996) clearly states that good evaluation should be able to prove that the programme

- is aimed at important worthwhile organisational benefits
- operates smoothly and effectively and is enjoyed by the participants
- achieves important skills, knowledge and attitude objectives
- uses the best available and most cost-effective designs
- is used effectively on the job
- provides valuable and cost-effective organisational benefits.

2.5 WHAT SHOULD TRAINING EVALUATION EVALUATE?

The question of what to evaluate is crucial to the evaluation strategy and one of the most neglected aspects of training (Mann, 1996; McClelland, 1994). Often the value of conducting training evaluations is overshadowed by the necessity simply to gain participants' or student's immediate post-course reactions – the results of which are sometimes mistakenly viewed as indicating whether or not the course was successful (Axtell et al, 1997; McClelland, 1994).

Various authors state that the majority of evaluation methods include learner or trainer perceptions. Very few methodologies actually take objective measures of the

level of transfer to work performance (Al-Khayyat & Elgamal, 1997; Bristol, Clancy, Geerthuis, Geerthuis & Holmes; 2002; Lewis & Thornhill, 1994).

Despite the financial investment of valuable resources, the information and skills that are learned in training may never actually be applied in the workplace. The question whether or not learning takes place depends on many factors including employee motivation, relevance of training and notably, the work environment, hence the importance of assessing training needs and evaluating outcomes as comprehensively as possible (Donovan et al, 2001). Little work has examined the extent to which trainees effectively apply the knowledge, skills and attitudes acquired in a training context once they are back in the job (Axtell et al, 1997).

Evaluations can also be devised to measure long-term reactions and effects such as what learning or behavioural change has occurred. However, to be able to measure the impact of the training, the evaluation process should also address the following question: What changes are necessary to make the course/programme more focused and/or relevant? (Bristol et al, 2002).

For this purpose it is generally agreed that the pre-test and posttest methodologies are preferable to the simple posttest (Bristol et al, 2002). The pre-test posttest design is seen as more powerful than the posttest design only (Sackett & Yang, 1996). This design can be used to attempt to show a change in behaviour after training in knowledge, skills, abilities, behaviour, attitudes or a combination of these (Sadri & Snyder, 1995). Thus focusing on the transfer of training that has taken place in theory evaluations is generally aimed at determining whether learning has in fact occurred.

Thus it is necessary to determine if the focus of the evaluation should be on functional objectives or behavioural change, or both. Functional objectives refer mainly to skills acquisition or enhancement relating to task accomplishment. An example of a functional objective is improving accounting or financial skills, whereas behavioural objectives refer to desired changes in existing behaviour (Sadri & Snyder, 1995). Because behavioural objectives are more difficult to define accurately and their outcomes less predictable than functional ones, defining behavioural objectives will require more initial observation to determine the amount

of change that will be required to realise the ideal. It is important to note that behavioural change back on the job is ostensibly difficult to quantify and measure. Thus a more systematic approach to the evaluation of behavioural-based training, for example on-the-job appraisal of performance, should be made by the person receiving the training (McClelland, 1994).

An additional consideration relating to what the training evaluation should evaluate is the cost involved. The key insight is that designs that may be preferred if power is the only consideration may not be the design of choice if the entire cost of the evaluation were to be considered. For example, a pre-and post-measurement design may be more powerful than a post measurement only design in a particular setting, and thus might require fewer participants. However the pre-and post-measurement design requires two administrations of the training criterion measure to each participant. If one criterion administration cost is high (eg assessment centre) the post-measurement design may involve lower total cost than the pre-and post-measurement design to achieve the same degree of power. In real terms there are trade-offs between power and cost when planning training evaluation (Sackett & Yang, 1996).

Designing a good evaluation effort involves knowing when to collect evaluation measures and which groups to collect them from (Sims, 1993; Van Dyk et al, 1997). The first step in planning training evaluation is to determine the purpose of evaluating the programme - what do you want to know about the training programme? Each kind of question necessitates consideration of how the evaluation should be designed to provide answers. Evaluation must never be seen as a single activity or as a haphazard process. It is an integral part of the instructional system design process and should therefore be conducted in a systematic and structured manner if one wants to ensure that it is objective and credible (McClelland, 1994; Sims, 1993; Van Dyk et al, 1997).

For the purpose of focusing on what is required to design an effective evaluation effort, three models for training design and evaluation will be discussed in this chapter.

2.6 USE OF MODELS DURING TRAINING DESIGN AND EVALUATION

The designer of training and human resource development programmes has a variety of conceptual models which can be explored in the development of programmes (Al-Khayyat & Elgamal, 1997; Goldstein, 1993; Van Dyk et al, 1997). These models are extremely useful and enhance the chances of success in training design and evaluation. They are mainly characterised by the dominant use of the systems approach, are micro rather than macro, and are conceptually rather than empirically based (Al-Khayyat & Elgamal, 1997).

The purpose of these models is to convey key concepts and processes to be included in a particular approach. Models that are verbal or visual, or a combination of both, are a shorthand method of communicating what the authors believe to be the critical success factors in their approach to instructional design (Goldstein, 1993; Molenda, Pershing & Reigeluth, 1996).

The model is seen as the “road map” or “planning process” for the designer. An effective model can help the user to understand what is essentially a complicated process and presents reality in a simplified and comprehensible form (Goldstein, 1993; Molenda et al, 1996; Van Dyk et al, 1997).

Van Dyk et al (1997) further identify four purposes of instructional design models:

- improving learning and instruction by means of the problem-solving and feedback characteristics of a systematic approach
- improving management of instructional design and development by means of the monitoring and control functions of the systematic approach
- improving the evaluation process by means of the designated components and sequence of events, including the feedback and revision events inherent in models of systematic instructional design
- testing or building learning and instructional theory by means of theory-based design within a model of instructional design

Two types of training and development models tend to dominate the literature. The first is based on a micro-view of training activities, while the second is macro-based. The former is used extensively, while the latter is seldom found in the literature. The micro-approach focuses on a particular training event, which analyses and explains its activities without explicitly accounting for environmental elements surrounding the training activities. The macro-model focuses on the internal and external organisational factors that impact on training activities (Al-Khayyat & Elgamal, 1997).

For the purpose of this study, three models used for the design and evaluation of training will be discussed, namely Kirkpatrick's levels of training evaluation, the general systems model (micro-model), and the business impact instructional systems design model (business impact ISD model).

2.6.1 Kirkpatrick's levels of training evaluation

Evaluation changes from a complicated, elusive generality into clear and achievable goals if it is broken down into logical steps (Kirkpatrick, 1996). These steps can be defined as follows (Kirkpatrick, 1996):

- Step 1: Reaction. How well did the participant like the programme?
- Step 2: Learning. What principles, facts and techniques were learned? What attitudes were changed?
- Step 3: Behaviour. What changes in job behaviour resulted from the programme?
- Step 4: Results. What were the tangible results of the programme in terms of reduced cost, improved quality, improved quantity, etc?

According to the four-level model of Kirkpatrick, a training programme can be evaluated on the basis of each level, as detailed in table 2.1. Various methods and tools are used at each level.

Table 2.1*Kirkpatrick's four-level model of training evaluation*

LEVEL	ISSUE	QUESTIONS ANSWERED	TOOLS & METHODS
1	Reaction	<ul style="list-style-type: none"> ▪ How well did they like the course? ▪ Did they enjoy the training? ▪ Was it relevant to their job? ▪ Were the instructors interesting, knowledgeable and well prepared? ▪ Was the training well organised? ▪ Was adequate time allocated to training? ▪ What did the participants think or feel about the training? 	Rating sheets Questionnaire
2	Learning	<ul style="list-style-type: none"> ▪ How much did they learn? ▪ How much did the participants increase their knowledge and skill? 	Pre-test and posttests Simulations Classroom performance Pen and paper test
3	Behaviour	<ul style="list-style-type: none"> ▪ How well did they apply it at work? ▪ Are the participants using what they have learned back on the job? 	Performance measures Observations 360° evaluations
4	Results	<ul style="list-style-type: none"> ▪ What return did the training investment yield? ▪ What is the impact of training on performance metrics such as improved productivity, additional profit, improved efficiency, higher quality, reduced turnover, reduced cost, reduced absenteeism, etc. 	Cost-benefit analysis Interviews

Source: Kirkpatrick (1996, p. 295-311)

Each level will now be explained and discussed on the basis of table 2.1.

2.6.1.1 *Reaction*

Reaction may be best defined as how well the trainees liked a particular training programme. Evaluating in terms of reaction is the same as measuring the feelings of conferees, similar to measuring “customer satisfaction”. It is important to emphasise

that it does not include a measurement of any learning that takes place (Kirkpatrick, 1996).

The following guidelines should be followed when evaluating level 1:

- (1) Determine what you want to find out.
- (2) Use a written comment sheet covering all items in a step.
- (3) Design the form so that the reactions can be tabulated and quantified.
- (4) Obtain honest reactions by making the forms anonymous.
- (5) Encourage the participants to write in additional comments not covered by the questions that were designed, to be tabulated and quantified (Kirkpatrick, 1996).

According to Bramley and Kitson (1994), evaluation at level 1 is extremely common. However, it is not without its problems. The authors caution against simply measuring enjoyment. Hamblin (cited in Bramley & Kitson, 1994) states that a decision must be made about what aspects of reaction should be investigated and in what way the practitioner wishes the trainee to react. If we fail to go through this process of thinking about reaction objectives, we are in danger of obtaining irrelevant data. Despite this warning, this is the most popular form of evaluation.

Goldstein (cited in Mann, 1996) supports the statement that while most trainers believe that initial receptivity provides a good atmosphere of learning the material in the instructional programmes this does not necessarily cause high levels of learning. Liking does not imply learning.

2.6.1.2 *Learning*

According to Kirkpatrick (1996), it is important to recognise that a favourable reaction to the programme does not ensure learning. For the purpose of evaluation, learning is defined as follows: attitudes that were changed and knowledge and skills that were learned. It does not include the on-the-job use of attitudes, knowledge and skills.

Kirkpatrick (1996) defines the following guidelines for evaluating in terms of learning:

- The learning of each participant should be measured so that quantitative results can be determined.
- A before-and-after approach should be used so that any learning can be related to the programme.
- Where practical, a control group (not receiving the training) should be compared with the experimental group receiving the training.
- Where practical, the evaluation results should be analysed statistically so that learning can be proved in terms of correlation or level of confidence.

According to Bramley and Kitson (1994), measuring learning at level 2 is also problematic. In order to assess which is the result of learning, it is necessary to use reliable tests and measure ability before as well as after the learning experience. The design of reliable measuring instruments is difficult and the necessary skills are often not available in small training departments. It is also difficult to assess the true pre-event levels.

2.6.1.3 *Behaviour*

According to Kirkpatrick (1996), the following guidelines must be followed in evaluating the training programme in terms of behavioural changes:

- A systematic appraisal should be made of on-the-job performance on a before-and-after basis.
- Performance should be appraised by one or more of the following groups: (1) the person receiving the training; (2) the person's superior(s); (3) the person's subordinates; and (4) the person's peers or other people thoroughly familiar with his or her performance.
- A statistical analysis should be made to compare performance before and after and to related to changes to the training programme.
- Post-training should be appraised to compare performance before and after and to relate changes to the training programme.

- The post-training appraisal should be done three months or more after the training so that the trainees have an opportunity to put into practice what they have learned. Subsequent appraisals may add to the validity of the study.
- A control group (not receiving the training), if practical, should be used.

Kirkpatrick (1996) further states that to determine effectiveness, an attempt should be made to measure in objective terms. Measuring changes in behaviour resulting from training programmes usually involves a complicated procedure.

Bramley and Kitson (1994) mention that the problems of evaluating at levels 3 and 4 are not well understood, because not enough of this kind of evaluation is being done.

Mann (1996) states that just as a favourable reactions do not necessarily mean that learning will occur in the training programme, superior training performance does not always result in similar behaviour in the work setting. The concept of “transfer of training” is crucial at this level.

According to Mann (1996, p.3), transfer of training is defined as the “degree to which trainees effectively apply the knowledge, skills and attitudes gained in a training context to the job. For transfer to occur, learned behaviour must be generalised to the job context and maintained over a period of time on the job”.

According to Georgenson (cited in Mann, 1996), no more than 10 percent of industrial training expenditure actually results in transfer to the job. Other researchers have similarly concluded that much of the training conducted in organisations fails to transfer to job settings.

Evaluating transfer of training to the job setting requires measurement of behaviours and skill performance. This may involve complex measures. A surrogate measure of performance would make evaluation at this level more accessible (Mann, 1996).

Mann (1996) states that self-efficacy could be the surrogate measure of performance. Self-efficacy is defined as the belief that one can successfully perform the behaviour required to produce designated types of performance, and according to Bandura (1978), develops through one or more of four mechanisms: (1) enactive mastery; (2) vicarious experience; (3) verbal persuasion; and (4) emotional

(physiological arousal). These mechanisms often form an integral part of the training process, but enactive mastery (defined as “repeated performance accomplishments”), has been shown to enhance self-efficacy more than any of the other mechanisms. Research has shown that self-efficacy accounts for a significant portion of the variance in performance after controlling for ability. Thus individuals who leave training, in the belief that they can successfully perform the tasks, should be more resilient when encountering difficulties. Self-efficacy can be regarded as a predictor of training success or as a desirable outcome of training (Mann, 1996).

2.6.1.4 Results

The objectives of most training programmes can be stated in terms of results such as reduced turnover, reduced costs, improved efficiency, reduction in grievances, increase in quality and quantity of production or improved morale. From an evaluation point of view, it would be best to evaluate training programmes directly in terms of the results desired. However, there are many factors that make it extremely difficult to evaluate certain kinds of training programmes in terms of results. It is therefore recommended that training should be evaluated in terms of reaction, learning and behaviour first, and then results (Kirkpatrick, 1996).

A difficulty in the evaluation of training is evident at the outset. In technical terms this is referred to as the “separation of variables” - that is, how much of the improvement is due to training compared with other factors? This problem makes it extremely difficult to measure results that can be attributed directly to a specific training programme (Kirkpatrick, 1996).

According to Mann (1996), this level is used to relate the results of the training programme to organisational objectives. Relevant criteria to measure results need to stem from adequate needs assessment.

2.6.1.5 *Criticism and suggested improvements*

The benefits of collecting data at each level are uncertain. It is this uncertainty that may result in organisations either failing to evaluate at all, or else selecting unreliable methods (Mann, 1996).

Kirkpatrick (1996) also mentions that another difficulty in the evaluation of training is evident at the outset. However, on the basis of the study by Mann (1996), recommendations are made about what should be measured in training evaluations.

Measuring change in knowledge, based on Kirkpatrick's learning criterion level, as a method of evaluating the effectiveness of training is of value, but practitioners need to be aware of the limitations of the approach. The study showed that not all of what is learned and is "known" immediately after training is retained one month later. Hence if practitioners are to use the amount retained immediately after training, as a measure of training effectiveness, they should be aware that this is a measure only of the short-term effectiveness of the training and may be an inflated measure of the real value (Mann, 1996).

The results of this study further indicate that evaluating training at the learning level has limited value in predicting self-efficacy, which is taken as a surrogate measure of performance (Mann, 1996). Thus measuring amount of learning is only of real use in indicating how much knowledge has been transferred to the trainee. In other words, measuring changes in knowledge (learning) has no value in predicting how well people will believe after one month that they can perform in the trained skills. If practitioners wish to know how much has been learned during a training session, it is recommended that they measure knowledge change one month after the programme. However, it would be unwise to use this measure to make assumptions about performance of trained tasks (Mann, 1996).

Attitude and reaction levels measures, the only procedures widely used by practitioners, are useful only in providing information on how well run the training sessions were, how much they were liked, etc. Positive attitude does not predict how well people are able to perform trained tasks (Mann, 1996).

Self-efficacy improvements after training do transfer to the working environment and are therefore useful measures of the success of training programmes. It is thus recommended that an effective way for practitioners to evaluate training is to measure self-efficacy in the trained tasks, immediately after the training (Mann, 1996).

Bernthal (1995) also recommends the following add-ons to Kirkpatrick's model:

- (1) Consider the context. Understand how training fits into the organisation's operations and culture. Many things besides training can affect the work environment. In evaluating level 3 or level 4 changes, it is also important to measure contextual variables.
- (2) Establish a link, a cause-and-affect path between training interventions and such outcomes as job behaviours and productivity. The path can show where and in what ways the training results in measurable changes.
- (3) Make appropriate choices. It is important to choose an appropriate evaluation design and suitable measurements. Ask what you really need to know. The answer determines your approach. An appropriate initial evaluation might be a post-training assessment on change in trainee's knowledge. Another approach would be to use a multirater tool to compare trainees with a control group.
- (4) Inventory your resources. No matter what level of approach is being used - ensure that the expectations of what can be achieved are realistic. Consider the costs, the amount of time available to spend on trainees and the expectations of the customers (trainees, senior managers, etc).

Phillips (1996) states that although Kirkpatrick presents four levels, today's environment requires at least one other level, namely return on investment (level 5), to compare cost versus benefits. This level focuses on return on investment (ROI) which requires business results to be converted into a monetary unit and the added value of the programme to be compared with its costs.

Almost all organisations conduct reaction evaluation to measure participant satisfaction, but very few conduct evaluations at the results level and the ROI level, possibly because reaction evaluation is easy, whereas business results and ROI calculations are extremely difficult. The ROI from human resource development usually rests with this infrequently used, valuable and difficult fifth level of evaluation (Phillips, 1996).

2.6.2 General systems model for the evaluation and design of training

An open model takes into account that forces that exist outside need to be considered. With due consideration of the fast-changing business world, this is definitely appropriate, since this will include factors in the external business environment that compel organisations to change or fold (Nadler, 1986). Cascio (1991) supports the view that training and development operate in a complex organisational milieu. Failure to consider the broader organisational environment often contributes to programmes that either result in no observable change in trainee attitudes or behaviour or worse yet, negative results that do more harm than good.

However, Goldstein (1993) contends that the systems model cannot be considered a magic wand for all the problems that were unsolved prior to its introduction. The systems approach does provide a model that emphasises important components and their interactions. It is a useful tool that enables designers of instructional programmes to examine the total training process.

According to Molenda et al (1996) design of instruction can proceed in an orderly and systematic way if the processes are carried out in a logical manner and the output of each set-up provides the input for the next. Erasmus et al (2000), supports this view and states that a systematic approach to the development of training is essential.

A systematic approach to the development of training is outlined in figure 2.1. Three phases are shown in this model, namely the needs assessment phase, the training phase and the evaluation phase.

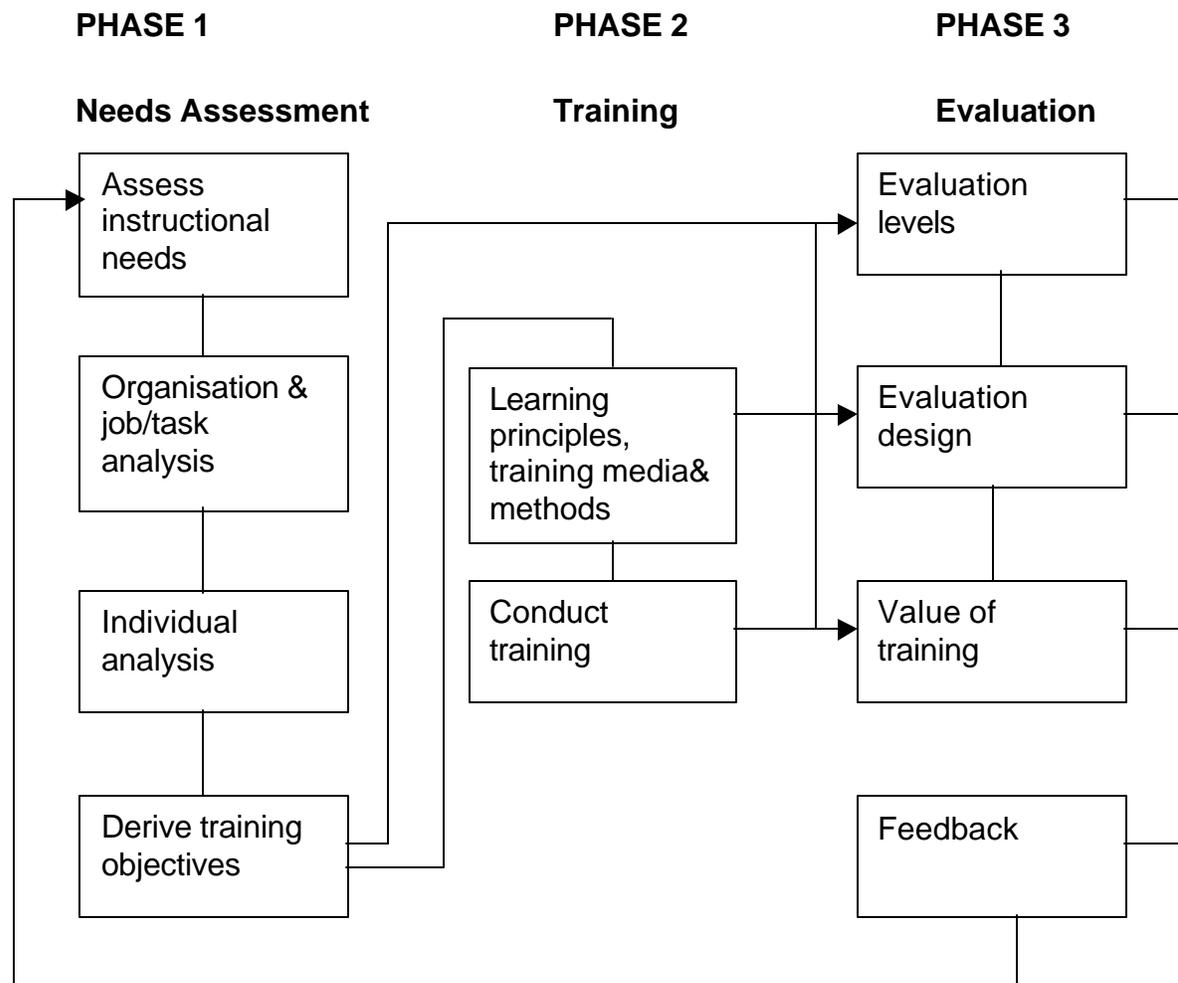


Figure 2.1: *General systems model* (adapted from Cascio, 1991; Goldstein, 1993)

2.6.2.1 Phase 1: needs assessment

Phase 1 is defined as an investigation, undertaken to determine the nature of performance problems in order to establish the underlying causes and the way in which training can address this (Erasmus et al, 2000). Goldstein (1993) describes phase 1 as the phase of the instructional process that provides the information necessary to design the entire programme. A training gap is defined as the difference between the required standard of the job and the incumbent's performance. Need identification is the starting point in any training and development activity. Need identification or assessment is not a routine function, because it should be conducted carefully and in a diagnostic manner (Al-Khayyat & Elgamal, 1997).

The ultimate aim of the needs analysis is to establish: (1) what needs actually exist; (2) whether they are important; (3) how the needs became apparent; (4) how they were identified; (5) how they may best be addressed; and (6) what the priorities are (Erasmus et al, 2000).

Any thorough needs assessment phase must address three key areas: the organisation, the job and the individual. Organisational assessment considers the proposed training within the context of the rest of the organisation. An important consideration is whether or not the proposed training will be compatible with the organisation's mission, strategy, goals and culture (Erasmus et al, 2000; Goldstein, 1993; Van Dyk et al, 1997).

The second crucial aspect of needs analysis is the job and its concomitant duties and responsibilities. This is called task analysis and different methods such as, the critical incident method are used. Once the duties or tasks in which training is needed are identified, the detailed analysis of each task may begin. The purpose of this step is to ascertain if the task is important and if training is essential and then to determine the procedures that should be taught. The final level of needs analysis focuses on the individuals to be trained. It is important to determine which employees should receive training and what their current levels of skill and knowledge are (Erasmus et al, 2000; Van Dyk et al, 1997).

Once the needs analysis has been completed, the needs that were identified are translated into measurable objectives that can guide the training process. Training objectives should focus on the behaviour component, which describes in clear terms what a learner has to do to demonstrate that he or she has in fact learned. Behavioural training objectives state what the person will be able to do, under what conditions and how well he or she will be able to do it (Erasmus et al, 2000; Molenda et al, 1996; Van Dyk et al, 1997).

The training programme should emphasise the development of knowledge, skills and abilities deemed important for the job and should not emphasise those judged as unimportant (Cascio, 1991).

2.6.2.2 *Phase 2: training*

Once the training needs have been determined and the behavioural objectives stated, a training programme can be developed to achieve the stated objectives (Cascio, 1991; Erasmus et al, 2000; Van Dyk et al, 1997).

In order to ensure the success of the training programme, appropriate training methods must be selected and suitable training materials developed to convey the required knowledge and skills identified in the training objectives. In this phase the designer will focus on: learning principles, teaching style, training methods and management education methods if appropriate (Cascio; 1991; Erasmus et al, 2000; Van Dyk et al, 1997).

The necessity of understanding how people learn in order to design an effective training programme cannot be overemphasised. The programme should involve, learning principles, teaching style, training methods and management education methods if appropriate, for this reason. This is why the concepts are seen as a crucial part of phase 2 (Erasmus et al, 2000).

a Learning principles

Learning principles facilitate the learning process and can enrich the training programme if taken into consideration during design and training (Erasmus et al, 2000; Van Dyk et al, 1997). Al-Khayatt and Elgamal (1997) support this view in stating that various learning theories and models provide different techniques and strategies to enhance the design of the training programme.

Attention should also be focused on the preconditions of learning. Two preconditions of learning should be taken into consideration, namely trainee readiness and motivation. Trainee readiness concerns the situation in which trainees possess the background skill and knowledge necessary to master the material that will be presented to them in the new training programme. Trainee motivation requires trainees to experience a need to learn new skills and therefore to understand the need for training. Learning without motivation is not as successful as learning with motivation (Erasmus et al, 2000; Goldstein, 1993; Van Dyk et al, 1997).

In addition to the preconditions for learning, other relevant learning principles include (1) conditions of practice; (2) knowledge of results; (3) overcoming interference; (4) transfer of training; and (5) adult learning principles (Erasmus et al, 2000). Cascio (1991) states that knowledge of results (feedback) is essential for learning to occur. This informational aspect of knowledge of results enables the learner to correct mistakes. To further enhance all of the above-mentioned, Goldstein (1993) states that it is crucial to remember that transfer of training from an instructional setting to a work environment involves all the issues related to the necessity of having a positive transfer climate in the work organisation. Several influences on the motivation to transfer have been identified, including intervention fulfilment, learning outcomes, job attitudes and the expected utility of results (Donovan et al, 2001).

b Conditions of practice

Actively practising the skill or task being learned can increase learning. An important condition in designing training is to decide whether to have the whole task learned and practised as one unit or whether to break the task down into separately learned and practised parts. A second condition of practice is to determine whether the practice should be divided into spaced segments or scheduled in one long session. A final condition of practices is to decide how much practice is enough (Erasmus et al, 2000; Goldstein, 1993).

c Knowledge of results

Effective learning requires trainees to receive feedback or knowledge of results on how they are performing. Feedback is critical for both learning and motivation and, if feedback is not provided, trainees may learn a technique incorrectly or lose the motivation to learn. Feedback maximise trainees' willingness to learn and is also necessary if goals for maintaining or improving performance have been set (Erasmus et al, 2000; Goldstein, 1993).

d Overcoming interference

A trainee may experience interference when habits and/or learning acquired before the start of training make it difficult for the trainee to absorb new material. To overcome interference, the trainer should teach the principles underlying the new

response and provide support and sufficient practice to increase the strength of the new stimulus-response connection (Erasmus et al, 2000; Goldstein, 1993; Van Dyk et al, 1996).

e Transfer of training

If learning that has taken place during training is not transferred to the job situation, the training programme has been ineffective. Learning theorists recommend the following traditional ways of maximising the transfer of training (Erasmus et al, 2000; Goldstein, 1993):

- Maximise the similarity between the training situation and the job situation.
- Provide as many experiences as possible with the task being taught.
- Provide a variety of examples.
- Label or identify important features of a task.
- Make sure that general principles are understood.
- Make certain that the training behaviours and ideas are rewarded.
- Design the training content so that trainees can see its applicability.
- During the training, the trainer should emphasise the usefulness of new information.
- The trainer should ask the trainees to set specific and measurable goals for performing the new behaviours on the job.

f Learning principles for adults

Most employees in organisations are adults. The science of teaching adults is known as andragogy. Andragogy is based on the premise that learning should be active and student centred, that training should focus on real-world problems and on applying techniques such as case studies and role-play and that experience and knowledge of adults can be used productively (Erasmus et al, 2000; Goldstein, 1993).

The andragog, who undertakes to plan an educational activity sees the task as twofold, firstly and primarily to design and manage a process for facilitating the

acquisition of content by the learners; and only secondarily, to serve as a content resource (Knowles, 1996).

g Teaching style

The way in which training practitioners approach teaching may influence the effectiveness of learning. Training practitioners must take particular note of the following characteristics that may influence optimal teaching style: instrumentality, scepticism, resistance to change and attention span, expectation level, absorption level, topical interest, self-confidence and locus of control (Erasmus et al, 2000).

Van Dyk et al (1996) clearly state that the “totality principle” should be taken into consideration. The principle of totality is viewed as the most comprehensive teaching principle. It is closely connected to Gestalt psychology, which endeavours to study humans in their totality or entirety. It is based on the premise that the teacher/trainer, the student and the process all show themselves as complete entities. In the teaching situation, the instructor, reveals his or her entire personality and character, and in this way the student’s full involvement can be obtained by the instructor and the trainer.

h Conducting training

An important aspect that needs to be finalised before training can be conducted is a thorough analysis of the learner group. This analysis could entail information of their past experience, qualifications, job titles and reason for training, as well as the supervisor’s reasons for nominating the trainee (Erasmus et al, 2000; Goldstein, 1993).

The choice of a training method largely determines how the training should be conducted. Apart from the above, a curriculum should be planned and the course content should be set out logically. Although this phase of the training process represents only the tip of the iceberg, it is essential for this to be executed successfully (Erasmus et al, 2000).

In this section it is important to take Gagne’s instructional theory (Goldstein, 1993) into consideration. According to the theories as described in Goldstein (1993)

specific learning outcomes are related to conditions necessary to support learning performance.

2.6.2.3 *Phase 3: evaluation*

At the end of a training programme it is vital to have formal evaluation and feedback to determine the effectiveness of the programme (Cascio, 1991; Van Dyk et al, 1996). The object of evaluation is to determine the extent to which the training programme has met the stated objectives. This is the last phase in the training process (Erasmus et al, 2000).

The four levels of evaluation, as defined by Kirkpatrick (1996), are used in conjunction with this model as discussed in 2.6.1.

2.6.2.4 *Criticism of the general systems model*

The basic engine of this model is the systems approach, which views human organisations and activities as systems in which inputs, outputs, processes (throughputs) and feedback and control elements are salient features. Designing instruction can proceed in an orderly and systematic way if the processes are carried out in a logical order and the output of each step provides the input for the next (Molenda et al, 1996). However, this model focuses on the micro rather than macro, and is conceptually based rather than empirically based (Al-Khayyat & Elgamal, 1997).

The micro-approach focuses on a particular training event which analyses and explains its activities without explicitly accounting for the environmental elements surrounding the training activities (Al-Khayyat & Elgamal, 1997). Those models which various authors refer to as general systems models or instructional models, take into account the elements surrounding the training (Cascio, 1991; Erasmus et al, 2000; Goldstein, 1993).

Goldstein (1993) recommends the use of the above model in conjunction with other evaluation models such as that of Kirkpatrick as mentioned in 2.6.1. This will ensure that effective design and evaluation are possible. However, the use of the models in

isolation may not lead to the desired result as set out in the needs assessment phase.

2.6.3 The business impact instructional design model

The business impact instructional design model addresses the new realities of training in today's business context. The business impact ISD model ties the instructional design process, more closely to other business processes, shifting the focus from training to improving organisational productivity through performance improvement (Molenda et al, 1996). Nowadays, the instructional system design is viewed differently than it was in the past because of the changing business environment (Al-Khayyat & Elgamal, 1997; Molenda et al, 1996).

The reason for this is global competition, total quality management, and corporate re-engineering. This new emphasis has caused instructional designers to expand the boundaries of their models to incorporate features of the larger environment that affect and are affected by instruction. Instructional system design's "systemic" view requires not only a look at the human resource systems, but also link-ups with the other systems in the organisation - production, sales accounting and so on. Successful organisations no longer view training as a staff or support function; it must contribute to the bottom line (Molenda et al, 1996). And it is here that the macro-evaluation of training and development's entire system lies. This is not an evaluation of a training programme; it is an attempt to measure the organisation's return on investment in the training, the bottom line and the monetary value (Al-Khayyat & Elgamal, 1997).

For training to be transferred to the workplace it must be accompanied by change in the workplace – job redesign, incentive systems, supervisor support, new tools, etc. The new skills and attitude acquired in the classroom shrivel rapidly unless they are used and supported in the workplace (Molenda et al, 1996).

Phillips (1996) states that ambitious human resource development efforts, linked to competitive strategies, enable organisations to increase market share, introduce new products, improve response times and increase productivity. When training takes on

the highly visible role, such as implementing parts of the strategic plan, the pressure of accountability comes into play.

The major theme of the business impact ISD model can be summed up in the statement: “Training alone does not solve performance problems”. Almost all performance problems faced by organisations are multidimensional (Molenda et al, 1996).

The most distinctive aspect about the business impact ISD model is that evaluation and change concerns are addressed explicitly at each stage. This model shows how training and nontraining interventions relate to each other, emanating from a common needs analysis and intersecting in a common implementation process (Molenda et al, 1996).

The business impact ISD model uses taxonomy of training evaluation based on the strata ranging from stratum 0, where only attendance is counted, with no pretence of measuring the learning outcomes, to stratum 5, measuring the impact of the training programme on the general society in which the organisation plays a part. The strata are an extension of Kirkpatrick’s levels discussed in 2.6.1.

The procedures of the business impact ISD model clearly distinguish the following: needs analysis, learner setting and job analysis, design, development, production and implementation (Molenda et al, 1996).

For the purpose of this study only the *differences* between the general systems model as described in 1.4.2 and the business impact ISD model will be highlighted. Where no differences are highlighted, one may assume that the processes are similar.

Table 2.2*Strata of evaluation in the business impact (ISD) model*

Stratum	Name	Description
0	Activity accounting	Counts the volume of training conducted or the number of trainees regardless of the quality or impact of training
1	Participant's reactions	Measures participant satisfaction with the training and is sometimes referred to as the smile tests
2	Participant learning	Attempts to assess the extent to which learners accomplish the objectives of the programme - do they exhibit the intended knowledge, skills, attitudinal behaviours on the completion of the training?
3	Transfer of training	Focuses on job performance - do the participants use their new skill on the job?
4	Business impact	Examines the ultimate impact on the success of the organisation - does the improved employee performance make a difference to the profitability?
5	Social impact	Attempts to ascertain the impact of the organisation's changed performance on the society

Source: Molenda et al (1996, p. 283)

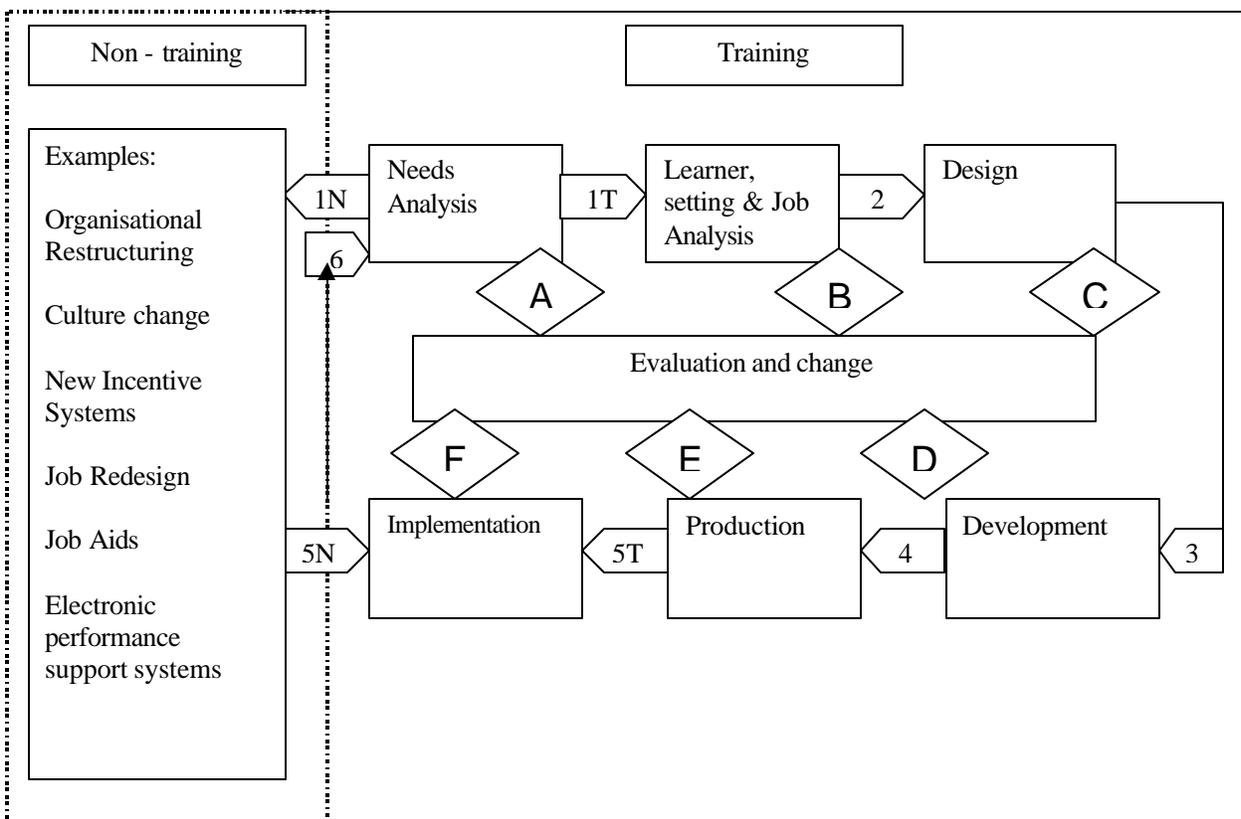


Figure 2.2: Business impact ISD model (Molenda et al, 1996, p.281)

2.6.3.1 Phase 1: needs analysis

In a business environment, the purpose of the needs analysis is to identify performance problems or business opportunities. Ascertaining the nature and extent of the needs and their causes is the core of needs analysis. The business impact ISD model explicitly incorporates nontraining interventions into the model. These can be subsumed under three categories: organisational development (OD), human resource development (HRD) and technical systems development (TSD) (Molenda et al; 1996).

Organisational development deals with strategy, the structure of an organisation, its systems, competence and culture. Human resource development deals with people, including the ways in which they are selected and placed in jobs. It covers employee incentives and motivation systems as well as employee health and safety. Employee education and training are integral to HRD. Technical systems development includes ergonomics, and deals primarily with the machines, tools and facilities that make up the physical part of the production system (Molenda et al, 1996).

Additional areas are focused on as part of the needs analysis process. They are (1) needs analysis process evaluation, (2) needs analysis outcome evaluation and (3) assessing payoff. The needs analysis process evaluation is focused on achieving strategic alignment. Two questions need to be answered during this evaluation. Firstly, are the questions that evolved and the data collected and analysed used to support the organisation's strategies and policies. Secondly, does the performance improvement plan that evolved from the needs analysis relate to performance problems or business opportunities, which are aligned with organisation's vision and direction of the organisation (Molenda et al, 1996)?

It is important to consider whether or not the proposed training will be compatible with the organisation's mission, strategy, goals and culture. Corporate culture compatibility is critical to training in organisations. Organisational assessment as the first step in the needs analysis phase is crucial (Erasmus et al, 2000).

At this stage the design team ought to establish the criteria upon which the total project will be judged on, that is the needs analysis outcome evaluation. The criteria usually focus on business and social impact (Molenda et al, 1996).

For example:

- business impact criteria: (1) increasing productivity, market share, quality, savings, etc; and (2) decreasing costs; downtime, errors; waste; accidents; absenteeism, etc
- business impact assessment tools: (1) pre- and post-training data; and (2) cost-benefit analysis or return on investment analysis
- social impact criteria: (1) contributions of training to local, regional, national prosperity; (2) matching of trained manpower to local, regional, national needs; and (3) improved organisational climate, improved socioeconomic indicators, greater equal opportunity
- social impact assessment tools: (1) cost benefit analysis; (2) value analysis; (3) organisational climate survey; (4) statistical indicators of socioeconomic conditions; and (5) human resource accounting, etc (Molenda et al, 1996)

Van Dyk et al (1997) refer to three levels of training needs:

- *Macro-level needs.* This refers to needs of national and even international interest. Examples are needs emanating from technological developments, the increasing need for skilled labour and managerial staff.
- *Meso-level needs.* The second type of need refers to the organisation's specific requirements and a large group of employees, frequently in the entire population with the same job classification. This may include the following factors: the organisation's mission, strategy, long - and short-term goals and objectives, new products or services, organisational changes, new policy and equipment, and so on. The focus is the total organisation.
- *Micro-level needs.* This type of need refers, to only one person's or a small population's need. It is determined by comparing the individual's performance with the required norms of competence.

The final purpose of needs analysis is to identify the criteria to be used in judging how proposed interventions will yield pay-off. In the business impact ISD model it is critical for the design team to agree up front about the criteria for success. In short, what is the potential "bottom line" for the organisation? In business terms this translates into costs and benefits. Costs are resources to be invested in implementing the proposed intervention. Benefits are the returns attributable to those investments. The designer should identify measurements and ensure that those factors are measured during subsequent phases of the project (Molenda et al, 1996).

Another critical step in needs analysis, as part of the business impact ISD model which differentiates it from others, is the change activities that are planned during the needs analysis phase. According to the Molenda et al (1996), the seeds for ultimate acceptance and use of the solution are planned at the beginning of the phase. The important people at this point are the sponsor, the key person who must approve the whole project, and other key decision makers. The latter may include supervisors, employees to be trained, subject matter experts or customers. The goal is to identify key people, think about how the solution to the problem will affect each of them, and start to pursue their buy-in (Molenda et al, 1996). According to Van Dyk et al (1996),

the purpose of a strategy or a plan of action is to establish needs, regardless of the level or type of needs assessment to be undertaken. Such a plan must clearly indicate the sort of questions to ask and answers to be obtained as well as the variables involved.

Molenda et al (1996) clearly distinguish between the following steps:

- As the problem is clarified, identify possible key adopters (whose acceptance is critical to successful implementation).
- Determine what would appeal to key adopters. How will this affect each of them personally?
- Start to involve key people, especially informal opinion leaders.

According to Molenda et al (1996), the outcome of needs analysis is a performance improvement plan. As shown in figure 2.1, this plan has two components: non training interventions (1N) and training interventions (1T). The former may include organisational restructuring, job redesign, altered systems for performance appraisal, new incentives and job aids. The latter typically include courses, self-study modules, apprenticeship experiences and other structured learning experiences.

Training is only one possible solution to performance problems. A solution might be an electronic performance system, a recommendation for employee incentives, the removal of performance barriers or a better mechanism for communication and feedback (Gayeski, 1998).

a Learner setting and job analysis:

While analysing learners, settings and job task analysis, the business impact ISD model adds two functions, namely: (1) to continue to look for ways to take care of the nontraining aspects of the overall intervention, and (2) to seek information on barriers to the transfer of training to the job. Strategies for transfer of training are identified which can be implemented before, during and after training. For example, before training, plan the timing carefully and avoid seasonal or cyclic busy times (Molenda et al, 1996).

Elangovan and Karakowsky (1999) define transfer of training as the generalisation of the skills acquired during the training phase to the work environment and the maintenance of these skills over time. Positive transfer of training represents the extent to which trainees apply the knowledge, skills and attitudes gained in the training context to the job. If employees do not effectively transfer the trained skills to the job site, then clearly neither the employee nor the organisation profits from the training. Therefore the effectiveness of the transfer of training plays a major role in determining the utility of training and development programmes in the organisation.

During the learner setting and job analysis process, the designer develops the criteria and methods for evaluation, focusing on transfer of training to determine if trainees are actually applying new skills and knowledge on the job (Molenda et al, 1996).

The change activity required in this process can be described as follows: the requirement for new performance becomes clear and the designer should work with the supervisor and trainees to effect the workplace changes necessary to support the trainee's new performance. In other words, supervisors must accept the learning of the knowledge and skills proposed in the job analysis and the changes that must be made in the work setting to enhance the probability that employees will use their new skills (Molenda et al, 1996).

Elangovan and Karakowsky (1999) identify the following three broad groups of factors that may affect transfer of training:

- (1) training design factors: stimulus variability, conditions of practice, general principles, identical elements, type of learning and feedback
- (2) trainee characteristics: demographic factors, motivation, personality and ability
- (3) work environment factors such as transfer climate, supervisor support

The main outcome of this phase is a clear identification of the goals and objectives of the project. The purpose of phase 1 is to provide clear guidelines on the size and shape of the solution (Molenda et al, 1996).

2.6.3.2 *Phase 2: design*

The point the instructional theorists are trying to make is that traditional models of learning do not provide enough information on the design of instructional environments. They are saying that it is necessary to understand the type of learning involved and the instructional event being considered before one can choose the most effective learning procedures (Goldstein, 1993).

In the business impact ISD model, there is a bias towards instructional strategies that are more likely to yield mastery of new skills and the transfer of these skills in the workplace, to ensure a thorough understanding of the learning required. Active learning in the form of apprenticeships, role-play, etc, is emphasised. The designer coordinates the training design with the design of job aids, performance support systems and any other nontraining interventions (Molenda et al, 1996).

During this phase the principle change concern is to visualise an instructional system that will be accepted by subject matter experts, instructors and learners as well as a blueprint or set of specifications for the instructional systems and for performance measures, which are shown as 3 in figure 2.2. The major evaluation concern at this stage is to prepare the criteria and methods for the evaluation of learning. Unless the training experience is appealing to those most affected by it, it will not be used (Molenda et al, 1996).

2.6.3.3 *Phase 3: development*

The business impact ISD model differs from conventional ISD models in the approach adopted to formative evaluation and the addition of planned change activities. Formative evaluation activities are expanded to include usability testing in addition to learn verification. At this stage, evaluation is focused on participant reactions and learning. Usability testing is added to the model because of its emphasis on attracting acceptance by learners and instructors (Molenda et al, 1996).

Evaluation for usability focuses on a sample of end users actually using the prototype while being observed by designers, who record reactions with an eye towards possible revisions. The benefits of usability testing are as follows: (1)

Difficulties are detected and remedied before full production. (2) Over time designers become more sensitive to user needs and thus better at designing user-friendly products (Molenda et al, 1996; Van Dyk et al, 1997). Formative evaluation should be conducted under conditions that closely match the conditions expected when students are ready to apply the learning (Van Dyk et al, 1997).

The main change activity to be completed at this stage is to enhance acceptance of the product and create a product that is appealing to the users, instructors and learners. People are more likely to accept a solution that has certain attributes: (1) relative advantage - a clear personal pay-off; (2) compatibility with existing habits and values - does not require too much personal change; (3) simplicity - the main features are easy to see and to understand; (4) cultural compatibility - the tone and examples are in line with the audience members' expectations and preferences; and (5) pedagogical appeal. The outcome of this development stage is a tested prototype, a complete version of the instructional system, including the teaching and learning materials, all learning activities and all user manual as shown in figure 2.2, (Molenda et al, 1996).

2.6.3.4 *Phase 4: production*

In the production phase, the business impact ISD model adds a concern for accounting to the customary activities in an ISD model. This is a reflection of the model's focus on deriving business benefits from any cost expended. Typical planning, programming and budgeting are completed in this phase. Planning deals with setting objectives and priorities, programming refers to selecting and organising specific activities to accomplish objectives, while budgeting matches programmes with resources – a spending plan (Molenda et al, 1996).

Phillips (1996) recommends that training costs be tracked according to individual programme and four functional areas, namely analysis, development, delivery and evaluation. Analysis costs are important because they will clearly show the cost involved in conducting the needs analysis. Development costs are critical because they can be used for comparison with a potential programme purchase or previous development time. Delivery costs are usually the highest cost and delivery cost per person is a critical factor in measuring the overall efficiency of the training effort.

Finally, evaluation costs are important, because they demonstrate to human resource development staff how much has been spent on improving the training process and increase training effectiveness (Phillips, 1996).

During the production phase, the focus is not only on accounting - the typical “train-the-trainer” activities are conducted during this time. The instructional system that finally emerges from the production process (5T in fig 2.2) is the outcome of this phase. If prototype testing and revision took place during the development phase, the designer can rest assured that this instructional systems will be effective in helping people learn and will be viewed positively by instructor and learners alike (Molenda et al, 1996).

2.6.3.5 *Phase 5: implementation*

In the conventional ISD model, implementation activities focus on “train-the-trainer” operations and persuasion strategies to win acceptance from key players. In the business impact ISD model, this is also included in the production phase (Molenda et al, 1996).

In addition, the business impact ISD model specifies that this phase should show a set of activities to merge and consolidate the training and nontraining interventions. The merger is shown in figure 2.2, in the form of 5N & 5T (Molenda et al, 1996).

During the implementation phase, it is important to note that the focus of evaluation shift, to a summative judgement about overall worth of the intervention. What is the final analysis that was done and what was its value to the organisation? This may include assessment of activity accounting (stratum 0 as stated in table 2.2), business impact (stratum 4, in table 2.2) and social impact, referred to as stratum 5, in table 2.2 (Molenda et al, 1996). Summative evaluation address its effectiveness, including costs, logistics of delivery and the level of acceptance of all concerned and ease of maintenance (Van Dyk et al, 1996).

During this phase, activity accounting can be a legitimate and helpful type of evaluation. It asks the following questions: how many people experienced which activities at which cost? This information can serve the following three purposes: (1)

an internal review to be used in planning and controlling routine operations; (2) an analysis that can help in formulating major plans and policies; and (3) a report on external parties about compliance with regulations (Molenda et al, 1996).

Stratum 4, business impact evaluation, can be performed by gathering actual cost and benefit data (Molenda et al, 1996). Although business results are desired, it is critical to evaluate the other strata as well. There is some evidence of a chain of impact among the levels, which indicates that if measurements are not taken at each level it is difficult to conclude that the results achieved were actually caused by the training programme. Although it is important to produce business results and measure return on investment in training programmes, it is difficult to measure at those levels. This leads to two important questions: What is the appropriate strategy? Is anything short of level 4 or 5 evaluation acceptable (Phillips, 1996)?

These questions should be answered during the needs analysis phase. During this phase, it is recommended that the designer and sponsor agree on a definition of what would be a successful yield of benefits (Phillips, 1996). Benefits may result from either of two changes: (1) reduced inputs to the production processes of an organisation (eg reduced personnel costs for goods), or (2) increased outputs from production process (eg higher quality goods or services). Two methods are commonly used to demonstrate the business return of a programme (Phillips, 1996). The first is the benefit-to-cost ratio (BCR). The BCR uses total programme cost and total programme benefits:

$$\mathbf{BCR = programme\ benefits/programme\ cost}$$

The second is the return-on-investment (ROI) method. In calculating the ROI of a programme, the total costs are subtracted from the total benefits to produce the net benefits. Net benefits are then divided by total programme cost and multiplied by 100 (Phillips, 1996).

The ROI formula is as follows:

$$\mathbf{ROI\ (\%) = net\ programme\ benefits/programme\ cost\ x\ 100}$$

The challenge in terms of change activities during the implementation phase is to combine nontraining and training interventions and ensure that they are accepted, installed and maintained within the organisation. The outcome of this phase (shown as 6 in fig 2.2) is the complete performance improvement system, the combination of training and nontraining interventions that were specified earlier in response to deficiencies identified in the needs analysis (Molenda et al, 1996; Phillips, 1996).

After the review of the three models for training design and evaluation, it is clear that the design and evaluation of training programmes is a complex issue and more than one model can be utilised. A “one-fits-all” approach cannot be followed. Various barriers to effective training evaluation can be identified on the basis of this.

2.7 BARRIERS TO EFFECTIVE TRAINING EVALUATION

According to Mann (1996), the question of *what* to evaluate is crucial to the evaluation strategy. Many researchers believe that one of the main barriers to employing effective evaluation procedures for training programme is the difficulty of knowing how and what to evaluate. The failure of training programme evaluations can be attributed to inadequate planning or design, lack of objectivity, evaluation errors of one sort or another, improper interpretation of results and inappropriate use of results, and lack of sponsorships and lack of budget (Abernathy, 1999; Goldstein, 1993; Sims, 1993). Companies fail to do training evaluations correctly and thus do not obtain valid business or performance results (Sims, 1993).

The degree of certainty of the results depends on variables such as the rigor (reliability) of the design, the measures and the sampling strategy. Most importantly, credibility depends on whether the findings of an evaluation can be replicated. If only one evaluation is conducted, it probably cannot stand on its own merit. Other studies are likely to point out flaws or alternative explanations for the findings (Bernthal, 1995).

Many training evaluations are conducted by trainers who do not have the skills, time or resources to do an in-depth study (Bernthal, 1995; Goldstein, 1993; Lewis & Thornhill, 1994; Molenda et al, 1996).

Training practitioners are frequently content to demonstrate only that a particular programme “works”, the prime concern being to sell the idea to the top management or legitimise an existing investment in a particular development programme. However, the real test is whether the new training programme is superior to the previously used or already existing methods to accomplishing the same training objectives. In order to show this, planned, systematic research is needed to evaluate the effects of training outcomes (Cascio, 1991; Van Dyk et al, 1996).

Lewis and Thornhill (1994) state that evaluation results that do not reflect positive changes or positive results may be a function of an incorrect decision, to conduct training. This decision may have been taken higher in the organisation’s hierarchy. In these circumstances it may not be advisable for the trainer to question the wisdom of this decision. It is possible in this scenario to see reasons related to organisational culture. It is clear that these reasons occur together in many organisations. Several of them are related to the “threat effect” which is implicit in evaluation and may suggest a defensive organisation culture. From this perspective, the approach to training evaluation in an organisation will merely become a small part of the overall scheme of organisational activities.

Other issues that should be mentioned are the concepts of summative and formative evaluation. According to Goldstein (1993), formative evaluation is used to determine if the programme is operating as originally planned or if improvements are necessary before the programme can be implemented. The major concern of summative evaluation is the evaluation of the final product with the major emphasis being programme appraisal. Hence formative evaluation stresses try-out and revision processes primarily using process criteria, whereas summative evaluation uses outcome criteria to appraise the instructional programme.

Exclusive emphasis on the design aspects of measuring training outcomes is rather narrow in scope. The purpose of the evaluation, the content and the objectives of

the training course and the characteristics of the employee and the work context all deserve first consideration, and formative evaluation merits emphasis as an adjunct to summative evaluation (Sackett & Mullen, 1993).

Barriers may exist to the statistical power of evaluation designs. This creates a dilemma for the individual reading textbook treatments of training evaluation. The reader is told that training should always be evaluated, on the one hand, while on the other it is emphasised that there is little to be gained from evaluation with inadequate power. However, in some situations, the evaluator has the flexibility to simply increase the sample size for an evaluation study in order to ensure adequate statistical power; in others, the sample size is fixed (Sackett & Mullen, 1993; Sackett & Yang, 1996). Basic and applied researchers may have different priorities and may speculate on the relative importance of the various forms of validity for different types of research problems. Regardless of the setting, however, statistical conclusion validity is judged to be of lesser importance than internal validity (Sackett & Mullen, 1993).

Further considerations should be given to experimental designs. A pre-test/posttest no control design does at least permit the computation of a measure of change; the problem with these designs is attributing the change to training or some other factors (Cascio, 1991). This procedure is used most in the evaluation of training. Such tests often fail to provide evidence of change as a result of training - not because of what is technically referred to as a true effect, but because of a number of experimental issues (Sadri & Snyder, 1995).

However, some of the barriers to training evaluation can be overcome through good planning, while others are more difficult (Sims, 1993). The following are some common pitfalls or mistakes in training programme evaluation:

- There is failure to work out the details of the programme, to include data-collection instruments, the specific procedures to be followed and the scheduling of surveys, interviews and observations (Sims, 1993).
- Evaluators are not trained in the principles and techniques of evaluation, which include the use of data-gathering instruments (Goldstein, 1993; Sims, 1993).

- There is a failure to make clear to all concerned the purpose of the evaluation of the programme and the uses to be made of evaluations and recommendations (Sims, 1993). Goldstein (1993) supports this statement in saying that it is often not clear to training human resource people what should be evaluated and what questions should be answered by an evaluation.
- There is a lack of objectivity in training programme evaluations, that is not focusing on the components of the training situation as an integrated system (Bernthal, 1995; Sims, 1993).
- There are rating errors, caused by inappropriate scales used to evaluate performance or materials. Some errors are the result of design of rating instruments, while others are caused by the raters themselves (Goldstein, 1993; Sims, 1993).
- The interpretation of data obtained during training programme evaluation may be problematic when assuming that consensus in one category of data on a single training system element guarantees a valid and accurate judgement (Bernthal, 1995; Sims, 1993).
- Concluding that an observation or judgement made by only one observer or group of trainees is inaccurate or invalid may be a mistake (Sims, 1993).
- Evaluations are not reported in terms that are meaningful to the intended audience. Evaluations should focus on the direct outcomes of the training - that is, behaviour change (Sims, 1993).
- There is an overgeneralisation of findings. Only by conducting repeated evaluations will an accurate picture emerge (Bernthal, 1995; Sims, 1993).
- Inappropriate use of evaluation results – for example, using data and reports on a single part of a training programme as a basis for denying or granting funding for future training programmes; using data and reports designed for evaluating the whole training programme as a basis for denying or granting funding for future training programmes; or using otherwise unsupported and invalid data as a basis for causing significant changes to a training programme (Sims, 1993). Goldstein (1993) states that there is a fear that training evaluation will indicate that a publicly endorsed programme is not meeting its objectives. This is an unfortunate misunderstanding of training evaluation. The purpose of evaluation

is not to declare programmes good or bad, but to gain as much as possible from the effort.

Various new trends in evaluation are emerging on the strength of the above barriers to effective evaluation.

2.8 NEW TRENDS IN THE EVALUATION OF TRAINING PROGRAMMES

New assumption for performance improvement and learning have emerged. These assumptions are as follows (Gayeski, 1998):

- (1) The training programme design is now seen as a collaborative process. A well-executed design process is an organisational development project.
- (2) Training is not the only solution to performance problems. A solution may be performance management systems, incentives, removal of performance barriers, knowledge management approach or a better communication or feedback process.
- (3) Return on investment in both time and money has become increasingly important.
- (4) One size does not fit all, various methods for evaluation must be utilised, depending on the need of the organisation.

According to Phillips (1996), although Kirkpatrick presented four levels of training evaluation, today's environment requires at least one other level - that is, the return on investment to compare cost versus benefits and requiring business results to be converted to a monetary unit and the added value of the programme being compared with its costs.

An alternative approach has emerged, namely concept mapping and pattern matching which use stakeholder expectations to design and evaluate training courses. It is based on the idea that managers know what skills and behaviours their employees need to do their jobs, and that training in those areas will produce bottom-line results (Abernathy, 1999).

It is critical that trainers understand that value is not determined by post-programme evaluation or pre-test or posttest. Value is the measure of impact and positive change elicited by the training. For this purpose, the 360° assessment is an excellent method to determine whether co-workers have experienced a difference in the performance of the training participant. If one wishes to measure training, the bottom line is to determine the impact it is having on people, and through them on processes – in short operations (Abernathy, 1999).

2.9 CHAPTER SUMMARY

In this chapter, the design and evaluation of training interventions were discussed. The concept of training evaluation and the meaning of this concept were analysed and discussed in detail, in the context of models used for the design and evaluation of training. Three models were discussed: Kirkpatrick's model for evaluation, the general systems model and the business impact ISD model. Various barriers to effective evaluation were highlighted as well as possible ways to ensure that the barriers were addressed as part of the design process.

The chapter concluded with a discussion of new trends in the evaluation of training. The focus was on the theoretical aims of the study – to clarify the meaning of training evaluation and define theoretical models used for training design and evaluation.

The literature review conducted for this study clearly indicates the lack of empirical validation of the models of training and development. Models appear to be seldom tested. The majority of empirical literature on training and development is concerned with issues such as training programme effectiveness.

In the next chapter, the meaning of competency and the use of competencies in training design and evaluation will be investigated.

CHAPTER 3: COMPETENCIES

In this chapter the meaning of “competency” will be clarified and the use of competencies in training design and evaluation investigated. The assessment centre as a method of predicting overall performance will be examined and discussed. The theoretical aim, namely to clarify the meaning of competency will be addressed.

3.1 CONCEPTUALISATION OF COMPETENCIES

The literature on human resource development focuses increasingly on how best to select and develop effectively performing employees. Such preoccupations are in direct response to demands for higher productivity, increased flexibility and lower costs for organisations. Through the implementation of sophisticated human resource development and workplace learning strategies, organisations are increasingly trying to develop competencies to enable employees to respond quickly and flexibly to business needs. The need for greater flexibility has resulted in a more widespread use of competency approaches as a basis for workplace learning provision (Garavan & McGuire, 2001).

The term “competency” has been defined from several points of view and there is no widely accepted single definition (Hoffmann, 1999; Jubb & Robotham, 1996; McLagan, 1997; Woodruffe, 2000). Those researching the field, as well as practitioners, have formulated several meanings that serve as a focus for their efforts to implement the competency approach in their work. This has produced a multi-faceted concept called “competencies”. It will be argued that the rationale for the use of competencies will determine the definition of the term (Hoffmann, 1999).

Hoffmann (1999) suggests that two different meanings of the term “competency” have developed. Competencies may be expressed as behaviours that an individual needs to demonstrate or minimum standards of performance. The term “competencies” has been used to refer to the meaning expressed as behaviours, while the term “competences”, has been used to refer to the meaning expressed as

standards. Various authors support the statement that advocates a clear distinction between competence and competency (Jubb & Robotham, 1996; Pierce, 1994). The term “competence” is concerned with the performance of work in an effective and efficient manner, while “competency” is a dimension of management ability and behaviour required for competent performance. Thus a job consists of a set of deliverable outputs (competences), which are likely to require associated abilities (competencies).

Woodruffe (2000) states that the words “competence” and “competency” can be used interchangeably. This definition was discussed in detail in 1.3.2.2. A review of the literature identifies three main positions adopted towards the definition of the term (Hoffmann, 1999):

- (1) observable behaviour
- (2) the standard or quality of the outcome of the person’s performance
- (3) the underlying attributes of a person

According to Garavan and McGuire (2001), the literature on competencies sometimes fails to make explicit its underlying philosophical assumptions, specifically its assumptions about the nature of work, the individual and the organisation.

For the purpose of this study, the word “competency” will be defined as sets of behaviours that are instrumental in the delivery of desired results and/or outcomes. It is important to note that the focus here is on behaviours and not on results or personal attributes (Bartram et al, 2002).

3.2 IDENTIFICATION OF COMPETENCIES

Competency identification and assessment are controversial issues. If one considers criticisms on the validity and reliability of identification processes, many of the assessment methods are based on positivistic traditions and reflect the scientific principles of quantitative approaches. The methods used relate to the definitional perspective advocated. Work-oriented approaches advocate methods such as the job element method, whereas worker-oriented approaches advocate personal

profiling. Multidimensional approaches do not advocate any particular method but suggest instead the use of multiple methods (Garavan & McGuire, 2001). Briscoe and Hall (1999) states that there are a variety of ways to create competency models.

One frequently advocated method is the critical incident method, in which employees of average and high performance are asked to describe critical situations or behavioural examples, which have occurred while at work and how they react to these situations (Briscoe & Hall, 1999; Dubois, 1993; Garavan & McGuire, 2001; McLagan, 1997). Such behaviours are systematically analysed and validated as being consistent with superior performers. A key advantage of this approach is that validated behaviours empirically correlate with successful performance within a particular organisation. Another built-in advantage is that of the involvement of employees or executives, their involvement often leading to greater enthusiasm for the competencies later (Briscoe & Hall, 1999).

Critical behaviour interviews (CBI) are conducted frequently. The use of the CBI is especially useful for identifying the soft competencies required for successful job performance. Hence they make a major contribution to the data required to construct competency models for many professional and managerial jobs. Two important sets of competencies are identified for analysis, namely competencies held by only the exemplary performers, and competencies held by both the exemplary and the average performer. The competencies held by both the average and the exemplary performers are the minimum job competencies. The competencies held by only the exemplary performers are the competencies that significantly distinguish exemplary from average job performance. These are the major sets of competencies that are used to build the competency model (Dubois, 1993).

The job function analysis is commonly used. This involves the identification of the task functions, which are used to infer the knowledge and skills for job performance. It has the potential to effectively identify the essential prerequisite skills and knowledge for a job in addition to the identification of possible training and development issues (Garavan & McGuire, 2001; McLagan, 1997).

3.3 APPLICATION OF COMPETENCY MODELS

Once competencies have been developed, organisations use them for a variety of applications. Competency frameworks are used to help align human resource activities with the needs of the organisation (Dubois, 1993; Pickett, 1998).

According to Woodruffe (2000), competencies should be the common language of the human resource system, allowing the organisation to match the human resources it has with the resources it needs. They are the dimensions against which people should be assessed for readiness or potential to move into jobs, and against which people should be appraised. They are the dimensions against which people should be developed.

The most common applications of competencies include individual and team development (Pickett, 1998). However, the two most common applications are executive selection and development (Briscoe & Hall, 1999; Jubb & Robotham, 1996; Strebler, 1995).

3.4 APPLICATION OF COMPETENCIES IN TRAINING AND DEVELOPMENT

Once competencies have been developed, companies use them for a variety of applications. Competencies are typically placed in an organised framework or grid. This framework is then used as a guide for making hiring and firing decisions, as well as suggestions about development needs (Briscoe & Hall, 1999). Pickett (1998) states that competency frameworks are also used to align human resource activities with the needs of the organisation. The most common use of competencies includes individual and team development which is an integral part of the performance appraisal system, recruitment and promotion.

Integrating competencies into an organisation's training and development efforts provides many benefits, especially increased effectiveness and reduced cost. An organisation can use competencies to evaluate the applicability and quality of its training and development programmes (Byham & Moyer, 1996).

According to Garavan and McGuire (2001), the use of competency frameworks as the focus of workplace learning serves the dual purpose of facilitating the identification of learning needs and ensuring that learning provision addresses business needs. Byham and Moyer (1996) state that having a training curriculum targeting at the competencies required for success in a job/role, not only ensures that the right training can be delivered to the right people, but provides a built-in, highly job-relevant mechanism for evaluation training effectiveness. The effect of training can be measured by means of post-training evaluation of the same competencies once an appropriate period of time has elapsed. This pre-test/posttest approach provides a quantitative measure of improvement by competency. Measures of training effectiveness are a mechanism that can be used to validate the investment made in training.

Competencies have been used to develop learning programmes of various kinds. Models of learning and instruction can be described and explained by means of systems thinking. Systems exist in an environment and exchange inputs and outputs with the environment. In using this framework of analysis, there are two main types of approaches to the way that competencies have been defined and used. An output-based approach describes what needs to be done by individuals to demonstrate competence. Competencies are outputs in the sense that they are performed as a consequence of training or learning programmes (Hoffmann, 1999).

A focus on inputs requires the development of an appropriate syllabus to structure the learning. This approach begins with the identification of the underlying attributes that competent performers possess. Once these elements have been identified, they are used to create the content of learning experiences (Hoffmann, 1999).

Jubb and Robotham (1996) support this view in stating that many organisations have developed and redesigned their management development strategies around competency-based systems. Organisations are using such systems to concentrate on key management positions in companies, and to concentrate on what people need to do in order to be successful in those positions. In theory, it has become possible to optimise an organisation's performance more effectively in a number of ways: choose the right people for the right roles, determine individuals' ability for the new roles and identify where an individual needs particular training.

Briscoe and Hall (1999) focus on the advantage of the competency models, as establishing a common language with which to communicate what needs to be emphasised and what not, as well as giving a degree of sophistication and legitimacy to applications, such as succession planning, which is sometimes lacking.

Competencies in training and development can also be used as a basis for competency-based instructional programmes. It is critical to note that the selection and application of instructional strategies for competency-based interventions should be guided by several fundamental considerations. It is necessary to guard against overemphasising of the application of any one technology or instructional strategy. There is no single learning strategy that is most appropriate for all applications; nor is there a preferred learning strategy. The learning strategy must be consistent with and conducive to the environmental conditions in the application arena. The instructional strategy or strategies should replicate the achievement of the job outputs in a simulation of actual work conditions, including the interruptions, stresses, political impacts and other deterrents to the achievement of the job outputs (Dubois, 1993).

Literature research has indicated various uses for competencies in training and development. Competencies can be evaluated by using assessment centre technology. The use of assessment centres will now be discussed in more detail.

3.4.1 Use of assessment centres

A number of early applications threatened the reputation of the assessment centre by borrowing its name for procedures that incorporated only parts of the method. The guidelines specify that the following elements must be present for a process to be considered an assessment centre (Howard, 1997):

- (1) *Job analysis.* A job analysis of relevant behaviours should identify the dimensions, attributes and job performance important to job success, and determine what the assessment centre should evaluate. Behavioural observations must then be classified into job-relevant categories. Although traditionally referred to as “dimensions”, the categories may be attributes, characteristics, aptitudes, qualities, skills, abilities, knowledge or tasks.

- (2) *Techniques*. The techniques or exercises must be designed to provide information for the dimensions or attributes identified in the job analysis. Multiple techniques must be used. These may include tests, interviews, questionnaires, sociometric devices and simulations. Job-related simulations such as in-baskets, group discussions, interaction simulations and fact-finding exercises are the hallmark of assessment centres. There must be a sufficient number of these to allow opportunities to observe candidates' behaviour relating to the dimensions being assessed.
- (3) *Assessors*. Multiple assessors must be used to observe and evaluate each assessee. Assessors must receive thorough training and demonstrate their ability to perform.
- (4) *Gathering and reporting data*. Assessors must use a systematic procedure to record specific behaviour observations as they occur. They must prepare a report or record of observations made during each exercise. Data from assessors and other techniques must be pooled by convening a meeting of assessors or involving a validated statistical process.

The elements proposed by Howard (1997) have also been mentioned by other authors. According to Woodruffe (2000), the job analysis will have revealed the typical and representative situations faced by individuals in the job. It will identify the main outputs in these situations. Simulation exercises are defined, and to perform effectively in an exercise, the participant will have to use a selection of competencies revealed by the job analysis. In this way the exercise design and job analysis cross-validate each other. If the job analysis competencies are correct and the exercises are well designed as a simulation of the job, then it will be possible to see the competencies in people's performance of the exercises. These exercises are the core of a development or assessment centre (Woodruffe, 2000). Thus an assessment centre consists of a collection of behavioural exercises designed to tap constructs that have been identified via job analyses to be important for job success (Adams, Etchegaray, Hobart, Morris & Robie, 2000; Avery & Faley, 1992; Bartram & Kurtz, 2002).

An assessment centre may include the following: an in-basket exercise, a leaderless group discussion, a business game and an interview. An in-basket requires an individual to deal with a typical set of written materials found in a manager's in-basket. The items range from situations where no actions should be taken to extremely complex problems. Time limits are normally given. The leaderless group discussion requires a group of individuals to solve a problem on which they must reach consensus, usually within an hour. Normally no formal leadership roles are assigned. During business games, participants are asked to engage in some kind of business game in which they must purchase material and manufacture and market a finished product. An intensive one- to two-hour in-depth interview is usually conducted with each participant (Avery & Faley, 1992).

In addition, the participants in an assessment centre are administered a battery of pencil-and-paper tests, measuring intelligence, personality and vocational interest (Avery & Faley, 1992; Woodruffe, 2000). However, the total assessment of these skills comes when one can observe their demonstration in the context of job performance (Dubois, 1993).

According to Avery and Faley (1992), an assessment centre represents a form of work sampling and, according to many of its proponents, has content validity. The research conducted on the assessment centre is based on the criterion-related variables, and the overall assessment rating is usually correlated with current performance. The validity data for the assessment centre method are highly encouraging. Of 23 studies that compared the usefulness of the assessment centre to other types of predictors and tests, the former proved more effective in 22 cases and had equal validity in the one remaining case (Avery & Faley, 1992).

Chan's (1996) study concluded that assessment centre ratings were found to be predictive of subsequent promotion, but not of concurrent supervisory ratings of performance. Logistic regression analysis showed that assessment ratings produced a significant and substantial increment in validity in predicting promotion over and above current supervisory ratings of job performance, which is an important relationship that has not been previously examined. A finding that assessment centre ratings predict promotion over and above current job performance would have clearly applied value because, like all other organisations, those considering the use

of assessment centres when evaluating individuals for promotion will almost always utilise current supervisory ratings of job performance as a predictor in the selection process (Chan, 1996).

However, it should be noted that assessment centres can be designed to achieve content validity by ensuring that they replicate the job. Furthermore, an assessment centre is likely to have predictive validity, even if its basis is open to debate. Different types of validity are not interchangeable. It is not enough only to establish any sort of validity. Content validity is particularly appropriate if the centre is being used to sample the candidate's competence. The assessment centre may be used to establish potential to perform at the target level now or in the immediate future. In these circumstances, the centre is used as an indicator of potential, and criterion validity is more important (Woodruffe, 2000).

In summary, based on the research literature concerning the assessment centre technique, four preliminary statements may be made (Avery & Faley, 1992):

- (1) The technique appears to be highly valid and predictive for individuals across a large number of criteria and organisations.
- (2) The technique appears to be reasonably "fair" on the basis of race, sex and age.
- (3) The content validity of the technique has never been directly assessed.
- (4) Assessment centres appear to be significantly better than other selection procedures when it comes to adverse impact. They have received positive support from the courts.

Assessment centres have expanded not only across new organisational levels, but into new human resource functions. Beyond traditional selection and promotion, organisations use assessment centres in the following ways (Howard, 1997):

- (1) *Recruitment.* Assessment centres provide realistic previews of jobs, for example, to acquaint engineers and scientists with the role of manager.
- (2) *Placement.* After a diagnosis by assessment centre, new recruits are placed in areas that will capitalise on their greatest strength or shore up developmental

needs. Placement decisions may concern assignments to temporary task forces and virtual teams.

- (3) *Development.* The assessment centre diagnoses strengths and skill deficiencies to help plan appropriate training and development.
- (4) *Proficiency assessment.* A centre diagnoses proficiency in skills for accreditation, for example, science teaching certificates.
- (5) *Organisation development and human resource planning.* Assessment centres help managers to work more cooperatively as a team, support organisational change efforts (as mentioned earlier), and identify general skill deficiencies that may require hiring replacements or global training and development.
- (6) *Career and succession planning.* Assessment centres identify competencies associated with key positions, and the individual or organisation uses the information to plan development and movement.

3.5 INTEGRATION OF THE LITERATURE STUDY

In chapter 2 the design and evaluation of a training and development programme were reviewed on the basis of various theoretical models. The theoretical models focus on various factors that need to be taken into consideration in the design and evaluation of an instructional system.

In chapter 3, competencies and the application of competencies were discussed, as part of job analysis and the use of competencies as the basis for an assessment centre. Further emphasis was placed on the use of competencies as a basis for training and development programmes or interventions.

As part of this study it is crucial to focus on the use of competencies for the evaluation of training. Competencies can be utilised as part of an assessment centre to focus on evaluation at level 2 (learning) or level 3 (behaviour) as outlined in table 2.1.

Hoffmann (1999) identifies two main types of approaches to the way that competencies have been defined and used, namely output-based and input-based (defined in 3.4).

Competencies as outputs can be evaluated as part of an assessment centre. Assessment centres are favoured as a method of ascertaining training needs, evaluating training effectiveness, assessing potential and selecting for promotion (Crawley & Pinder, 1990; Dubois, 1993).

Simulation exercises are the core of an assessment centre. To perform effectively in an exercise the participant will have to use a selection of competencies revealed by the job analysis. If the job analysis competencies are correct and the exercises are well designed as simulations of the job, then it will be possible to see the competencies in the performance of the exercise (Woodruffe, 2000). Simulation activities can assess more effectively those objectives dealing with applied skills, especially interpersonal skills such as communication, management and sales (Molenda et al, 1996).

Thus competencies as a basis for evaluation can be utilised at level 2 (learning) as defined by Kirkpatrick (1996) or stratum 2 (participant learning) as defined by Molenda et al (1996).

Evaluation at level 2/stratum 2 may be problematic. In order to assess gain, which is due to the learning, it is necessary to use reliable tests and measure ability before as well as after the learning experience (Bramley & Kitson, 1994). Dubois (1993) states that one of the most popular assessment forms of determining performance changes, is the administration of pre-tests and posttests on the competency. If the competency and its performance are concretely defined and can be directly measured by a test item or set of test items, then a pre-test and posttest method can be a useful learning evaluation measure.

The design of reliable measuring instruments is difficult and the necessary skills are often not available in training departments (Bramley & Kitson, 1994).

The objectivity of training evaluations can be increased by using different measurement methods in the same evaluation or conducting several evaluations, each using different approaches, including self-assessment, multirater assessments, focus groups, behavioural simulations and assessment centres. The assessment centre can yield valuable data. However, this approach may be difficult and time consuming to implement (Bernthal, 1995).

According to Dubois (1993) competencies can also be utilised for evaluation on level 3/stratum 3. A pre-test and posttest design can be used for this purpose. The difference between each pair of pre-interventions and post-interventions score for each competency reveals the perceived change in performance that occurred over the interval of time between the administration of the instrument. The scores reflect the degree, if any, of growth or change, which has occurred. It should be noted that in order to assess the degree to which competency acquisition has been transferred to the job, inquiries about the participant's job performance must be made. A "self-and-others competency assessment" process, commonly referred to as a 360° assessment, can be utilised for this purpose.

Competencies as an input focus on the content of training and learning experiences that will lead to competent performance. Competencies have been used to develop learning programmes of various kinds (Hoffmann, 1999). Thus competencies can be utilised during needs analysis and design (fig 2.2). During needs analysis a variety of strategies are used to identify performance problems and business opportunities (Molenda et al, 1996).

Dubois (1993) states that the completion of the following steps will result in effective competency-based learning opportunities: (1) analyse learner characteristics, including entry-level competencies and work climate in depth; (2) confirm and temporarily organise the competencies to be included in the learning intervention; (3) identify the subordinate competency for each critical competency and sequence the competencies in the order in which it is required; (4) elaborate the competencies as learner objectives; (5) design and develop the intervention learning plan; (6) brief the client; (7) subject the performance improvement intervention to a pilot test.

During design, the major concern is to prepare the criteria and methods for stratum 2 evaluation learning. This will guide the design of instruction by focusing training efforts on the desired outcomes (Molenda et al, 1996).

The term “competency” has been used by different authors to mean different things. However, for managers, trainers and other stakeholders using the competency approach, it may be better to choose how to use the term to achieve their own purpose than simply to acknowledge the different meanings of the term. The meaning of competency shifts according to the context of its use and the requirements of the user (Hoffmann, 1999).

3.6 CHAPTER SUMMARY

This chapter dealt with the definition of competencies and the way competencies are determined and measured. The concept of competence/competency and the meaning of the concept were discussed in detail. Methods used for determining the competency framework and the use of the assessment centre in the measurement of the competencies were also examined. The chapter concluded with a discussion of validity studies on the assessment centre method.

The theoretical aim of defining the concept of competencies was achieved in this chapter.

The next chapter explains the research methodology in detail.

CHAPTER 4: METHODOLOGY

In the previous chapters the theoretical objectives of the study were achieved by means of a literature study.

The first part of this chapter explains the research aims and the research hypotheses. The second part describes the population, sample, each measuring instrument used as part of the study and the experimental procedure. The chapter concludes with an outline of the organisation in which research will be conducted as well as the accelerated development training programme.

4.1 RESEARCH AIM

4.1.1 General aim

The general aim of this research is to examine the effectiveness of the accelerated development training programme.

4.1.2 Theoretical aims

The specific theoretical aims of this study are to clarify

- the meaning of training evaluation
- theoretical models used for training evaluation and design
- the meaning of competency

4.1.3 Empirical aims

The specific empirical aim of this study are to

- determine the impact of the accelerated development training programme on the identified behavioural competencies required to function effectively in a supervisory or specialist role at Bayside Aluminium

- determine the impact of the accelerated development training programme, by measuring the overall growth in proficiency per competency
- make recommendations for future research
- determine the implications for future training programmes

4.2 FORMULATION OF HYPOTHESIS

4.2.1 Hypothesis

The following general research hypothesis was stated and tested:

An accelerated development training programme (ADP) will have no significant impact on the development of the identified behavioural competencies.

4.3 DETERMINATION AND DESCRIPTION OF THE POPULATION AND SAMPLE

A nonprobability sample was used as depicted in table 4.1. The total number of participants in the accelerated development training programme was taken as a sample. A nonprobability sample and the complete number of participants were used due to organisational constraints. Permission could not be obtained to utilise a control group for the purpose of the research study.

The sample consisted of artisans ($n=6$) and operators ($n=8$) and included seven white males and seven black males. The participants were between the ages of 25 and 38, had a qualification equivalent to grade 12 (36%) and higher than grade 12 (64%), lower than a national higher diploma.

Table 4.1
Demographic characteristics

Candidate	Age	Race	Current position	Qualification
A	35	White	Artisan	N5
B	28	White	Operator	N6
C	26	Black	Artisan	N5
D	29	White	Artisan	N5
E	30	White	Artisan	N4
F	33	Black	Operator	Grade 12
G	36	Black	Operator	N5
H	28	White	Artisan	N6
I	36	Black	Operator	Grade 12
J	38	White	Artisan	N4
K	26	Black	Operator	Grade 12
L	36	Black	Operator	Grade 12
M	35	Black	Operator	Grade 12
N	25	Black	Operator	N4

The sample as indicated in table 4.1 had a mean age of 31,5 with a minimum age of 25 and a maximum of 38.

Table 4.2 reflects the distribution of participants between different departments of Bayside Aluminium.

Table 4.2
Representation of departments (n=14)

Department	Frequency	% Distribution
Casthouse	6	42,9
Carbon	3	21,4
Reduction	4	28,6
Engineering Services	1	7,1

According to table 4.2 the majority of the participants (42,9%) worked in the Casthouse Department, followed by fewer participants in the Reduction Department (28,6%) and the Carbon Department (21,4%). One participant (7,1%) worked in the Engineering Services Department

Table 4.3 reflects the biographical characteristics of the sample. The sample consisted of male operators (57,14%) and male artisans (42,86%). The sample included a limited selection of two ethnic groups, black and white. The dominant population (ethnic) group was black (57,18%) and white 42,86 percent represented white operators and artisans. High percentage of the population was black in line with meeting employment equity targets on specialist and supervisor levels in the organisation.

A minimum qualification of grade 12, was used as a selection criteria to determine participation in the program. This criteria was included to ensure that a percentage of the population could gain entry into the supervisor and specialist levels in the organisation. The minimum qualification requirement for the supervisor and specialist levels, are National diploma or National certificate (N6).

For the purpose of the study qualification can be defined as a planned combination of learning outcomes which has a defined purpose or purposes, and which is intended to provide qualified learners with applied competence and a basis for further learning. It means the formal recognition of the achievement of the required number and range of credits and such other requirements at specific levels of the national qualifications framework, NQF (South African Qualifications Authority [SAQA], 2000).

Table 4.3*Biographical characteristics of sample population (n=14)*

Demographic characteristic	Frequency	% Distribution
Gender		
Female	0	0
Male	14	100
Ethnic group		
White	6	42,86
Black	8	57,14
Position title		
Artisan	6	42,86
Operator	8	57,14
Qualification		
National technical certificate (N5)	4	28,57
National diploma (Production)	1	7,14
National technical certificate (N4)	2	14,29
Grade 12	5	35,71
National diploma	1	7,14
National technical certificate (NTC4)	1	7,14

The specific qualifications can be explained as follows. National diplomas are obtained from technikons. Classes are presented in six monthly semesters.

National technical certificates are obtained from a technical college in an engineering discipline (mechanical or electrical). The qualification is achieved starting at N1 and progressing to N6. Classes are presented in trimesters. An N6 qualification can also be converted to a national diploma on the basis of the number of subjects completed.

The population had relatively high educational qualification, with the lowest qualification, grade 12 (35,71%) and the highest the National higher diploma (ND), at 7,14 percent. A small percentage (7,14%) meet the minimum requirement for a specialist and supervisor position in Bayside Aluminium.

In chapter 4 the validity and reliability of measuring instruments were discussed. This was crucial in assisting the researcher to draw valid conclusions and make recommendations.

4.4 SELECTION OF MEASURING INSTRUMENTS

Two measuring instruments were used in the study, namely Apil-B (learning potential) and the assessment centre. For the purpose of this study, the in-basket exercise as defined in 4.4.2.2 was used as the pre-test and posttest. The data obtained from the in-basket exercise will be analysed and discussed in chapter 5.

4.4.1 Learning potential (Apil-B)

4.4.1.1 Rationale for the use of the Apil-B

The ability, processing of information and learning battery (Apil-B) is a set of tests designed to assess an individual's core or fundamental cognitive capabilities and potentialities. The Apil-B is suitable for application to individuals with 12 years of education or tertiary education (*Apil-B administrator's manual, 1997*).

The battery is often used to identify people who are likely to have the cognitive ability to master the intellectual challenges of tertiary education. It is also used to identify employees who can be developed to fulfil a managerial or higher-level technical work roles (*Apil-B administrator's manual, 1997*).

The instrument was chosen because of its psychometric qualities as stated in 4.4.1.4 and the ability to select a group of participants, in a fair and reliable manner.

4.4.1.2 *Description of the Apil-B*

The battery provides a profile of eight scores as well as a learning curve, and measures the following constructs (*Apil-B administrator's manual*, 1997):

- *Conceptual reasoning, the ability to think abstractly and conceptually, form abstract concepts, reason hypothetically, theorise, build scenarios, trace causes etc.* The capacity to think abstractly is known as fluid intelligence. A score is given on a stanine (9-point scale).
- *Flexibility, speed and accuracy of information processing and cognitive flexibility.* The cutting point between 5 and 6 is used to distinguish “slow” from “quick”, “inaccurate” from “accurate” and “low cognitive flexibility” from “high cognitive flexibility”. A score is given on a sten (10-point scale).
- *Curve of learning.* This measure looks at the person’s future achievement capacity. The gain score is the individual’s improvement off his or her own base. A score is given on a sten (10-point scale).
- *Memory test.* A high score is regarded as evidence of the person having processed the information more deeply and having understood the interrelationships between the concepts. A score is given on a stanine (9-point scale).
- *Knowledge transfer.* This is the capacity to apply and adapt knowledge. A score is given on a stanine (9-point scale).
- *Overall learning potential, integrated score on a seven-point scale or percentage score.* The seven points are, excellent, good, high average, average, low average, and rather limited and poor.

4.4.1.3 *Administration of the Apil-B*

The Apil-B was administered as part of the selection process to identify participants for the accelerated development programme. The test was administered by a registered psychometrist (profiled appointments).

4.4.1.4 *Reliability and validity of the Apil-B*

Various reliability and validity studies have been completed for the Apil-B. Because of the unusual format of some of the measures, a variety of reliability evaluation techniques are necessary to estimate the reliability of the test. Six database sets were used to estimate the reliability of the test. The reliability of conceptual reasoning and memory scores were calculated using the KR-type estimates. The reliability estimates range from the lowest estimate 0,70 to the highest estimate, 0,85. The reliability of the knowledge transfer test can be estimated through the split-half method. The reliability estimates for the six database ranges from 0,71 (lowest) to 0,84 (highest). A reliability of the information processing speed cannot be estimated directly, it is expected that the score will have reliability in the 0,80s based on strong correlations. No reliability of the flexibility score can be estimated, however the flexibility score does have large variance which is a prerequisite for good reliability (*Apil-B administrator's manual, 1997*).

The overall Apil-B score was used as a predictor. The correlations of the predictor with learning ability, conceptual thinking and information processing, were all significant at the five percent level (*Apil-B administrator's manual, 1997*).

4.4.2 Assessment centre

4.4.2.1 *Rationale for the assessment centre*

The assessment centre is a structured combination of assessment techniques that are used to provide a wide-ranging, holistic assessment of each participant. However in practice, each attribute is analysed in relation to the whole (Garavan & Morley, 1997).

According to many of its proponents the assessment centre represents a form of work sampling and therefore has content validity (Arvery & Faley, 1992). This view is supported by Adams, Etchegaray, Hobart, Morris, and Robie (2000). The technique has a high degree of utility in predicting various aspects of success with an uncorrected mean validity of approximately 0,30, based on more than 100 validity coefficients representing more than 12 000 individuals. It has frequently indicated an absence of adverse impact and consistently shown a high degree of content validity.

4.4.2.2 Description of the assessment centre

The assessment centre consisted of a behavioural style profile (personality profile analysis) and an in-basket exercise. For the purpose of the research study, the researcher focused on the use of the in-basket as the pre-test and posttest.

The in-basket exercise, was custom designed by an external consultant, a consulting firm specialising in psychological assessment.

The in-basket (Aluco) consisted of nine items, the exercise required the participant to deal with a typical set of written materials similar to tasks required to be completed by a supervisor or process specialist. The items range from situations, where no actions should be taken to more complex problems, as an employee would typically experience in a manufacturing environment.

The behavioural competencies measured by the in-basket exercise included action orientation, planning and control, problem solving, teamness and impact as set out in table 4.5.

4.4.2.3 Administration of the assessment centre

The assessment centre was administered by Profiled Appointments, which specialise in psychometric assessment under the supervision of a registered industrial psychologist.

The competencies as measured by the in-basket were rated on the basis of a five point scale, with the following anchors: (1) much less than acceptable; (2) less than acceptable; (3) acceptable; (4) more than acceptable; (5) much more than

acceptable. Ratings consisted of a numerical score on each of the following behavioural competencies: action orientation, planning and control, problem solving, teamness and impact as set out in table 4.5.

The competencies that were measured relate to job requirements typical for a supervisor and process specialist at Bayside Aluminium.

4.4.2.4 Reliability of the assessment centre

For the purpose of the research study, the researcher focused on the use of the in-basket as the pre-test and posttest. The reliability of the in-basket used was 0,7 (*Aluco in-basket technical manual, 1997*). The validity of the in-basket exercise was high ($r=0,9$). Face validity seemed to be high in terms of the job relevance of the custom-designed in-basket.

The high validity score indicates that the inferences drawn from the test scores can accurately determine success in a supervisory or process specialist role at Bayside Aluminium. The instrument was chosen for its psychometric qualities and high face validity.

4.5 JOB ANALYSIS METHOD

For the purpose of the study, behavioural competencies were identified according to the work profiling system.

4.5.1 Work profiling system (WPS)

4.5.1.1 Rationale for the use of the WPS

The competency models for each job family were identified using the work profiling system which is an integrated job analysis system. It is designed to give a quick, detailed picture of a job's requirements and the human attributes a job holder needs to fulfil those requirements (*Work profile system v1.1 technical manual, 1995*).

4.5.1.2 *Description of the WPS*

The work profiling system (WPS), which has been designed to analyse jobs and profile work roles divided into two parts (*Work profile system v1.1 technical manual, 1995*):

- Part 1 establishes the main tasks comprising the job. These involve general behaviours applicable to many jobs.
- Part 2 asks about the context within which the main tasks are performed.

The WPS uses standard terminology for increased objectivity. The WPS questionnaires and reports describe work characteristics, such as work behaviour and human abilities. This makes comparing different jobs/roles much easier (*Work profile system v1.1 technical manual, 1995*)

The WPS reflects the perception of a job through one or more individuals who are in a position to know the job well. It treats differential job perception as valuable information in its own right, not as an error of measurement. This ensures effective discrimination of different roles. The WPS process has various applications, namely: generation of competency models, generation of competency profiles, establishing critical success factors and choosing assessment methods (*Work profile system v1.1 technical manual, 1995*).

The WPS was used to identify competency models in the organisation where research was conducted. Competency models were then defined and have been in use since 1999. Data collection of the WPS will not be discussed as part of the research.

4.5.1.3 *Administration of the WPS*

The WPS is administered by means of the work profiling system (WPS) questionnaire, part 1 or 2, depending on the selection of the questionnaire, in a paper-and-pencil format (*Work profile system v1.1 technical manual, 1995*).

The questionnaire was administered by trained WPS analysts, comprising of trained Bayside Aluminium employees and SHL consultants.

4.5.1.4 *Reliability and validity of the WPS*

The WPS provides a detailed picture of a job in terms of the most important tasks that need to be performed and the attributes that are needed to perform them. Reliability and validity studies were conducted by SHL on this methodology which was used to identify competency models or competency frameworks (*Work profile system v1.1 technical manual, 1995*).

Based on research done by SHL, a positive correlation ($r=0,36$) was indicated for the WPS person-to-job match correlation with overall job performance at the 0,01 significance level. This indicates that workers achieving higher match scores were, on average more likely, to receive higher overall job performance ratings (*Work profile system v1.1 technical manual, 1995*).

4.6 COLLECTION OF INFORMATION

The competency models for each job family would be identified using the work profiling system. The WPS would be administered by SHL consultants by means of the work profiling system questionnaire, part 1 and part 2, in a paper-and-pencil format. Information would then be validated by the incumbent of the positions.

The following information would be collected for use during the pre-test. As indicated in figure 4.1, employees were nominated for participation by department at Bayside Aluminium. After all the nominations had been received, all the nominees were invited to a briefing session, clearly stipulating the following: content of the ADP, rules and guidelines, the selection process and the training programme.

The following information would be collected to be used for the pre-test. After the briefing session, all nominees attended a learning potential assessment (Apil-B). Registered psychometrists, Profiled Appointments consultants, would be used to administer the Apil-B. Feedback would be given, based on the results of a panel, comprising of human resource development personnel and representatives from all departments. Fourteen employees were selected to participate in the accelerated development programme. Individual reports were also given to each nominee.

The selected participants were invited to attend an assessment centre, administered by Profiled Appointments. The assessment centre was administered in the test room of Profiled Appointments, using standardised procedures. It was pointed out that the results of the assessment centre were going to be used for developmental purposes as part of the ADP and would be re-administered on completion of the ADP. This information would be used for posttest purposes.

Verbal and written feedback will be given to each participant on the results of the assessment centre, clearly highlighting the development areas.

4.7 PROCESSING AND ANALYSIS OF INFORMATION

The pre-test and posttest data were analysed using the sign test. The sign test is a nonparametric technique, an alternative to the *t*-test for dependant samples. The test is applicable to situations in which the researcher has measures (eg under two conditions) for each subject and wants to establish that the two measurements (or conditions) are different (Statistica 6.0, 2001).

The only assumption required by this test is that the underlying distribution of the variable of interest is continuous; no assumptions about the nature or shape of the underlying distribution are required. The test simply computes the number of times (across subjects) that the value of the first variable (*A*) is larger than that of the second variable (*B*). Under the null hypothesis (stating that the two variables are not different from each other) it is expected to be the case about fifty percent of the time. Based on the binomial distribution a *z* value can be computed, for the observed number of cases where *A* is larger than *B*, and compute the associated tail probability for that *z* value (Statistica 6.0, 2001).

This enabled the researcher to prove or disprove the general hypothesis.

4.8 THE ACCELERATED DEVELOPMENT TRAINING PROGRAMME

In order to understand the rationale for the study, background in terms of the organisation in which the study was conducted is provided in the following two sections. The first section focuses on the organisational design of the organisation

and the second on background information on the training and development systems, which lead to the design of the programme used in this study.

4.8.1 Organisational design

The study was conducted at Bayside Aluminium. Bayside Aluminium is a flat structured organisation and consists of two employee groups namely, leadership and specialists teams (LST) and operations maintenance expertise teams (OMET). Differentiation is on the basis of the job title and focus area of the positions. LST positions are classified as professionals and team leaders, whereas OMET positions are classified as technical and maintenance. Each employee group makes a contribution in terms of the above-mentioned areas.

According to the Hay methodology of broad banding and job analysis, five levels can be distinguished from general manager to operator. For each position, a minimum qualification has been determined. An example of a typical organogram of a production department is depicted in figure 4.1.

All positions are linked to minimum qualifications, years of experience required, key performance areas, and behavioural competency profiles as defined by the work profiling system, used by the consulting firm, Saville and Holdsworth (SHL) as discussed in 4.5.1.

It is critical for the purpose of the research to understand the organisational context, as well as the role of training and development in the organisation. The following section will provide more detailed information on training and development in the organisation, as well as changes that have occurred and the reasons for the changes in the organisation.

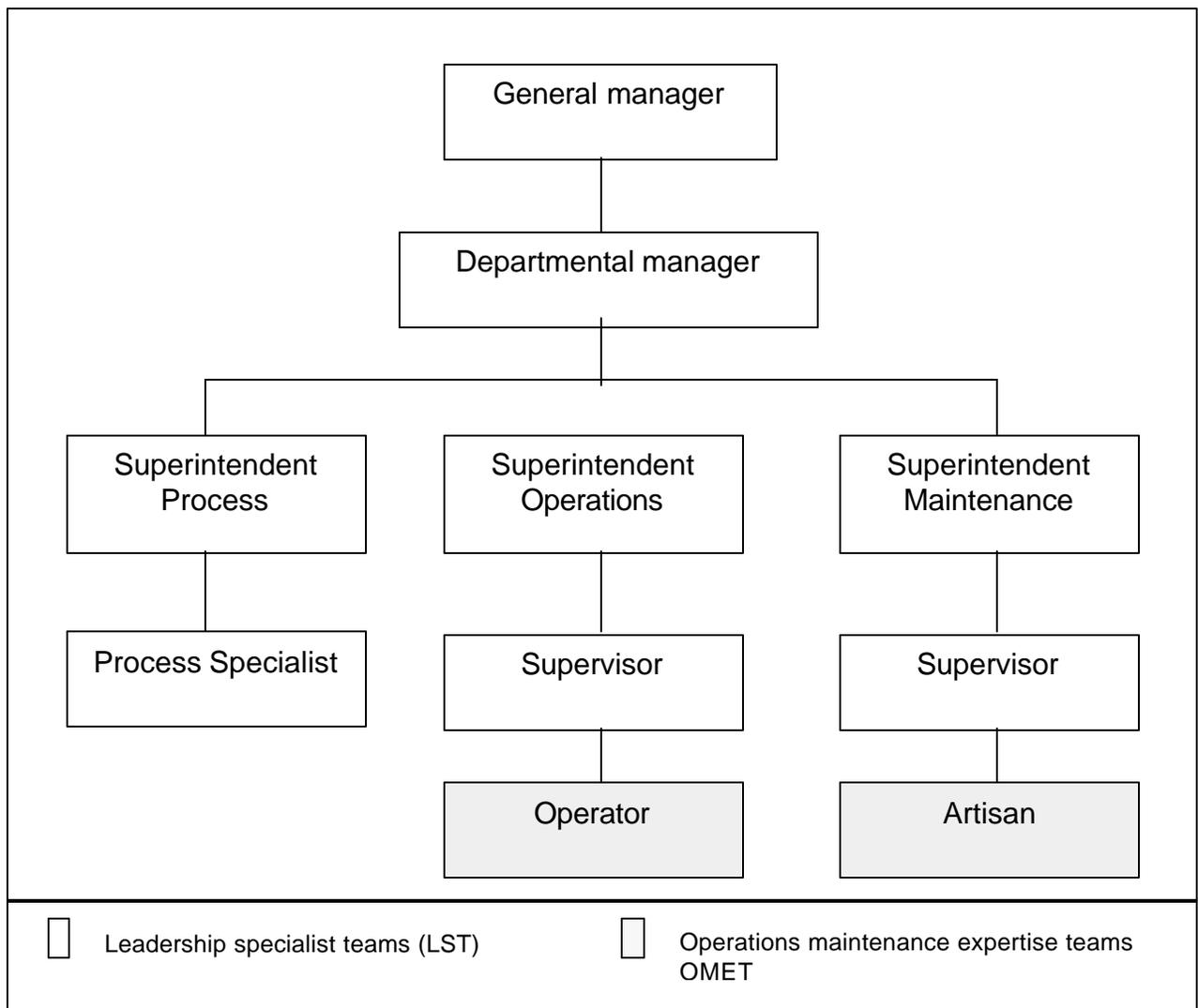


Figure 4.1: *Example of Bayside Aluminium organogram*

4.8.2 Training and development in the organisation

The organisational key performance measures for 1997 to 1999, focused mainly on training and the enhancement of organisational skills levels in a mechanistic fashion. The target for the 1997/1998 and 1998/1999 financial years was four percent of available man-days, which translated into one training day per employee per month. There was little focus on the evaluation of the effectiveness of the training that had taken place in relation to achieving organisational goals.

In order to achieve these set goals, the skills-based pay training system for operators and artisans were implemented in August 1997. At that time Bayside Aluminium as

an organisation moved to a flatter organisation structure resulting in a greater need for a competent and skilled workforce.

The following benefits were foreseen with the implementation of skills-based pay system: an improvement of competencies plantwide; a homogeneous and better equipped workforce, promotion from within, facilitation of multi-skilling, establishing a learning organisation culture, portable skills, transparent integrated career path, and equal pay for equal expertise.

Various role players highlighted problem areas in the skills-based pay system. One problem area identified was that limited numbers of operators and artisans were being promoted, because the training system did not favour promotion from within. Increasingly more internal applicants were disillusioned by the fact that the technical skills of this group were regarded as superior, while the behavioural competencies required to function within a higher level position were underdeveloped because of the nature of the skills-based pay system.

This was further complicated by the fact that, for the two subgroup of employees at Bayside Aluminium, the leadership specialist team (LST) and the operations maintenance expertise teams (OMET), different training systems had been designed and access to training that would develop the required competencies was restricted. This caused various problems, such as limited opportunities to develop behavioural skills required to gain entry into an LST position, poor application of skills acquired as part of skills-based pay etc. For the purpose of this study, the researcher focused on one problem area, namely, the development of behavioural skills/competencies required to gain entry to a LST position.

Since the OMET training system focuses strongly on technical skills and not on any behavioural competencies, it has become increasingly difficult for employees to be promoted to the LST level in the organisation. This has compelled the organisation to recruit external, rather than to promote from within.

One of the aims of the accelerated development training programme is to facilitate movement from one employee group to the next, by developing the competencies and skills of employees who participate in the programme. Another aim is to develop organisational capability through the creation of a learning culture and increased

self-awareness in order to develop competencies required to function at the next level of position.

This will increase the organisation's available talent pool, and more employees will be able to move from the OMET level to the LST level, limiting external recruitment and minimising recruitment costs.

4.9 DESIGN OF THE ACCELERATED DEVELOPMENT TRAINING PROGRAMME

The accelerated development training programme consists of various phases. The focus of the research study is the evaluation of the accelerated development training programme, according to its impact on identified behavioural competencies.

4.9.1 Phase 1

The accelerated development training programme was designed on the basis of a needs analysis conducted by the researcher. Various methods were used to determine the needs of the organisation. The following sources of information were used to determine if the company required a specialised training programme or intervention:

- an analysis of the number of internal promotions from operator and artisan level to supervisory and specialist level
- an analysis of the number of external appointments to supervisory and specialist positions
- an analysis of interview data - interviews were conducted with supervisors and superintendents in the company to determine possible needs and reasons for the number of internal and external promotions
- interviews with various union representatives to determine the needs of their constituents
- a job and task analysis of the supervisors and specialists in the company
- an analysis of employees at operator and artisan level, focusing specifically on formal qualifications, and taking into account the minimum qualifications required for supervisory and specialist positions

For the purpose of job and task analysis, the job descriptions and competency models were reviewed.

4.9.2 Phase 2

Phase 2 focused on the selection of the training media and methods, measurements of the programme, the selection methods to be utilised and the plans for implementation.

On the strength of phase 1, a decision was made to use the learning and training methods outlined below. The learning methodology used in the programme focuses specifically on the adult learner.

Different types of training methods to be used in the design of the programme, were identified. Those varied from classroom to experiential learning. Transfer of learning was further enhanced by individual job assignments. On completion of each training module, the participants were required to complete an assignment utilising learning from the module in the workplace.

All the participants were divided into teams and assigned work-related projects. These groups were referred to as syndicate groups. The participants were assigned to syndicate groups to ensure that individuals from different departments and employee groups were represented in each group.

Workplace topics and relevant problems were integrated into the programme to further enhance the transfer of knowledge and understanding of new concepts in the work environment. This was done during all the modules to ensure not only an increase in knowledge, but also a change in behaviour. Relevant topics were included as part of the project delivery, where a team was assigned a relevant work problem to solve and identify possible solutions and cost savings for the organisation. On completion of this task, the groups presented the information to a panel comprising of the general manager and managers in the organisation.

The panel were responsible for the selecting of the topics of the projects. The following guidelines were given to ensure that appropriate topics were chosen: (1)

the topic had to be a problem facing the organisation and; (2) the project could be completed in six weeks and no longer. Each project team were expected to manage their own workload and utilise identified resources in the organisation to assist with the project. This ensured the development of not only individual competence, but also of the ability to work in a team. Application of skills in the workplace was improved by using work related project assignments. The group were supported by, the programme facilitator, individual coaches, and human resource development personnel.

On completion of the above, the implementation process was planned. This included consideration of the communication, nomination and selection processes (fig 4.2).

To ensure that employees from all departments participated in the process, it was decided that after all nominations had been received, all the nominated employees would attend a briefing session, clearly explaining the process that would be followed, and communicating the rules of the accelerated development training programme.

After the briefing session 40 nominees attended a learning potential assessment (Apil-B). On the strength of the results, a panel comprising of human resource development personnel and representatives from all departments, 14 employees were selected to participate in the programme. The final decision was made, taking into consideration the fact that each department should be represented in this group of employees and the final participants selected should be both from the designated and nondesignated groups of employees.

After selection, the 14 employees would attend an assessment centre administered by an external consulting agency. This assessment centre would focus on competencies as per the supervisory and specialist competency models. For the purpose of this assessment, only certain identified competencies would be assessed. As part of the design process in phase 1, the organisation decided to focus on competencies identified for both supervisory and specialist positions, excluding leadership. The accelerated development programme was seen as

establishing the foundation for future learning. Leadership/supervisory training was targeted as the next step. On the strength of this decision and for the purpose of this assessment, only certain identified competencies would be assessed, excluding supervisory or leadership competencies.

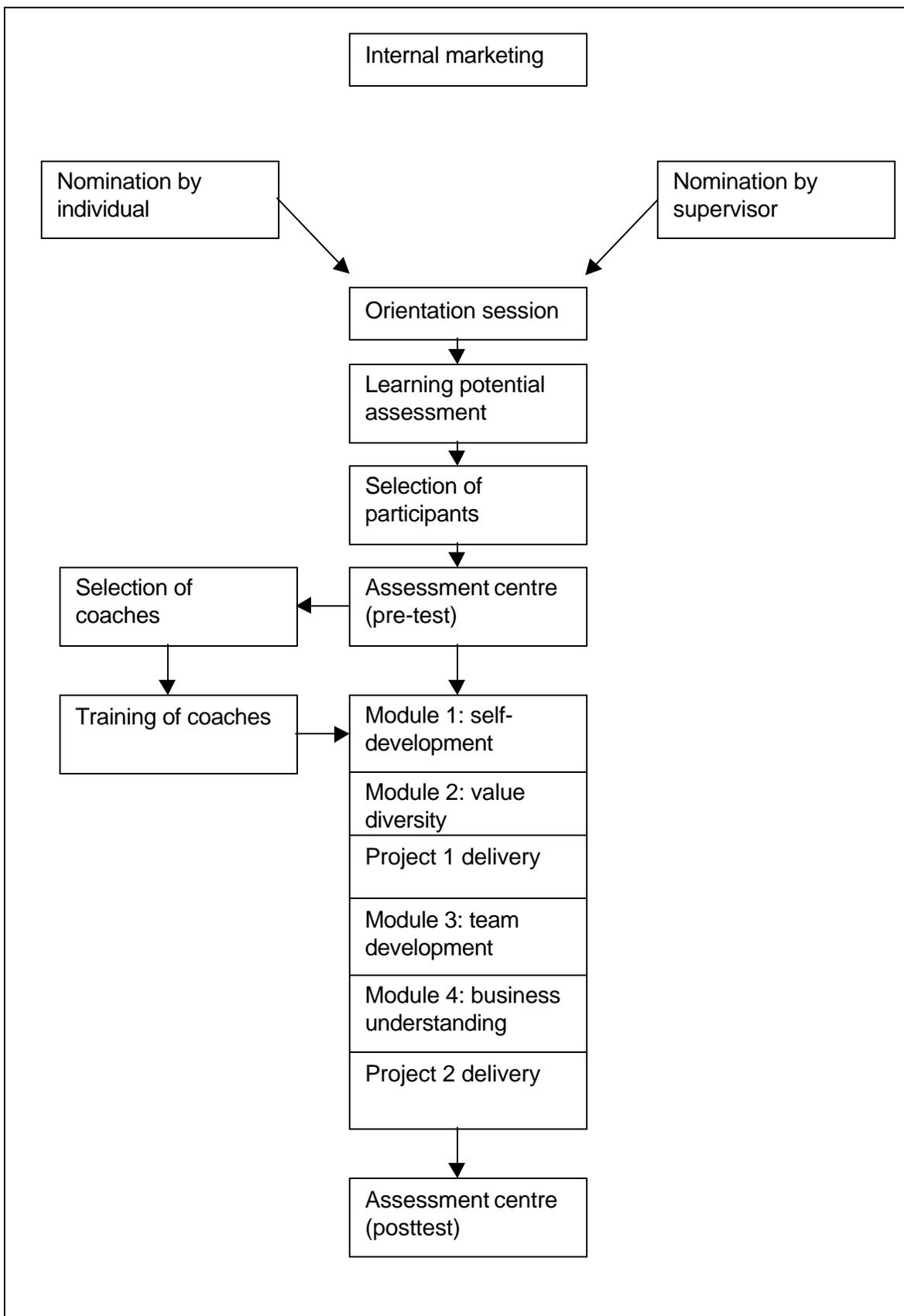


Figure 4.2: *Design of the accelerated development training programme*

Coaching formed a critical part of the accelerated development training programme. As part of the design of the programme, it was decided that the supervisor of the selected 14 participants, would play the role of coach. This decision was based on the fact that the supervisor had consistent and daily interaction with the participant of the training programme and would be able to give valuable feedback as the individual progressed through the programme. In preparation for their role, the coaches would attend a four-day training course designed to develop the required skills necessary to act as a coach. The training would be presented by an external consultant.

Once the coach training had been completed, the accelerated development training programme would commence with the first module being presented by an external facilitator. The first module would be presented to both the participants of the ADP and the supervisor of the employees, who would act as coaches as part of the learning process.

To improve the application of learning in the workplace, it was decided that the trainee' would be required to complete individual tasks, over and above the group tasks. At the start of the second module, the task to be completed in the previous module, would be reviewed.

4.9.3 Phase 3

Various areas to be measured were identified, to ensure that the various steps in the programme were highlighted to determine overall effectiveness. After the areas to be measured had been selected, various data collection tools, as well as the person responsible for the measurement, were identified. Information from the questionnaires would be analysed and presented to the organisation's management team. This would include the trainees' perceptions of the programme, perceptions of the coaches of the programme, and their perception of support received. Competency-based assessment would also be analysed and a summary communicated to the management team. Return on investment would be calculated according to possible savings arising from project work completion and costs. The areas that would be measured and the data collection tools are defined in table 4.2.

Table 4.4

Measurement of the effectiveness of the training programme identified during the design

Area of measurement	Method	To be measured by
Content	Competency-based assessment (pre-test and posttest)	External consultant
Course content relevance	Questionnaire	Facilitator
Application of knowledge Feedback from the coach Feedback from the delegate Project work delivery	Feedback Interview between facilitator and trainee Interview between facilitator and trainee Possible cost saving and feedback from the review panel	Facilitator Review panel
Learning support (support received from coach, facilitator, programme manager)	1:1 interview	Facilitator
Programme review Delegate feedback Return on investment	Questionnaire Kirkpatrick's model	Programme manager Programme manager

Source: Bayside Aluminium (2000a)

However, it should be noted that for the purpose of this research, only the assessment centre will be discussed as a measurement instrument.

On completion of all the modules and the two assigned projects, the trainees would attend a second assessment centre, to determine if any change had occurred in terms of the behavioural competencies. This information would be utilised to develop an individual development plan for each trainee, in an effort to facilitate future development.

The above-mentioned versus the cost of the training programme would then be taken into consideration to determine if another similar programme would be presented in the future.

4.10 DESCRIPTION OF THE CONTENT OF THE ACCELERATED DEVELOPMENT TRAINING PROGRAMME

The content of the accelerated development training programme is based on the competency models used for the needs analysis. The competency models for each job family were identified using a job analysis method, the work profiling system administered by the consulting firm, Saville and Holdsworth (*Work profiling system technical manual*, 1995) as defined in 4.5.2.

Based on the design of the programme as the foundation for future learning, it was decided to focus on certain competencies that had been combined from the supervisory competency model and the specialist model, as listed in table 4.5. The programme, as the foundation of future learning, would enable the participant to decide at a later stage if he or she would choose to focus his or her development on a supervisory or specialist career path. Another aim of the programme was to equip the individual with the required organisational cultural competencies (action orientation, teamness, delivering quality results, and innovation).

Table 4.5
Identified behavioural competencies

Competency Area	Competency Description
LEADING	
Action Orientation	<p>Action Orientation: Proactive, self-starting, seizes opportunities and takes responsibility for action. Actively influences events, even if this is outside your specific area of responsibility and drives work activities along. Is solutions driven and focuses on achieving outcomes and ensures that key objectives are met.</p> <ul style="list-style-type: none"> ▪ Makes things happen ▪ Makes contributions on own initiative ▪ Is focused on meeting objectives ▪ Is proactive ▪ Initiates action when necessary ▪ Takes ownership of own work ▪ Has a sense of responsibility
CO-OPERATING	
Supporting others	<p>Teamness: Co-operates and works well with others in the pursuit of organisational objectives and team goals. Shares information. Develops supportive relationships with colleagues and creates a sense of team spirit.</p> <ul style="list-style-type: none"> ▪ Recognises the value of individual contributions ▪ Shares information with the team ▪ Encourages and gains willing co-operation between team members ▪ Appropriately supports colleagues ▪ Contributes positively to team effort ▪ Appropriately challenges team members ▪ Deals with team conflict effectively
COMMUNICATING	
Persuasiveness	<p>Impact: Presents the key points of an argument persuasively coming across assertively and with credibility. Makes an immediate positive impression on others and is able to change their views when required.</p> <ul style="list-style-type: none"> ▪ Gains willing co-operation ▪ Pitches message at the right level ▪ Is effective in getting ideas across ▪ Handles objections convincingly ▪ Influences people's behaviour ▪ Commands respect and credibility ▪ Understands the personal needs and motives of others
ANALYSIS	
Problem Solving	<p>Problem Solving: Identifies and diagnoses problems and finds solutions to them. Isolates problem areas through effective evaluation of available information and facts, solving problems through the use of appropriate knowledge, procedures and techniques.</p> <ul style="list-style-type: none"> ▪ Probes to gain better understanding ▪ Effective at identifying relevant information. ▪ Stays objective in the analysis of different options ▪ Integrates data from different sources ▪ Evaluates an appropriate number of alternatives before making decisions or recommendations ▪ Draws appropriate conclusions for the situation at hand ▪ Considers all relevant facts ▪ Effectively breaks procedures into logical steps ▪ Asks appropriate questions to solve immediate problems
ORGANISING	
Planning and Organising	<p>Co-ordinate and Control: Ensures the efficient co-ordination of activities by effective scheduling and the establishment of clear priorities, organises activities and people to ensure best use of time and resources. Monitors performance against schedules and priorities.</p> <ul style="list-style-type: none"> ▪ Ensures the efficient co-ordination of activities against clear priorities ▪ Regularly reviews progress against goals ▪ Anticipates potential problems and pitfalls in area of work to ensure best use of time and resources ▪ Ensures deadlines are met ▪ Takes into account the impact on all parts of the process when planning ▪ Produces comprehensive action plans ▪ Ensures that plans and actions are aligned with disciplinary goals ▪ Plans for related conditions ▪ Matches resources and expected outputs

Source: Bayside Aluminium, (2000b)

In consultation with the consultant who will be acting as the facilitator for the accelerated development training programme, appropriate training modules were

identified to address the specific behavioural competencies as mentioned above.

These were as follows:

Table 4.6

Content of training modules of the accelerated development training programme

	Module 1	Module 2	Module 3	Module 4
Name of the module	Self-management	Relationships (value diversity)	Team development	Organisational understanding (service, quality and business understanding)
Behavioural competency to be developed according to defined competency model	Action orientation Adapting (coping with pressure) Planning and organising Impact	Teamness Impact	Teamness Impact Building and maintaining relationships	Delivering quality results
Other competencies that will be developed that do not form part of the competency model	Self-knowledge Objective setting Development of personal vision	Cultural sensitivity Conflict management	Understanding team dynamics, how to solve team conflict	Business understanding Commercial awareness

Source: Bayside Aluminium, (2000a)

In addition to the above-mentioned modules work-related projects would address the following competencies:

- analysis (technical proficiency)
- problem solving
- innovation
- coordination and control
- business understanding
- teamness

4.11 CHAPTER SUMMARY

The methodology for this study was explained in this chapter. First, a hypothesis was formulated, following by an overview of the setting of the study, the organisational context and training and development in the organisation. The composition of the sample was discussed, namely 14 males, seven white males, seven black males. All the measuring instruments utilised in the study were explained. The research design and procedure followed to collect the required data were then outlined.

In the next chapter, the results of the statistical analysis will be reported and discussed.

CHAPTER 5: RESEARCH RESULTS

Chapter 5 focuses on the statistical analysis of data and the findings. The empirical aim of this chapter is to determine the impact of the accelerated development training programme on the identified behavioural competencies required to function effectively in a supervisory or specialist role, by measuring the overall growth in proficiency per competency.

The results obtained in the empirical study were analysed to determine if learning had in fact taken place after completion of the accelerated development training programme.

The Statistica statistical package (Statistica 6.0, 2001) was used in all the statistical procedures. First a description of the demographic characteristics of the sample will be presented. The sign test, a nonparametric alternative to the *t*-test for dependent samples, was used to determine if the competency rating (variable) in the pre-test was larger than that of the posttest. After completion of the analyses, the researcher interpreted the findings within the framework of existing theory.

5.1 DISCUSSION OF RESEARCH RESULTS

The following general research hypothesis was stated and tested: an accelerated development training programme (ADP) will have no significant impact on the development of the identified behavioural competencies.

The pre-test and posttest data are analysed using the sign test. The sign test is a nonparametric technique, an alternative to the *t*-test for dependant samples (Statistica 6.0, 2001). The purpose of the procedure was to determine whether there is a statistical significant difference between the pre-test and the posttest (Statistica 6.0, 2001). Data obtained from the pre-test and posttest is analysed in terms of descriptive statistics and significance testing. This enabled the researcher to prove or disprove the general hypothesis and achieve the empirical aim, determining the impact of the accelerated development training programme by determining the overall growth in proficiency per competency.

The pre-test and posttest consist of an in-basket exercise (see point 4.4.3.2, p. 93). The following competencies are measured in the pre-test and posttest: action orientation, coordinate and control, problem solving, teamness and impact. A total score for the in-basket exercise is calculated based on the sum of the score achieved in each competency divided by the number of competencies measured.

The descriptive statistics are reported in table 5.1. The mean and standard deviation are indicated in percentages. To clarify the differences in the total score, the differences in the scores obtained from the individual competencies were studied. Differences in the individual competencies give a clearer picture of the nature of the differences in the total score obtained.

Table 5.1
Descriptive statistics: pre-test and posttest

Competency	Pre-test		Posttest	
	Mean	Standard deviation	Mean	Standard deviation
Action orientation (AC)	47,86	19,13	49,71	19,56
Coordinate & control (CC)	41,36	22,09	49,71	22,90
Problem solving (PS)	43,14	20,77	44,57	19,71
Teamness (T)	53,29	24,61	61,07	24,09
Impact (I)	34,79	21,37	49,86	26,86
Total score	46,19	18,49	52,96	18,69

The data that show the reported means for the pre-test and posttest are close together on action orientation and problem solving. An 8,35 difference was indicated on the mean of the pre-test and posttest on coordinate and control. A 15,07 difference was indicated on the mean of pre-test and posttest on impact. Impact, coordinate and control, teamness and the total score on the pre-test and posttest showed a marked increase.

The competency that featured at the higher levels in the pre-test (highest mean score) was teamness and at the lower levels in the pre-test (lowest mean) impact. The competency that featured at the higher levels in the posttest (highest mean score) was teamness and at the lower levels in the pre-test (lowest mean) problem solving.

The data further reflected an increase between the mean for the pre-test and the posttest on all the competencies. This may indicate an improvement in the participant's proficiency for all the competencies as well as a significant difference between pre-test and posttest scores.

The sign test was used to determine the significance level. Significance level is the probability with which the researcher is willing to reject the nul hypotheses. The sign test computes the number of times the value of the variable (competencies in pre-test) is larger than that of the second variable (competencies in posttest). Under the general hypothesis (stating that the two variables are not different from each other) we expect this to be the case about 50% of the time (Statistica 6.0, 2001). The null hypothesis is rejected when the probability obtained is less than equal to the predetermined significance level (Howell, 1999).

The following abbreviations of competencies will be used in table 5.2: action orientation (AO), coordinate and control (CC), problem solving (PS), teamness (T), impact (I). Total pre and total post refers to the total score achieved in the pre-test and posttest.

Table 5.2
Level of significance: pre-test and posttest

Competency	Significant value
AO pre & AO post	0,000*
CC pre & CC post	0,073
PS pre & PS post	0,000*
T pre & T post	0,248

I pre & I post	0,007*
Total pre & total post	0,002*

(** p 0,05; * p 0,01)

It is evident (table 5.2) that there was no relative difference in co-ordinate and control and teamness. A relative difference was indicated in the following competencies: action orientation, problem solving and impact.

After examining the results of the sign test, it was clear that three of the five dependent variables (competencies), differed significantly statistically namely impact (I) (p 0,01) and action orientation and problem solving (p 0,01).

The total score (sum of ratings achieved on all scores divided by the number of competencies measured) differed statistically significantly (p 0,01) between the pre-test and posttest results.

5.2 INTERPRETATION OF RESULTS

Interpretation of the results should be read with the understanding that the accelerated development programme was developed as a “pilot programme”. The purpose of a pilot programme is to explore the relatively unknown. A pilot programme, by its nature, is likely to encounter problems and suffer design faults (Boak, 1995). The outcome of this research will decide whether or not the programme should be continued.

In terms of the results of this study, the general hypothesis, “an accelerated development training programme will have no significant impact on the development of the identified competencies” can be rejected. Based on statistical analysis (point 5.2) the accelerated development programme did have a significant impact on the development of the identified behavioural competencies in terms of the total score achieved between pre-test and posttest. After examining the results it should be noted that the competencies, coordinate and control and teamness did not statistically differ significantly.

The result of the findings should be interpreted in the following context:

- so called “separation of variables” (how much of the improvement is due to training, is it the result of the participants attending the accelerated development programme)
- overgeneralisation of the findings (only evaluation at level 2/stratum 2 was considered, see point 2.6.1.2, p.38 and 2.6.3.2, p.60)

The findings will be further explored in the light of available literature on the evaluation of training programmes and the internal evaluation conducted by Bayside Aluminium (Appendix C).

Sackett and Mullen (1993) state that basic and applied researchers may have different priorities and speculate about the relative importance of the various forms of validity for different types of research problems.

According to Sackett and Mullen (1993), “training evaluation” is equated with either obtaining an effect size measure to quantify the extent of change attributable to the training programme or simply documenting that statistically significant change occurred. Statistical conclusion validity needs to take first priority in applied training evaluation research. It may be reasonable in some settings to trade off internal validity for statistical conclusion validity.

The evaluation of a “pilot” training programme with 20 employees, with a view to training additional employees if the programme is successful is used as an example of such a situation (constrained sample size) (Sackett & Mullen, 1993). Based on Avery et al’s use in (Sackett & Mullen, 1993) of a true experimental design, with pre-test, posttest and random assignment to treatment and control group, the statistical power is calculated as 0,46. However, if a control group is not established, but a pre-test administered, all 20 employees are trained, and a posttest are administered, the power of the test of pre-test-posttest difference is 0,85. In this pre-experimental design, power is higher since the analysis is based on an N of 20 and 20 posttest values, in contrast to the ANOVA design based on 10 treatment group values and 10 control group values.

Various authors (Kirkpatrick,1996; Sackett & Mullen, 1993) suggest methods to isolate the impact of training and development. In organisational settings, a variety of strategies other than formal design exist for minimising threats to internal validity. In some cases, participants and management (supervisors or other) can estimate the percentage of improvement attributable to the training programme, and “contextual knowledge” and “intelligent presumptions” can be used to infer that the treatment, rather than some other event, caused the change in question. In other words, we can often use rational judgement and previous knowledge about employees as a substitute for the benefits of a pre-test and a control group.

Although this process is subjective, the source of the estimate is the group who may be the most familiar with the situation and are aware of the other influences which affect performance (Kirkpatrick, 1996).

In the context of the research study, “separation of variables” will be discussed in terms of “contextual knowledge”, data obtained from the internal evaluation of the ADP would be utilised as “contextual knowledge” and “intelligent presumptions” as means of inference. As stated in appendix C, various measures are used on stratum 1 (participants’ reactions), 97 percent of the participants believe that they gained by attending the programme and 100 percent of the participants recommends the programme to others. According to the literature (Kirkpatrick, 1996) as stated in 2.6.1.2, a favourable reaction does not ensure learning.

In evaluating learning a before-and-after approach should be used so that any learning can be related to the programme and where practical, the evaluation should be analysed statistically so that learning can be proved in terms of correlation or level of confidence (Kirkpatrick, 1996). Based on the actual measurement conducted on stratum 2 it is clear that a before-and-after approach was used and statistical analysis was completed as part of the measurement. It is evident that according to the statistical analysis (point 5.2) the accelerated development programme had a significant impact on the development of the identified behavioural competencies in terms of the total score achieved between pre-test and posttest. In this instance, “contextual knowledge” will mean that the researcher takes into consideration that no other training or development interventions was attended by participants of the accelerated development training programme due to

organisational requirements. Therefore the attendance of participants on the accelerated development programme lead to the change in behavioural competencies.

Based on the fact that the accelerated development training programme is a “pilot programme”, it is clear that phase 2 (point 2.6.3.2), as stated in the business impact model, require improvement. In this phase, the designer of the instructional system, coordinates the training design, with the design of job aids, performance support systems and nontraining interventions. A performance management tool can be designed based on what is used in the organisation where research was conducted (Abernathy, 1999).

Sackett and Mullen (1993) states that the researcher can sometimes function as a detective, noting the level of different variables and using this information to determine how much of the improvement is due to training. An investigation led the researcher to the conclusion that history was not a viable threat. No other activity could plausibly produce the observed change, thus showing that training was in fact effective. Maturation effects may be ruled out on logical grounds, owing to the duration of the training programme (6 months), the working environment of the participants and informal feedback obtained from participants on completion of each training module.

On the strength of the empirical evidence as stated in table 5.2 and the aforementioned data, it is evident that change did occur.

The results of the study will be discussed on the basis of the appropriate use of the measuring instrument, at the appropriate level of the strata of evaluation as defined by Molenda et al (1996).

The general aim of the research study was to determine the impact of the accelerated development training programme, by determining the overall growth in proficiency in the identified competencies. In other words, to what extent did behaviours change between the pre-test and posttest. The level 2/stratum 2 measurement was conducted using an in-basket exercise as defined in 4.5.3.2.

The research study measured the learning of each participant to estimate the overall growth in proficiency per competency, in order to determine the impact of the accelerated development programme - that is, to what extent did behaviours change (ie level 2/stratum 2 evaluation). A before and after approach was used, that is, an in-basket was administered before and after the accelerated development group. Owing to organisational constraints, no control group was used during the research study due to organisational constraints.

Level 2 evaluation was conducted on the basis of predefined competencies. For the purpose of the research study, the word “competency” was defined as sets of behaviours that are instrumental in the delivery of desired results and/or outcomes. It is important to note that the focus here is on behaviours and not on results or personal attributes (Bartram et al, 2002). The content of the accelerated development training programme targeted the competencies required for success in a supervisor/specialist role at Bayside Aluminium. It can therefore be regarded as a highly job-relevant mechanism for evaluating training e

ffectiveness. This provided a quantitative measurement, with content validity, of improvement as a result of the training programme.

As previous studies clearly demonstrate, in-basket exercises do predict success in training with correlations ranging from 0,18 to 0,36. The critical question of course is that of predictive validity (Cascio, 1991). Does behaviour during the in-basket simulation reflect actual job behaviour? The results are mixed. Turnage and Muchinsky (cited in Cascio, 1991) state that while in-basket scores did forecast ratings of five-year and career potential ($r=0,19$ and $r=0,25$), they did not predict performance rankings or appraisals. Brass and Oldham (as cited in Cascio, 1991) reported significant validities ranging from 0,24 to 0,34 between four in-basket scoring dimensions and a composite measure of supervisory effectiveness. According to Cascio (1991), in-basket exercises are potentially powerful predictors of managerial success.

Empirical studies do not indicate the success of using the in-basket exercise as learning evaluation (level 2/stratum 2) or transfer of training (level 3/stratum 3).

Although level 2 evaluation was completed as part of the study, limited attention was focused on transfer of training. The latter was taken into consideration as part of the Bayside Aluminium evaluation of the accelerated development programme. Transfer was not included as part of the empirical study.

Transfer of training (level 3/stratum 3) is perhaps the most critical goal of training. Since training represents a step towards improving job performance and/or organisational effectiveness, a lack of transfer to the job may indicate a poor training effort (Sims, 1993). Transfer of training is an essential criterion against which training effectiveness should be evaluated. Clearly the success with which individuals apply new skills in the workplace is of importance to both attending the training programmes and to the employing organisations which continue to invest in such development actions (Axtell et al, 1997).

Transfer of training can be studied based on three types of influences on transfer: aspects of the programme, characteristics of the trainee and features of the work environment (Axtell et al, 1997). The business impact (ISD) model clearly stipulated that the designer should work with supervisors and trainees to effect the workplace changes necessary to support the trainee's new performance. Most of these changes entail nontraining interventions, including job redesign, changes in organisational structure, informal job aids and reinforcement and follow-up (Molenda et al, 1996).

Many factors besides training can affect the work environment. In evaluating changes, it is important to measure contextual variables. For example, the lack of management support can undermine even the most effectively designed and delivered training programme (Bernthal, 1995).

Cascio (1991) states that the exclusive design aspects of measuring training outcomes, are narrow in scope. An experiment usually settles on a single criterion dimension, with the whole effort depending on observations of that dimension. Hence experimental designs are quite limited in the amount of information they can provide. In most practical training situations, criteria are multidimensional. There is no logical reason why experimental investigation cannot consider several criterion dimensions. Unfortunately, this is usually not the case.

It is vital to make appropriate choices and select an appropriate evaluation design and measurement. One should ask what one really needs to know and let the answer determine the approach of design and measurement (Bernthal, 1995).

From the researcher's focus on a single criterion measure, based on the literature study, it is evident that further exploratory study is required in terms of the evaluation design. It is also clear that simply to stating that the programme was ineffective on the basis of a single criterion measured is not adequate.

5.3 CHAPTER SUMMARY

This chapter reported, interpreted and discussed the results obtained from the statistical analyses on the basis of the literature research conducted chapters 2 and 3. The empirical aim was achieved in this chapter namely, to determine the impact of the accelerated development training programme on the identified behavioural competencies required to function effectively in a supervisory or specialist role, by determining the overall growth in proficiency per competency.

In the following chapter, final conclusions will be drawn and recommendations made. The limitations of the study and possible avenues for future research are mentioned. The chapter concludes with a summary of the value of this research study and suggests directions for possible future research on the design and evaluation of training programmes.

CHAPTER 6: CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

In the previous chapter the research results of the empirical study were tabled and the findings discussed in detail. This chapter provides an overview of the study. Final conclusions are drawn and recommendations made. The limitations of the study and possible avenues for future research are discussed. The chapter concludes with a summary of the value of the research study, by proposing directions for possible future research on the design and evaluation of training programmes.

6.1 CONCLUSIONS

6.1.1 Overview of the study

The problem statement was discussed in chapter 1. From the problem statement it is evident that a need exists to estimate the effectiveness of the accelerated development training programme in order to determine future use of similar training programmes. According to Mann (1996), evaluating the effectiveness of training programmes has several benefits. For instance, training evaluation can serve as a diagnostic technique to permit the revision of the programme. Thus the information can be used to select or revise programmes. Good evaluation information can demonstrate the usefulness of the training enterprise. This type of information can show the benefits of the training in terms of cost. Mann (1996) states, that other benefits gained in evaluating training affect decision making. Evaluations can help organisations to decide between alternative training programmes, and who should participate in the future. Research questions are posed, with the emphasis on the need for effective evaluation. The question is also posed about whether the accelerated development training programme has an impact on the identified behavioural competencies of employees. The general aim of the study was to examine the effectiveness of the accelerated development training programme. The paradigmatic perspective of the research study can be found in social cognitive learning theory, with the emphasis on learning, training and education. The procedure for empirical study was also outlined.

Chapters 2 and 3, focused on the theoretical aims of the study. Chapter 2 contained a detailed literature study on the design of training evaluation, focusing on the meaning of training evaluation, the purpose of training evaluation, what training should evaluate and the use of models during training design and evaluation. Three models were discussed in this chapter, namely Kirkpatrick's levels of evaluation, the general systems model and the business impact instructional design model. Barriers to effective training evaluation were discussed in detail and suggestions made to overcome the barriers to effective evaluation. Chapter 3 contained a literature study of the meaning of competency, while the application of competencies in training and development was discussed in detail.

Chapter 4 explained the methodology of the empirical research study. The empirical aim of the research study was to estimate the impact of the accelerated development training programme on the identified behavioural competencies required, by determining the overall growth in proficiency per competency. The study population was described as operators and artisans at Bayside Aluminium. The research design was then described as single group pre-test posttest design. The measuring instruments were explained in terms of the rationale for description, administration, validity and reliability. The method for statistical analysis was also discussed.

In chapter 5, the empirical results were described in detail with the aid of tables. The hypotheses were tested and the following conclusion drawn: the accelerated development training programme seems to be effective. Various methods to improve the design of the evaluation are suggested.

6.1.2 Value of the study

The value of the study was explained as follows:

- Theoretical models used for training design and evaluation were critically reviewed.
- The importance of evaluation of human resource development programmes was demonstrated.

- The complexity in designing both an effective training programme and effective evaluation was demonstrated.
- Based on the above-mentioned, the level of skill required to design and evaluate a training programme that will have a proven business impact was demonstrated.
- The meaning of competencies was clarified.
- The use of competencies in training design and evaluation was demonstrated.

6.2 LIMITATIONS OF THE STUDY

Limitations of the study will be discussed with specific reference to the experimental design used.

6.2.1 Pre-test/posttest, no control group design

The definitive characteristic of this design is that a group is compared with itself. In theory, there is no better comparison. In practice, however, this design is fraught with difficulties, for there are numerous plausible rival hypotheses for observed changes in the criterion score. This design should not be used to measure training outcomes, because it raises more questions than it answers, and includes too many invalidating factors to draw meaningful conclusions about training effects (Cascio, 1991).

Sackett and Mullen (1993) state that textbook treatments often view formal experimental designs as the sole mechanism for avoiding threats to internal validity in settings where it is important to assess change. In light of real constraints on organisations in terms of the feasibility of formal experimental designs, the authors suggest that it is often worthwhile to evaluate training programmes with a less sophisticated design than not to evaluate them at all. The pre-test/posttest, no control group design or a posttest-only nonequivalent control group design does at least permit the computation of a measure of change. Problems with these designs revolve around attributing the change to training or to other factors.

It is crucial to ensure that any attempt to measure training outcomes through the use of experimental design has adequate statistical power. Research indicates that the power of training evaluation designs is a complex issue, because it depends on the effect size obtained, the correlation between pre-test and posttest scores, sample size and the type of design used (Cascio,1991).

6.2.2 Size of the research sample

There are three basic problems inherent in the use of small samples (Avery & Faley, 1992):

- A correlation based on a small sample should be of a higher magnitude to reach significance than the magnitude required with a relatively large sample size.
- A computed correlation based on a small sample is relatively less reliable than a value computed for a larger sample.
- The probability of finding that a test is significantly valid when the test is actually valid is considerably lower with small sample sizes, that is, the power to detect a truly valid test is considerably less than in studies using small samples.

Cascio (1991) states that the median total sample size used in training evaluation research is 43. In many cases, such low power designs lead to the false conclusion that training had no effect, while the use of a larger sample size would have led to the opposite conclusion.

In constrained sample situations, in which true experimental designs have inadequate power, one option, is to use a true experimental design and consequently risk failure to detect an effective training intervention. Another option is to use the pre-test/posttest no control group design, which will be more powerful, and thus more likely to detect change. However, the change cannot be unambiguously attributed to the training programme. The question is: which is the more costly error- to wrongly abandon a useful training programme or to persist in using an ineffective one? The latter error seems to be more amenable to correction, since larger scale evaluation may become feasible in the future, if sample size constraints are erased or as more data are accumulated over time. The conclusion can be drawn that there

are likely to be situations in which it makes sense to trade off internal validity for statistical conclusion validity (Sackett & Mullen, 1993).

In a situation where a probability sample was used, the *t*-test for related samples could have been utilised to determine, two sets of data from the same subjects.

It is important to note that the researcher included all the participants in the treatment and did not have a control group. Hence the design did not allow the researcher to ascertain with any certainty that the effects were a result of the training programme instead of random factors or the passage of time.

6.2.3 Isolating the impact of the training programme

Cascio (1991) states that experimental designs are used so that causal inferences can be made - that is, by ruling out alternative plausible explanations for observed changes in criterion behaviour, we want to be able to say that training caused the changes. Unfortunately, most experimental designs and most training studies do not permit the causal arrow to be pointed unequivocally towards training as the explanation for observed results.

Various threats to valid interpretations of findings from research have been identified. In the context of training these may be described as threats, history, maturation, testing, instrumentation, statistical regression, differential selection, experimental mortality, interaction of differential selection and maturation, interaction of pre-test with the experimental variable, interaction of differential selection with training and the reactive effects of the research situation and multiple treatment interferences (Cascio, 1991; Goldstein, 1993). According to Cascio (1991), the threats may affect the following:

- statistical conclusion validity - conclusions about whether a presumed cause and effect covary
- internal validity - conclusions about whether changes in one variable caused change in another (anything affecting the controls of a design becomes a problem for internal validity)

- construct validity - the possibility that the operational definition of a cause or effect can be constructed in terms of more than one construct
- external validity - conclusions about the extent to which results can be generalised across populations, settings and times

6.3 RECOMMENDATIONS

6.3.1 General recommendations

The following recommendations can be made for the present study:

- Define the framework of evaluation as part of the design of the programme by utilising existing literature.
- Ensure the use of methods to isolate the impact. For example, the use of control groups, trend line analysis, forecasting methods, the participants', or management's estimate of the training effects are identified as part of the design of evaluation.
- Utilise more than one criterion measure at different strata of evaluation.
- Improve the rigour and reliability of methods used for evaluation (excluding assessment centre).

6.3.2 Theoretical aims

The theoretical aims of the study were defined in 1.3.2 and discussed in detail.

6.3.2.1 The meaning of training evaluation and theoretical models used

A detailed literature study (chapter 2) was conducted on the meaning and the design of training evaluation. It is clear that there is not a consistent definition of training evaluation. Various definitions were explored, and the implications of the various definitions and barriers to effective evaluation identified.

The use of models during training design and evaluation was explored. Three models were discussed in chapter 2, namely Kirkpatrick's levels of evaluation, general systems model and the business impact instructional design model. Based on the research, the purpose of these models is to convey key concepts and processes, and they are seen as a "road map" or "planning process" for the designer (Goldstein, 1993; Molenda et al, 1996; Van Dyk et al, 1997). The complexity of effective evaluation of training programmes were made evident, and the conclusion drawn that the use of models for instructional design will ensure a systematic approach to evaluation in today's business context. Research has indicated that different methods of evaluation, at different strata of evaluation may be conducted on the need of the designer and circumstances.

It was established through the literature study, that in order to increase objectivity, different measurement methods must be used, in the same evaluation or several evaluations should be conducted, each using different approaches, including self-assessment, multirater assessments, focus groups and behavioural simulations. Each of these evaluation methods presents unique advantages and problems that might affect your conclusion about an evaluation. When combined, the approaches represent a diverse and powerful approach to painting a complete picture (Bernthal, 1995).

6.3.2.2 The meaning of competency

A detailed literature study (chapter 3) was conducted on the meaning and use of competencies in training and development. Based on the research undertaken it is evident that there is no widely accepted definition of the term "competency". For the purpose of this study, the term was defined as a set of behaviours instrumental in the delivery of desired results and/or outcomes (Bartram et al, 2002).

Research clearly demonstrated that competency frameworks are the basis for training and development systems. This includes the design and evaluation of a training programme.

6.3.3 Empirical aims

The empirical aims of the study were defined in 1.3.3 and will be discussed in detail. The methodology for empirical research was outlined in chapter 4 and the results of the empirical research discussed in chapter 5.

The data further reflected an increase between the mean for the pre-test and the posttest on all the competencies. This may indicate an improvement in the participant's proficiency for all the competencies and may indicate a significant difference between pre-test and posttest scores.

6.3.3.1 The impact of the ADP on identified behavioural competencies required to function effectively in a supervisory or specialist role at Bayside Aluminium

The empirical aim, namely "the impact of the ADP on identified behavioural competencies required to function effectively in a supervisory or specialist role in Bayside Aluminium" was addressed. The sign test indicated that there was no significant difference in teamness and co-ordinate and control. A significant difference was indicated in three competencies: action orientation, problem solving and impact. A statistical significant difference was evident in the aforementioned stated competencies and the total pre-test and posttest score (table 5.2).

6.3.3.2 The impact of the ADP, in terms of the overall growth in proficiency per competency

All the competencies (table 5.1) showed an increase in mean score in the pre-test and posttest. This may indicate an improvement in proficiency in all competencies.

A change in the measured criterion is noted. One cannot infer on the basis of the empirical study that the change is an effect of the independent variable.

6.3.3.3 Recommendations for future research

Possibilities for future research in this direction could include the following:

- designing and evaluating a training programme using the business impact ISD model, focusing specifically on evaluation at strata 3, 4 and 5
- isolating human resource development factors, using different strategies from a control group to for example, trend line analysis, forecasting methods, calculating the effects of other factors and customer input
- conducting in-depth analysis of sustained use of trained skills focusing on: aspects of the training programme, characteristics of the trainee and features of the work environment
- determining the effects of organisational culture on the transfer and application of learning in the workplace
- determining the effect of self-efficacy on transfer of training in a South African context, where self-efficacy is defined as “people’s judgement of their capability to organise and execute courses of action required to attain designated types of performances” (Cheng & Ho, 2001)
- investigating more closely the predictive value of data from each of Kirkpartrick’s criterion levels or the stratum as defined in the business impact (ISD) model

6.3.3.4 *Implications for future training programmes*

Recommendations made in the study as stated in 6.3.1 should be taken into consideration for the design and evaluation of training programmes at Bayside Aluminium.

The findings of the empirical study demonstrates the need for a structured framework for the design of training programmes. The researcher therefore suggests the use of the business impact (ISD) model. Use of this model will ensure that the focus of both training and nontraining interventions are part of the needs analysis process.

It is necessary to ensure that a competency-to-job output matrix is utilised to improve the needs analysis based on competencies, thus increasing the probability that learning will in fact take place. This matrix can be used to examine the relative value

or importance of each of the critical competencies to the achievement of a single or collection of job outputs. When this approach is chosen, the emphasis of curriculum planning is on the acquisition of the competencies and then on their use for the achievement of job outputs. The rationale often given for this emphasis is the designer's interest in emphasising the high degree of transferability of the competencies to the achievement of the several job outputs (Dubois, 1993).

Other methods, self-reports, exercises, observations, checklists by facilitators and team assessments can also be utilised to determine the extent to which participants have learned what has been presented. It is important to measure, be it informally, the degree to which learning has occurred. Informal methods help to convince the facilitator and the programme designer that learning has actually occurred (Phillips, 1996).

6.4 CHAPTER SUMMARY

The final chapter provided an overview of the research study. Conclusions were drawn and the limitations of the research study highlighted and discussed. General recommendations for the research study were made and recommendations for future research discussed.

REFERENCES

- Abernathy, D.J. (1999). Thinking outside the evaluation box. *Training and Development*, 53(2), 18-24.
- Adams, K.A., Etchegaray, J.M., Hobart, G., Morris, M.A. & Robie, C.O. (2000). Effects of the rating process on the construct validity of assessment centre dimension evaluation. *Human Performance*, 13(4). Retrieved March 6, 2003, from <http://www.emerald-librabry.com/fulltext.html>
- Al-Khayyat, R. (1998). Training and development needs assessment: A practical model for partner institutes. *Journal of European Industrial Training*, 22(1), 1-12.
- Al-Khayyat, R. & Elgamal, M.A. (1997). A macro model of training and development: Validation. *Journal of European Industrial Training*, 21(3), 87-101.
- Aluco in-basket administrator's manual*. (1997). Richards Bay: Profiled Appointments.
- Antonacopoulou, E.P. (2000). Reconnecting education, development and training through learning: A holographic perspective. *Education and Training*, 42(5), 5-14.
- Apil-B administrator's manual*. (1997). Auckland Park: Aprolab.
- Avery, R.D. & Faley, R.H. (1992). *Fairness in selecting employees*. (2nd ed.). Boston: Addison Wesley.
- Axtell, C.M., Maitlis, S. & Yearata, S.K. (1997). Predicting immediate and longer-term transfer of training. *Personnel Review*, 26(3), 201-213.
- Babbie, E. (1992). *The practice of social research*. (6th ed). Blemont: Wadsworth.
- Bandura, A. (1978). The self system in reciprocal determinism. *American Psycholgist*, April, 344-358.
- Banfield, P., Joy-Matthews, J. & Megginson, D. (1999). *Human resource Development* (2nd ed.). London: Pricewaterhouse Coopers.

- Barnicle, B., Garavan, T.N. & O'Suilleabhain, F. (1999). Management development: Contemporary trends, issues and strategies. *Journal of European Industrial Training*, 23 (4/5), 193-201.
- Bartram, D., Callinan, M. & Robertson, I.T. (2002). A framework for examining organisational effectiveness. In D. Bartram, M. Callinan & I.T. Robertson. (eds). *Organisational effectiveness: the role of psychology* (pp 7-9). New York: Wiley.
- Bartram, D. & Kurz, R. (2002). Competency and individual performance: Modelling the world of work. In D. Bartram, M. Callinan, & I.T. Robertson. (eds), *Organisational effectiveness: the role of psychology* (p 227). New York: Wiley.
- Bayside Aluminium. (2000a). *Accelerated Development Program Overview* [brochure]. Richards Bay: Bayside Aluminium.
- Bayside Aluminium. (2000b). *SHL Bayside competency dictionary*. Pretoria: SHL.
- Bernthal, P.R. (1995). Evaluation that goes the distance. *Training and Development*, 49 (9), 41-46.
- Boak, G. (1995). Successful pilot programmes. *Industrial and Commercial Training*, 27 (11), 9-11.
- Bourner, T., Beaty, L., Lawson, J. & O'Hara, S. (1997). Action learning comes of age-part 3: Action learning for what? *Education and Training*, 39 (5). Retrieved May 30, 2001, from <http://www.emerald-librabry.com/fulltext.html>
- Bourner, T., Beaty, L., Lawson, J. & O'Hara, S. (1996). Action learning comes of age: Questioning action learning. *Education and Training*, 38 (8), 32-35.
- Bramley, P. & Kitson, B. (1994). Evaluating training against business criteria. *Journal of European Industrial Training*, 18 (1), 10-14.
- Briscoe, J.P. & Hall, D.T. (1999). An alternative approach and new guidelines for practice. *Organisational Dynamics*. 28 (2), 37-42.
- Bristol, A., Clancy, D., Geerthuis, H., Geerthuis, S. & Holmes, M. (2002). Evaluation of workplace learning. *Journal of Workplace Learning*, 14(1), 11-18.

- Bryans, P. & Smith, R. (2000). Beyond training, reconceptualising learning at work. *Journal of Workplace Learning: Employee Counselling Today*, 12 (6). Retrieved March 6, 2003, from <http://www.emerald-librabry.com/fulltext.html>
- Byham, W.C. & Moyer, R.D. (1996). *Using competencies to build a successful organisation*. Unpublished manuscript. Development Dimensions International, SA.
- Cascio, W.F. (1991). *Applied psychology in personnel management* (5th ed.). New York: Prentice Hall.
- Chan, D. (1996). Assessment centres. *Journal of Occupational and Organisational Psychology*, 69 (2), 167-182.
- Cheng, E.W.L. & Ho, D.C.K. (2001). A review of transfer of training studies in the past decade. *Personnel Review*, 30 (1), 48-60.
- Craig, R.L.(Ed). (1996). *The ASTD Training & Development Handbook*. (4th ed.). New York: McGraw-Hill.
- Crawley, B. & Pinder, R. (1990). Assessment centre dimensions, personality and aptitudes. *Journal of Occupational and Organisational Psychology*, 63 (3). Retrieved March 6, 2003, from <http://www.emerald-librabry.com/fulltext.html>
- Cusins, P. (1995). Action learning revisited. *Industrial and Commercial training*, 27 (4), 3-10.
- Donovan, P., Hannigan, K. & Crowe, D. (2001). The learning transfer system approach to estimating the benefits of training: empirical evidence. *Journal of European Industrial Training*, 25 (2), 221-228.
- Dubois, D. (1993). *Competency-based performance improvement*. Amherst: HRD Press.
- Elangovan, A.R. & Karakowsky, L. (1999). The role of trainee and environmental factors in the transfer of training: An exploratory framework. *Journal of Leadership and Organisational Development*, 20 (5), 268-276.

- Erasmus, B., Schenk, H., Swanepoel, B. & Van Wyk, W. (2000). *South African Human Resource Management Theory and Practice* (2nd ed.). Cape Town: Juta.
- Garavan, T.N. (1997). Training, development, education and learning: different or the same? *Journal of European Industrial Training*, 21 (2),3-13.
- Garavan, T.N., Gunnigle, P. & Morley, M. (2000). Contemporary HRD research: A triarchy of theoretical perspective sand their prescriptions for HRD. *Journal of European and Industrial Training*, 13 (4), 65-93.
- Garavan, T.N. & McGuire, D. (2001).Competencies and workplace learning: Some reflections on the rhetoric and the reality. *Journal of Workplace Learning*, 13 (4), 144-164.
- Garavan, T.N. & Morley, M. (1997). Graduate assessment centres: An empirical investigation of current themes in organisational design. *Journal of European Industrial Training*, 19 (11), 160-172.
- Gayeski, D.M. (1998). Out-of-the box instructional design. *Training and Development*, 52 (4), 36-41.
- Goldstein, I.L. (1993). *Training in Organisations*. Pacific Grove, Ca: Brooks/Cole.
- Greenfield, H. & Ulrich, D. (1995). The transformation of training and development to development and learning. *American Journal of Management Development*, 1 (2). Retrieved May 2, 2003, from <http://www.emerald-librabry.com/fulltext.html>
- Hoffmann, T. (1999). The meaning of competency. *Journal of European Industrial Training*, 23 (6), 1-13.
- Horwitz, F.M., Bowmaker-Falconer, A. & Searll, P. (1996). Human resource development and managing diversity in South Africa. *International Journal of Manpower*, 17 (4/5),134-151.
- Horwitz, F.M. (1999). The emergence of strategic training and development. *Journal of European Industrial Training*, 23 (4/5), 180-190.

- Howard, A. (1997). A reassessment of assessment centres: Challenges for the 21st century. *Journal of Social Behaviour and Personality*, 12 (5). Retrieved May 30, 2001, from <http://www.emerald-librabry.com/fulltext.html>
- Howell, D.C. (1999). *Fundamental statistics for the behavioural sciences* (4th ed.) Pacific Grove, Ca: Brooks/Cole.
- Huysamen, G.K. (1994). *Methodology for the social and behavioural sciences*. Halfway House: Thomson.
- Jubb, R. & Robotham, D. (1996). Competences: Measuring the unmeasurable. *Management Development*, 9 (5). Retrieved May 2, 2003, from <http://www.emerald-librabry.com/fulltext.html>
- Kirkpatrick, D.L. (1996). Evaluation. In R.L. Craig (Ed). *The ASTD Training & Development Handbook*. (4th ed., pp 294 - 312). New York: McGraw-Hill.
- Knowles, M.S. (1996). Adult learning. In R.L. Craig (Ed). *The ASTD Training & Development Handbook*. (4th ed., pp. 253 - 265). New York: McGraw-Hill.
- Kraut, A.I. & Korman, A.K. (1999). The delta forces causing change in human resource management. In A.I. Kraut & A.K. Korman (Eds). *Evolving practices in human resource management*, (pp. 3-22). San Francisco: Jossey Bass.
- Lewis, P. & Thornhill, A. (1994). The evaluation of training: An organisational culture approach. *Journal of European Industrial Training*, 18 (8), 25-32.
- Luthans, F. & Stadjkovic, A.D. (1998). Social cognitive theory and self-efficacy: Going beyond traditional motivational and behavioural approaches. *Organisational Dynamics*, 26 (4). Retrieved May 2, 2003, from <http://www.emerald-librabry.com/fulltext.html>
- Mann, S. (1996). What should training evaluations evaluate. *Journal of European Industrial Training*, 20 (9), 1-8.
- Matthews, P. (1999). Workplace learning: Developing a holistic model. *The Learning Organisation*, 6 (1), 18-29.

- McClelland, S. (1994). A model for designing objective-oriented training evaluations. *Industrial and Commercial Training*, 26 (1). Retrieved May 2, 2003, from <http://www.emerald-librabry.com/fulltext.html>
- McCracken, M. & Wallace, M. (2000). Exploring strategic maturity in HRD: Rhetoric, aspiration or reality? *Journal of European Industrial Training*, 24 (8), 425-467.
- McLagan, P.A. (1997). Competencies, the next generation. *Training & Development*, 51 (5), 40-48.
- Meyer, W.F., Moore, C. & Viljoen, H.G. (1997). *Personology: From individual to Ecosystem*. Johannesburg: Heinemann.
- Molenda, M., Pershing, J.A. & Reigeluth, C.M. (1996). Designing Instructional Systems. In R.L. Craig (Ed), *The ASTD Training & Development Handbook*. (4th ed.,pp 266 - 293). New York: McGraw Hill.
- Morley, M.J. & Garavan, T.N. (1995). Current themes in organisational design. *Journal of European Industrial Training*, 19 (11), 3-13.
- Nadler, L. (1986). *Designing training programmes, the critical events model*. CA: Addison-Wesley.
- Nyham, B. (1998). Competence development as a key organisational strategy: Experience of European companies. *Industrial and Commercial Training*, 30 (7), 267-273.
- Pickett, L. (1998). Competencies and managerial effectiveness: Putting competencies to work. *Public Personnel Management*, 27(1), 103-116.
- Pierce, C. (1994). Executive competencies research issues, activities and responses. *Executive Development*, 7(4), 953.
- Phillips, D.C. & Orton, R. (1983). The new causal principle of cognitive learning theory: Perspectives on Bandura's reciprocal determinism. *Psychological Review*, 90 (2), 158-165.

- Phillips, J.J. (1996). Measuring the results of training. In R.L. Craig. (Ed.), *The ASTD training and development handbook*. (4th ed., pp 313-341). New York: McGraw-Hill.
- Preskill, H. & Torres, R.T. (1999). *Evaluative inquiry for learning in organisations*. Thousand Oaks, Ca: Sage.
- Rothwell, W.J. (1996). Selecting and developing the professional HRD Staff. In R.L. Craig (Ed), *The ASTD Training & Development Handbook*. (4th ed., pp 48-76). New York: McGraw Hill.
- Rowe, C. (1996). Evaluating management training and developing: Revisiting the basic issues. *Industrial and Commercial Training*, 28 (4),1-7.
- Sackett, P.R. & Mullen, E.J. (1993). Beyond formal experimental design: Towards an expanded view of the training evaluation process. *Personnel Psychology*, 46 (3), 613-628.
- Sackett, P.R. & Yang, H. (1996). Statistical power and cost in training evaluations: Some new considerations. *Personnel Psychology*, 49 (3), 651-669.
- Sadri, G, & Snyder, P.J. (1995). Methodological issues in assessing training effectiveness. *Journal of Managerial Psychology*, 10 (4), 30-33.
- Sambrook, S. & Stewart, J. (2000). Factors influencing learning in european learning orientated organisations: Issues for management. *Journal of European Industrial Training*, 24. Retrieved June 2, 2003, from <http://www.emerald-librabry.com/fulltext.html>
- Sims, R.R. (1993). Evaluating public sector training programmes. *Public Personnel Management*, 22 (4), 591-616.
- Statistica 6.0 [computer software]. (2001). USA: Statsoft Inc.
- Strebler, M. (1995). Developing a competence-based management training programme. *Management Development Review*, 8 (3). Retrieved May 2, 2003, from <http://www.emerald-librabry.com/articles.html>

South African Qualifications Authority. (2000). *The national qualifications framework and curriculum development*. [Brochure]. Johannesburg: SAQA.

Ulrich, D. (1998). *Delivering Results: A new mandate for human resource professionals*. New York: Harvard Business Review.

Van Dyk, P.S., Nel, P.S., Loedolff, P.V.Z., & Haasbroek, G.D. (1997). *Training Management*. Johannesburg: Thomson.

Woodruffe, C. (2000). *Development and assessment centres* (3rd ed.). London: The Short Run Press.

Work profile system v1.1 Technical Manual. (1995). Pretoria: Saville and Holdsworth.

APPENDIX A

OVERVIEW OF THE ACCELERATED DEVELOPMENT TRAINING PROGRAMME

1.1 AIM

The aim of the accelerated development training programme is to develop organisational capability through the creation of a learning culture and increased self-awareness. This will result in an increase in the organisation's available talent pool.

1.2 PROGRAMME OBJECTIVES

On completion of the programme the delegate will:

- be able to take responsibility for own learning
- be able to use self-knowledge to gain insight into his relationships with others
- be able to use self-knowledge to set objective career goals and how to achieve this
- understand own stress reactions
- be able to cope with pressure, within his or her work environment
- be able to communicate effectively
- be able to identify and diagnose a problem and find solutions to the problem
- be able to provide a quality service to customers
- understand basic business principles
- understand his or her individual contribution to the end product
- understand dynamics in a team environment
- be able to contribute constructively to team effectiveness
- be able to plan and organise everyday work activities and projects

1.3 WHAT MAKES THE ACCELERATED DEVELOPMENT TRAINING PROGRAMME UNIQUE?

- *Integration of Bayside cultural competencies.* The programme focuses on the development of the competencies for the next level of position.
- *Learning methodology:* The learning methodology used in the programme is suitable for the adult learner. Different types of training methods are used ranging from classroom to experiential learning. Transfer of learning is further enhanced by individual assignments after completion of each module, as well as project assignments in work groups. The group is supported by the facilitator, individual coaches and HRD staff.
- *Learning process:* Learning is seen as a process, not an event. The process starts with the individual, his or her relationships and the bigger picture, namely organisational effectiveness.
- *Integration of workplace topics.* Workplace topics and relevant problems are integrated into the programme to further enhance the transfer of knowledge and understanding of new concepts in the work environment. This is done during all modules to ensure not only an increase in knowledge, but also changes in behaviour.
- *Foundation for future learning and sustained personal growth.* The accelerated development training programme is the first stepping stone towards future career paths. Delegates will leave the programme with a career development plan, as well as an individual development plan to achieve career goals. Follow-up sessions will be done every two months to sustain the momentum of learning.
- *Measurement of success.* Measurements are in place to ensure success and to continuously improve the programme. This involves content, transfer of knowledge, application of knowledge, learning support and programme review.
- *Organisational support.* Organisational support is addressed by engaging managers, superintendents and supervisors as part of the learning process from the outset. Managers are encouraged to visibly support the programme. Superintendents and supervisors are trained as coaches and encouraged to practise skills. Other individuals at Bayside Aluminium will also be utilised in the programme, to share knowledge and experience in the organisation.

4.5 NOMINATION PROCESS

The nomination process consists of two processes:

- nomination by the supervisor
- nomination by the delegate. (if self-nomination is used, the supervisor and manager must be informed and also sign the nomination form)

4.5.1 Selection criteria

The programme is aimed at artisans and operators. Delegates will be eligible to participate in the programme on the basis of the following criteria:

- The delegates must understand both written and spoken English.
- The minimum qualification is grade 10.
- The delegates must have their manager's and supervisor's support to participate in the programme.
- The delegate's must be able to attend all orientation and training days. Attendance on all training days is compulsory.
- The delegates are considered to be superior performers by their peers, managers and supervisors.
- They must exert high energy, a strong drive and work motivation.
- They are alert, fast-learning individual who are eager and open to learn from others and apply their learning in the workplace.

1.5 PROGRAMME RULES

1.5.1 Rules for trainees

- Attendance of all training days is compulsory.
- All module assignments must be completed.
- Projects must be completed on time.

- The option of self-study and recognition of prior learning will be available, for those employees currently on the skills-based pay system, in order not to delay progress. Special allowance will be made for legal training. However, the programme manager must be informed of any scheduled training on commencement of the accelerated development training programme.

2.1.1 Rules for the coaches

Attendance of the following events is compulsory

- coaching workshops
- orientation day
- programme launch
- feedback sessions (x2)
- programme review
- graduation

2.1.2 What the accelerated development training programme is not

- Successful completion of the programme is not based on attendance of the training sessions, but on performance during the programme.
- There is no guarantee of promotion or advancement to the next position.
- This is not a formal academic qualification.
- It does not replace the need for a formal qualification, but it does prepare the individual for an academic qualification.

2.1.3 Participation in syndicate groups

- Participation in syndicate groups to complete the project work is compulsory.
- Participants will be assigned to syndicate groups.
- Each syndicate group will comprise of members from different departments, with different levels of formal qualification.

2.1.4 Guidelines for panel

- The purpose of the panel is to focus on the way in which the syndicate group build and construct their arguments.
- The panel must give constructive feedback to enable the group to improve and also to motivate them to complete the second project.
- Questions are asked only to clarify concepts and promote understanding.
- One panel member should be identified to thank the group.
- One panel member must give feedback.
- Feedback must focus on positive aspects first, for example, what was good, the overall impression, and what can be improved on. (Note: must be a positive experience.)

APPENDIX B

EXAMPLE OF SYNDICATE GROUP PROJECT WORK

Project 1: syndicate group III

Project scope

To be competitive, a lean manufacturer and to remain profitable, wastage management is everyone's responsibility. Keeping our use of consumables to a minimum is key aspect of waste management. You are required to examine the sources of excessive use of consumables in Bayside and the causes of this (eg the root causes of the above), and recommend potential solutions to reduce consumable usage. You must include costs and benefits in your recommendations.

Project deliverables

- (1) Documented project proposal (written report)
- (2) Presentation of project findings and recommendations.
- (3) The above should include:
 - (a) sources of excessive usage.
 - (b) causes of excessive usage.
 - (c) costs of the above for Bayside.
- (4) Recommend solutions to address the above, including costs and benefits.

Due dates

Written proposal submitted: 12:00, 6 October 2000

Formal presentation: 10 October 2000

Resources available

- your coach

- subject matter specialists:
- procurement department
- production services
- your programme manager
- you and your group members

Topics to include in your proposal:

- Introduction
- Background (research conducted)
- Findings
 - I. Sources of excessive usage
 - II. Causes of excessive usage
 - III. Cost of excessive usage
- Recommend solutions
 - I. Potential ways to address the issue/s
 - II. Costs and benefits for Bayside
- Conclusion

Things to include in your presentation

- Overhead transparencies
- Agenda for presentation

- Simple graphs
- Handouts for the panel
- Each member of the syndicate group must do a section of the presentation
- Presentation length not to exceed 20 minutes
- 10 minutes for questions and answers

Suggested ways to improve your project

- Syndicate group to meet and plan project work.
- Involve all the resources in a planned way (do not leave things to the last minutes).
- Assign responsibilities to individual members of the syndicate group (divide the work).
- Assign a project leader from the syndicate group.
- Agree to ways of contacting one another to review project progress (eg e-mails).
- Always check that you are on target to meet your deadlines.

APPENDIX C

EVALUATION OF THE ADP CONDUCTED BY BAYSIDE ALUMINIUM

In this section, the evaluation of the accelerated development training programme, will be reviewed against the process evaluation as detailed in the business impact ISD model. This review will not only focus on evaluation, but also on how the evaluation process was designed and if this design has hindered or improved the ability of the designer of the programme to evaluate its effectiveness. The focus will be on possible alternative methods. Reference will also be made to the business impact model. At each stage in this model, the instructional designer uses different methods to evaluate activities and outputs.

The information contained in appendix C enabled the researcher to report on the findings in the organisation where research was conducted. The information should be read in conjunction with the description of the business impact ISD model as defined in chapter 2 (2.6.3).

Based on table C.1, stratum 1 (participants' reactions), stratum 2 (participants' learning), stratum 3 (transfer of training) and stratum 4 (business impact) were evaluated.

Table C.1

Analysis of the accelerated development training programme evaluation based on the strata of evaluation in the business impact (ISD) model

Stratum	Description	Evaluation completed as part of ADP	Method used
0	Activity accounting	No	
1	Participants' reactions	Yes	Questionnaire
2	Participants' learning	Yes	Assessment centre
3	Transfer of training	Yes	Questionnaire
4	Business impact	Yes	Return on investment Cost-benefit analysis
5	Social impact	No	

Source: Molenda et al (1996, p.281).

STRATUM 1: PARTICIPANTS' REACTIONS

The focus is on the evaluation of participant reactions during the development segment of the business impact ISD model. At this stage, formative evaluation is expanded to include usability testing in addition to learner verification. In usability testing, a sample of end users actually uses the prototype while being observed by the designers, who record reactions with an eye on possible revisions (Molenda et al, 1996).

The accelerated development training programme was used as a "pilot" programme to determine the future usability of this kind of programme. An existing programme was bought by the organisation. Formative evaluation was done informally, on the basis of information on the success of the existing programme in other organisations. It can be argued that this programme was in fact a prototype and warrants the

evaluation of stratum 1 after implementation of the programme. A questionnaire was used to determine the participants' reactions. As stated, the questionnaire utilised was developed by an external consultant and was not tested for reliability and validity.

After analysis of the data, 97 percent of participants believed that they had gained by attending the accelerated development training programme. The delegates were also asked what they enjoyed most, they indicated that they enjoyed the learning methods the most (88%) and the syndicate group and time commitment the least (65%).

When asked what they least enjoyed, 83 percent stated that they enjoyed business understanding the least and the modules covering self-management and relationships (90%) the most. All of the participants (100%) said would recommend the programme to others.

It can be argued that this method of evaluation does not meet requirements of content validity as prescribed in true experimental design. However, it is important to mention that this method may be high in face validity. It can be argued that based on this, the data obtained from this evaluation may be useful as part of the overall evaluation strategy.

STRATUM 2: PARTICIPANTS' LEARNING

Various methods were utilised to evaluate the participants' learning, namely learning in terms of behavioural competencies and learning based on feedback from the coaches. For the purpose of the study, feedback from the coaches will not be taken into consideration.

Behavioural competencies were evaluated to determine if the participants had exhibited the intended behaviour and showed an improvement after completion of the accelerated development training programme. An assessment centre was used as a pre-test and posttest measuring the effectiveness of the learning based on behavioural competencies. On the strength of the empirical evidence as discussed in chapter 5. There was a statistically significant change in the overall score and the

following competencies: action orientation; problem solving and impact showed significant growth in proficiency. Although it can be argued that the change in total score may indicate an overall growth in the defined behavioural competencies, the change cannot be unambiguously attributed to the training programme. Generalisation to the population group is questionable, owing to the nonprobability sample.

A control group could not be used, because the total sample was used for the study, and this programme was used as a pilot study. Hence on the strength of the results of the effectiveness of the programme, a recommendation would be made to continue or halt the use of this type of training programme.

Owing to the design of the accelerated programme and the utilisation of the assessment centre as a pre-test and posttest focusing on changes in behavioural competencies, a trend line analysis could not be done because of the employee group of the participants. Performance management based on the behavioural competencies, are not conducted at operator and artisan level in the organisation, where research was conducted. Although this method could be utilised at other organisational levels where performance data are available, the competencies could have been measured over a period of time.

STRATUM 3: TRANSFER OF TRAINING

The criteria and methods for stratum 3 (transfer of training) to determine if trainees are actually applying their new knowledge and skills on the job are completed as part of the learner, setting and job analysis of the business impact ISD model. Some of the methods used for gathering data on actual performance include: on-site behaviour observation, interviews with supervisors, participants and check-up on action plans made during training (Molenda et al, 1996).

The evaluation of transfer of training (stratum 3) was determined on the basis of a questionnaire and structured interview with the coach of each participant and panel feedback on project completion. This evaluation was done on an informal basis and has not been included as part of this study.

As stated in chapter 4, the participants were expected to complete work-related projects in syndicate groups and present the project to a panel. (See annexure B for an example of a project, project deliverables and guidelines.) After the presentation of each project, the panel reviewed the project on the basis of:

- project deliverables
- quality of the presentation
- impression of effort, planning and research
- overall impression of team learning
- overall rating

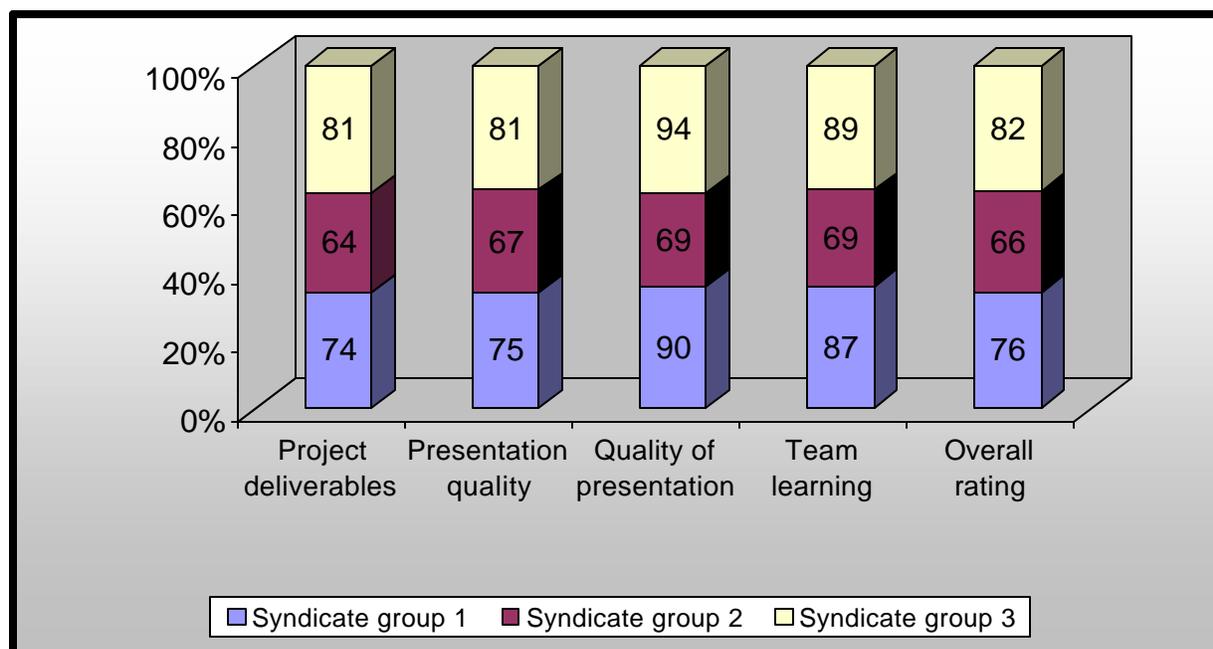


Figure C.1: *Syndicate group reviewed by the panel*

Figure C.1 depicts the percentage achieved by the three syndicate groups, based on the areas mentioned above. The percentage achieved by each syndicate group is indicated. On completion of the data analysis, it is clear that the panel believed that the team had benefited from the completion of the project and had grown in maturity and competence. It is, however clear that there was a distinct difference in the project delivery of the different syndicate groups. Herein lies the complexity of the evaluation. Did the project teams perform differently because of support from their

coaches? Did the project teams perform differently because of differences in terms of individual competence?

STRATUM 4: BUSINESS IMPACT

Stratum 4, business impact, examines the ultimate impact on the success of the organisation. In other words, does the improved employee performance make a difference to the profitability of the organisation? The criteria for evaluation in stratum 4 should be established during the needs analysis segment. Strategic alignment is the key to evaluating the process. The first question that should be answered critically is: Do the questions that evolved, the data collected and the analysis used support the organisational strategies and policies? Secondly, does the performance improvement plan that evolved from the needs analysis relate to performance problems or business opportunities that are directly aligned? (Molenda et al, 1996)

This was evaluated by calculating the return on investment of the accelerated development training programme and completing a cost-benefit analysis. This calculation was based on the cost and possible benefits owing to savings in the projects completed by the project teams. The focus of this evaluation was to ensure cost effectiveness and the use of a similar programme in the future. The design of the accelerated development training programme, focuses on change in behaviour and application of skills and knowledge as part of project work to be completed by the participants. The end result of the project work, if the projects are completed, will lead to possible savings that would be utilised to determine return on investment.

Table C.2

Cost analysis of the accelerated development training programme

DESCRIPTION	AMOUNT
Course development (time) or selection (price & fees)	
Design of framework	R 12 000,00
Learning potential assessment	R 50 000,00
Competency-based assessment	R 30 000,00

Instructional materials	
Training files and materials for ADP candidates	R 1 280,00
Equipment	
Other training material (videos)	R 651,00
Facilities	
Venue hire: ADP	R 52 556,00
Venue hire: coaches	R 36 550,00
Off-site expenses	
Travel – consultants	R 16 402,80
Consultancy fees	
Facilitation cost: ADP	R 91 630,00
Facilitation cost: ADP: coaching module	R 14 700,00
Facilitation cost: coaching workshop	R 19 500,00
Facilitation cost: support for coaches	R 34 000,00
Training: business skills	R 11 500,00

Table C.3

Cost analysis of the accelerated development training programme continued

DESCRIPTION	AMOUNT
Salary	
Participants (no of hours' instruction x average hourly rate); 4 artisans trained for 126 hours @ R58,35 p/h	R 29 408,40
Participants (no of hours instruction x average hourly rate); 10 operators trained for 126 hours @ R32,96 p/h	R 41 454,00
Total cost	R 441 632,20

Table C.4

Benefit analysis of the accelerated development training programme

DESCRIPTION	AMOUNT
Suggestions as part of the syndicate groups	
Possible savings if implementation of shift handover (per annum)	R 11 539 466,00
Possible savings if implementation of PPE (per annum)	R 1 115 352,00
Total benefits	R 12 654 818,00

The cost and benefit analysis is calculated in Table C.2 and Table C.3.

Cost to benefit ratio = programme benefits/costs

$$= 12\,654\,818,00 / 441\,632,20$$

$$= 28,65$$

Return on investment (%) = net programme benefits/programme benefits x 100

$$= 2865,46\%$$

The return on investment is normally quite high, in the range of 15 to 400 percent of the initial investment, which illustrates the significance results of successful programmes. In a recent case book, ROI values range from 150 to 2 000 percent (Phillips, 1996).

A step that is often overlooked in evaluation is the process of isolating the effects of human resource development – determining the extent to which the human resource development programme is linked to the improved results. At the very least, the evaluation report should acknowledge that other factors influenced results and should also list the factors (Phillips, 1996).

The isolation of the impact of training was not taken into consideration during the evaluation of the accelerated development training programme. The assumption was made that prior to the programme, the participants would not have been able to complete the projects and suggest possible savings. It should be noted that the participants may not have had the opportunity to be involved in similar projects in

their current positions. Thus, if afforded the opportunity, the participants may have been able to complete similar projects.

If the project work had not been included in the design of the accelerated development training programme, ROI may have been less. The fact that suggested savings and not actual savings were utilised for this calculation is also problematic. The percentage calculation may be misleading in demonstrating actual return on investment.

STRATUM 5: SOCIAL IMPACT

Social impact attempts to ascertain the impact of the organisation's changed performance on society. Social impact assessment tools are cost-benefit analysis, value analysis, organisational climate surveys and human resource accounting (Molenda et al, 1996).

The aim of the accelerated development training programme was defined as follows: to develop organisational capability through the creation of a learning culture and increased self-awareness. This will result in an increase in the organisation's available talent pool. This will enable the organisation to promote from within and improve its adherence to set employment equity targets. This programme will also enable the organisation to promote employee morale and focus on becoming an "employer of choice". This need was based not only on changing the business environment because of restructuring, but also on requests from the union representatives to promote from within.

One of the objectives of the programme was defined as follows: to improve the mobility of operators and artisans, with the end result of having more designated employees available for advancement to supervisory and specialist levels in the organisation. Although this objective was stated, it was not included as part of the measurement of the programme.

The following are social impact assessment tools that would be evidence of the accelerated development training programme achieving its objectives:

- the number of internal promotions

- cost savings due to the number of internal promotions versus external recruitment
- the utilisation of an organisational climate survey focusing on the dimension of “employer of choice”

Although it should be mentioned that four internal promotions were made from the 14 participants, the impact of the training programme was not isolated. It is clear that the criteria to be used in judging the way in which the accelerated development training programme would yield payoff were not defined in enough detail; nor were they included as part of the evaluation of the programme.

SUMMARY OF EVALUATION

The accelerated development training programme was introduced as a pilot programme. The purpose of a pilot programme is to explore, test estimates and pinpoint problem areas. A pilot programme, by its nature, is likely to encounter problems and experience design faults.

In summary, in the evaluation completed on stratum 1, 97 percent of the participants believed that the programme was beneficial. The reaction level measure is useful in providing information on how well run, the training sessions were and how much they were liked, etc. A positive attitude does not predict how well participants are able to perform trained tasks. The reaction measure is not linked to subsequent performance and such a measure should be used with caution (Mann, 1996).

The stratum 2 evaluation was conducted using a pre-test and posttest. From the evaluation as discussed in 6.1 and 6.2, it is evident that empirical evidence, shows that the accelerated development training programme was effective in developing some of the competencies and an improvement in the proficiency of all the competencies.

Evaluation on stratum 3 was conducted using questionnaires, designed by an external consultant. The reliability and validity of the response were uncertain and results were not included as part of this study.

Evaluation on stratum 4, business impact, shows a high return on investment of the accelerated development programme, in terms of the project work completed. This may be an overinflated result, owing to possible savings used for the calculation as opposed to implemented savings.

SUGGESTED IMPROVEMENTS

The following must be taken into consideration in terms of changes required to the design of the accelerated development training programme:

- The business impact ISD model must be used as a basis for the design and the evaluation of a training programme. The business impact criteria and business impact assessment tools must be defined in detail and as part of the design process.
- Include a 360 ° assessment to ensure isolation of impact of variables.