

BUILDING QUALITY INTO
FORMATIVE ASSESSMENT: USING
ACTION RESEARCH AS A TOOL FOR
IMPROVEMENT

**Building Quality into Formative Assessment: Using Action
Research as a Tool for Improvement**

by

95265474 I. Janse van Rensburg

Submitted in partial fulfilment of the requirements

for the degree

Magister Educationis

in

Assessment and Quality Assurance Education

in the

Faculty of Education

at the

UNIVERSITY OF PRETORIA

Supervisor: Dr E. Weber

Co-Supervisor: Ms H.E. Barnes

ABSTRACT

The purpose of this research study was to investigate how the quality of formative assessment in the Department of Defence Supply Support environment can be improved. Although formative assessment is applied in the Department of Defence, several limitations in the application thereof were found. The investigation was done on the Initial Supply Support learning programme at the Department of Defence School of Logistical Training Satellite in Pretoria. A small group of 19 learners (N=19) who attended the mentioned learning programme together with the assessor, who presented it, were selected as the target group.

Action research with the stages as proposed by Hodgkinson and Maree (1998) was used in this study. Using action research in this study could be characterised by a cyclical nature of planning, implementing, observing and evaluating. This cyclical nature lends it to provide information during the *evaluation* stage, which can be used in the *planning* stage of a new cycle of action research.

The five phases from Lategan and Van Rooyen (1998) as amended by the researcher, were used as a formative assessment process together with action research in order to investigate how the quality of formative assessment can be improved. Aligning the amended five phases of formative assessment with the four stages of action research resulted in; planning and designing with the *planning* stage of action research, collecting evidence with *implementation*, judging evidence and making recommendations were aligned with *observation* and providing feedback and further development with the *evaluation* stage of action research.

The concepts and principles as identified from the literature and analysed by the researcher were applied to each of the amended five formative assessment phases. The principles can be used as a set of standards, which an assessor should adhere to in order to improve formative assessment by using it as a process together with action research.

Applying formative assessment as a process, together with using action research in this study, indicated that the quality of formative assessment could be improved.

ACKNOWLEDGEMENTS

- The Good Lord for always be there, who always provided answers in times when I did not know the answers or way forward.

*“Nie met mag en krag sal jy slaag nie, maar deur my Gees,
sê die Here die Almagtige (Sag. 4:6)”.*

Many people played an important role in supporting and assisting me with their specific aptitude during the course of this study.

- The Director Logistic Resources Management for the opportunity to complete my study as well as to allow me to use the DOD School of Logistical Training Satellite in Pretoria for the research.
- The assessor and the learners who participated in this study.
- My supervisor, Dr E. Weber, who guided me in writing the dissertation.
- My co-supervisor, Ms Hayley Barnes, for her prayers, support, guidance and assistance during the last three months, from whom I learnt so much about academic writing.
- Elsie Venter for her guidance and assistance with SPSS.
- Vanessa Scherman for her guidance in the designing of the research instruments.
- My family for their prayers and support during the completion of my studies.
- My friends for listening and supporting me during a difficult period.

TABLE OF CONTENTS

ABSTRACT	I
ACKNOWLEDGEMENTS	II
TABLE OF CONTENTS	III
LIST OF ACRONYMS	VI
LIST OF TABLES	VII
LIST OF FIGURES	VIII
1 INTRODUCTION	1
1.1 OVERVIEW.....	1
1.2 BACKGROUND AND CONTEXT	3
1.3 RATIONALE OF THE INQUIRY	4
1.4 PROBLEM STATEMENT	5
1.4.1 RESEARCH QUESTION	5
1.5 RESEARCH APPROACH.....	6
1.6 SCOPE OF THIS STUDY	8
1.7 LIMITATIONS OF THIS STUDY	9
1.8 SUMMARY	9
1.9 OUTLINE AND ORGANISATION OF THIS REPORT	9
2 LITERATURE REVIEW	11
2.1 INTRODUCTION.....	11
2.2 QUALITY	12
2.3 FORMATIVE ASSESSMENT	12
2.4 QUALITY FORMATIVE ASSESSMENT	14
2.4.1 PURPOSE AND USE OF FORMATIVE ASSESSMENT.....	14
2.4.2 PHASE ONE: PLANNING AND DESIGNING OF FORMATIVE ASSESSMENT.....	17
2.4.3 PHASE TWO: COLLECTING EVIDENCE.....	25
2.4.4 PHASE THREE: JUDGING THE EVIDENCE	27
2.4.5 PHASE FOUR: RECOMMENDATIONS ON FORMATIVE ASSESSMENT.....	29
2.4.6 PHASE FIVE: FEEDBACK AND FURTHER DEVELOPMENT.....	30
2.5 ENHANCING THE QUALITY OF ASSESSMENT	32
2.6 CONCLUSION	32

3	RESEARCH DESIGN AND METHODOLOGY	35
3.1	INTRODUCTION.....	35
3.2	ACTION RESEARCH.....	35
3.3	MAKING USE OF ACTION RESEARCH IN THIS RESEARCH STUDY.....	38
3.4	RESEARCH QUESTION	41
3.4.1	<i>SUB-QUESTIONS</i>	41
3.5	APPLYING ACTION RESEARCH IN THE FIELD.....	42
3.5.1	<i>BACKGROUND INFORMATION RELATING TO THE IMPROVEMENT OF USING FORMATIVE ASSESSMENT AS A PROCESS</i>	42
3.5.2	<i>BIOGRAPHICAL RESULTS OF THE TARGET GROUP</i>	43
3.5.3	<i>APPLICATION OF ACTION RESEARCH IN THE FIELD</i>	45
3.6	SOURCES OF DATA AND ANALYSIS	49
3.6.1	<i>OBSERVATIONS</i>	50
3.6.2	<i>QUESTIONNAIRES</i>	50
3.6.3	<i>DOCUMENTATION REVIEW</i>	53
3.6.4	<i>SEMI-STRUCTURED INTERVIEWS</i>	53
3.7	VALIDITY AND RELIABILITY	54
3.7.1	<i>OBSERVATIONS</i>	55
3.7.2	<i>QUESTIONNAIRES</i>	56
3.7.3	<i>SEMI-STRUCTURED INTERVIEWS</i>	57
3.8	ETHICAL ISSUES.....	57
3.9	CONCLUSION	57
4	RESULTS AND ANALYSIS OF RESEARCH	59
4.1	INTRODUCTION.....	59
4.2	THE APPLICATION OF FORMATIVE ASSESSMENT IN THE INITIAL SUPPLY SUPPORT LEARNING PROGRAMME	59
4.3	QUALITY FORMATIVE ASSESSMENT AND THE DEVELOPING OF FORMATIVE ASSESSMENT STRATEGIES TO BE USED AS A PROCESS IN THE SUPPLY SUPPORT ENVIRONMENT.....	66
4.3.1	<i>PHASE ONE: PLANNING AND DESIGNING OF FORMATIVE ASSESSMENT</i>	66
4.3.2	<i>PHASE TWO: COLLECTING OF EVIDENCE</i>	71
4.3.3	<i>PHASE THREE: JUDGING THE EVIDENCE</i>	73
4.3.4	<i>PHASE FOUR: RECOMMENDATIONS ON FORMATIVE ASSESSMENT</i>	75
4.3.5	<i>PHASE FIVE: FEEDBACK AND FURTHER DEVELOPMENT</i>	75

4.4	CONCLUSION	78
4.4.1	<i>CHANGES THAT OCCURRED AS A RESULT OF USING ACTION RESEARCH ...</i>	78
4.4.2	<i>IMPROVEMENTS THAT OCCURRED AS A RESULT OF USING ACTION RESEARCH</i>	79
4.4.3	<i>NO CHANGES WHICH HAD OCCURRED AS A RESULT OF ACTION RESEARCH</i>	79
5	CONCLUSION	81
5.1	SHORT OUTLINE OF THE RESULTS	81
5.2	SUMMARY	82
5.3	DISCUSSION	84
5.3.1	<i>METHODOLOGICAL REFLECTION.....</i>	84
5.3.2	<i>SUBSTANTIVE REFLECTION.....</i>	85
5.3.3	<i>SCIENTIFIC REFLECTION.....</i>	86
5.4	RECOMMENDATIONS	88
5.4.1	<i>POLICY AND PRACTICE</i>	88
5.4.2	<i>FURTHER RESEARCH AND DEVELOPMENT WORK</i>	89
	REFERENCES.....	90
	APPENDIX A	93
	APPENDIX B	94
	APPENDIX C	100
	APPENDIX D	105
	APPENDIX E	107
	APPENDIX F	109
	APPENDIX G	110
	APPENDIX H.....	111

LIST OF ACRONYMS

- DOD - Department of Defence
SAQA - South African Qualifications Authority Act
OBE - Outcomes-Based Education
DoE - Department of Education
SPSS - Statistical Package for the Social Sciences

LIST OF TABLES

Table 3:1	Activities that take Place during each of the Stages of Action Research	38
Table 3:2	Activity Plan for this Research Study: Aligning Action Research with Formative Assessment to be used as a Process to Improve the Quality of Formative Assessment	39
Table 3:3	Examples of Using Codes during the Data Analysis of the Semi-Structured Interview	54
Table 3:4	Reliability of the Questionnaire, Using Tukey's Alpha	56
Table 3:5	The Alpha Value when an Item is deleted: Questionnaire	56

LIST OF FIGURES

Figure 3:1 Conceptual Framework for using Formative Assessment as a Process	40
Figure 3:2 Target Group: Age Figure 3:3 Target Group: Gender.....	43
Figure 3:4 Target Group: Nationality Groups.....	44
Figure 3:5 Target Group: School Qualification	44
Figure 3:6 Expectations of the Learning Programme Figure 3:7 Subjects Facilitated.....	45
Figure 4:1 The Learners' Opinions of the Application of Formative Assessment.....	62
Figure 4:2 The availability of National Standards and Assessment Criteria to the Learners Prior to the Application of Formative Assessment.....	63
Figure 4:3 The Learners' Opinions of the Benefits in terms of Using Formative Assessment	64
Figure 4:4 Response of Learners' Experiences in terms of Constructing a Response, Creating a Product and Demonstrating a Skill	68
Figure 4:5 The Learners' Experience of Assessment Methods and Techniques, which were used during the Application of Formative Assessment.....	69
Figure 4:6 Learners' Experiences of Receiving Feedback in terms of Effort, Capability and Completion of a Task	76

CHAPTER 1

1 INTRODUCTION

1.1 OVERVIEW

An inquiry into the quality of training was done at one service provider in the Department of Defence (DOD), namely the School of Logistical Training with its satellite in Pretoria, on one learning programme, i.e. the Initial Supply Support learning programme. This learning programme is designed to equip learners in the Supply Support environment with the skills to maximise their performance and tasks necessary for the effective functioning of supply administration within the DOD. The Supply Support environment in the DOD entails the rendering of various services such as purchasing, procurement, issuing and storage of commodities.

The South African Qualifications Authority Act, Act No. 58 of 1995 (SAQA Act) was implemented in South Africa nearly 10 years ago. Additional guidelines, (i.e. Criteria and Guidelines for Assessment of NQF Registered Unit Standards and Qualifications, 2001), legislation (i.e. Education White Paper 4, 1998a) and relevant documentation (i.e. Guidelines for Outcomes-Based Assessment in all Grades in Foundation, Intermediate and Senior Phases implementing OBE, 2002b) have also been promulgated and published accordingly. One of the primary functions of the Act is to monitor the quality of teaching and learning, both formal and informal. Any service provider should therefore ensure that his/her education and/or training are of a high quality. The DOD as service provider must therefore also adhere to legislation. Training material has been developed and implemented in accordance with these stipulations. Outcomes-Based Education (OBE) has been applied in the DOD for several years, but since implementation, the quality has not yet been evaluated.

It is the perception that although learners do achieve the learning programme outcomes in a Supply Support environment as formulated; they do not achieve these outcomes in the workplace. It was these findings that necessitated an investigation in terms of how the quality of formative assessment can be improved. The assessor could provide no evidence of the planning of formative assessment or examples of feedback regarding a learner's learning progression resulting from class visits that took place before this investigation. The assessor, who is also the instructor, is responsible for the facilitation and assessment of the Initial Supply Support learning programme. Facilitation relevant to this learning programme means to assist and guide learners in mastering the learning content.

Although the assessor does make use of formative assessment by using worksheets, oral questioning and short tests, the question is how can the quality thereof be improved in the Supply Support environment to enable learners to apply what is learnt, in the workplace? As a result, an investigation was done to determine how to improve the quality of formative assessment in the Supply Support environment.

In order to address the problem the focus of this study is to use formative assessment together with action research as a process in order to improve the quality of formative assessment. According to the literature, quality is the adherence to a set of standards (Gawe & Heyns, 2004). These standards are requirements, which an assessor must adhere to during each phase when using formative assessment as a process. To determine the quality of formative assessment, the adherence to a set of standards must be evaluated. As identified from literature several individual concepts (definition, purpose, use, strategies, methods, techniques, tools, feedback) and principles of formative assessment are addressed in this study. After analysing all the individual concepts of formative assessment, it is suggested by the researcher that they can be use together to form part of a formative assessment process. These concepts can be applied to the phases of formative assessment, as amended by the researcher, which is planning and designing, implementation, collecting and recording of evidence as well as the provisioning of feedback and further development (Lategan & Van Rooyen, 1998) (see section 1.5 and Chapter 2). Hence the suggestion that formative assessment, can be implemented as a process in order to improve quality. From a critical literature review in terms of determining a tool that can be used to operationalise the formative assessment process, action research was analysed. Action research can be identified by its stages of planning, implementing, observing and evaluating. From this judgment, it was found that action research is compatible with the phases of formative assessment and could be used together as a process for improvement. A more in-depth analysis and discussion of how the quality of applying formative assessment as a process in the Supply Support environment can be improved when using action research, will be portrayed in Chapter 2 of this research study.

This chapter provides an introduction to the study by first exploring the background to the context of and rationale for the inquiry. The problem statement is formulated from which a conceptual framework is designed to guide the research study. The research approach used in this study is explained in order to answer the primary research and sub-questions. The scope and limitations to this study are provided. Finally a layout with regards to the content of this report is provided.

1.2 BACKGROUND AND CONTEXT

The personnel of the Research and Development Section within the Directorate Logistic Resources Management, are developing several Supply Support learning programmes. The personnel of both the DOD School of Logistical Training in Cape Town and its Satellite in Pretoria present these learning programmes. Currently there are three different levels of Supply Support learning programmes that are presented, viz. Initial-, Junior- and Senior Supply Support learning programmes. The Initial Supply Support learning programme is the first learning programme offered to personnel in the Supply Support environment in the DOD. The learning programme is designed for all the Services (SA Army, SA Air Force, SA Navy and SA Medical Health Services) in the DOD.

The learners are introduced to basic concepts of Supply Support, which is important for providing a logistical service such as the receiving and sending of parcels to clients in the DOD as well as the private sector. It is therefore important that the training and assessment must be of a high quality to enable learners to render a professional client service.

The Director of the Directorate Logistic Resources Management was approached in terms of the problem of learners not applying that what was learnt in the workplace. To ensure that learners are able to apply the knowledge, skills, performance (behaviour), values and attitudes in the workplace after the completion of the Initial Supply Support learning programme, it is of utmost importance that their learning progress in terms of achieving the outcomes should be monitored for the duration of the learning programme. Monitoring a learner's progress can be done by means of applying formative assessment and providing feedback to the learner accordingly. According to legislation formative assessment should be authentic and applied in a real-life environment and furthermore adhere to several principles. As earlier mentioned, the assessor uses small tests as an assessment technique but according to legislation and the literature, this technique is not the only one to use when an OBE approach is applied. By means of this investigation the researcher will determine how formative assessment can be improved in the Initial Supply Support learning programme by using it as a process together with action research. As OBE is applied in the Supply Support environment it was decided that the quality of formative assessment would be investigated.

It is against this background that the research study originated. The investigation in terms of how the quality of formative assessment can be improved was done at this level, namely the Initial

Supply Support learning programme. Although several Initial Supply Support learning programmes are presented during a year, the investigation was done on only one programme and on one class over a period of six (6) weeks. Given the scope of this thesis, only one learning programme could be investigated. Based on the results of this study, further studies may be initiated to get an understanding of the problem under investigation.

1.3 RATIONALE OF THE INQUIRY

The aim of this research study was to investigate how the quality of formative assessment in the DOD Supply Support environment can be improved when using action research. Although Malan (1997) (as cited in Killen (1998)); McMillan (2000) and Moore (2002) state that *assessment* is a process of judging, recording and reporting of evidence, the emphasis in the literature is only on these concepts. The literature does not discuss *formative assessment* as a process. Thus, focusing on formative assessment as a process, it is the researcher's attempt to determine how to improve quality. The study will determine how the concepts (definition, purpose, use, strategies, methods, techniques, tools, feedback) and principles as identified from literature can be applied and transformed by using it in a process to improve the quality of formative assessment. Using these formative assessment concepts (definition, purpose, use, strategies, methods, techniques, tools, feedback) and principles in a process must be supportive, to determine the learner's progress towards achieving an outcome as well as to provide the learner (and the instructor) with information on how to improve the learning and its outcomes (Erasmus & van Dyk 1996; Wolfson & Lancaster, 1999; Boston, 2002; Van der Horst & McDonald, 2003; Killen, 2000; Black & William, 1998a). The suggestion of applying formative assessment as a process also complies with the OBE approach of planning, delivering and evaluating (Killen, 1998). This investigation is therefore important to determine how the quality of formative assessment can be improved by applying it as a process, together with action research to assist learners in improving their learning towards achieving an outcome. One learning programme, the Initial Supply Support learning programme, was chosen for the reasons as discussed below:

- Although more than one learning programme is presented during a calendar year, this programme was the only one active during the time of this research study.
- The instructor/assessor, who presented the learning programme, completed a foundational facilitator/assessor-learning programme and is competent in formative assessment.
- The researcher is working in the Directorate Logistic Resources Management, which is situated in Pretoria. The Initial Supply Support learning programme was presented in Pretoria

and therefore provided an ideal situation to establish a close working relationship between the researcher and the target group.

1.4 PROBLEM STATEMENT

The problem, which was the reason for the research study, was to investigate how to improve the quality of formative assessment in the Supply Support environment in the DOD. Action was needed in order to investigate how formative assessment was applied and how the quality thereof can be improved. Formative assessment can be characterised by several principles (see Chapter 2, section 2.4), which can be used as a set of standards to improve the quality of formative assessment (Spady, 1988; Killen, 2000; Airasian, 2001). According to literature (Airasian, 2001; Erasmus & van Dyk, 1996; Wolfson & Lancaster, 1999; Boston, 2002; Van der Horst & McDonald, 2003; Killen, 2003; Killen, 2000; Popham, 2002; McTighe, 1996/1997; SAQA, 2001; Black & William, 1998a) several limitations in the application of formative assessment as a process in the Initial Supply Support learning programme were identified by means of observation. An example of these limitations experienced was that no formative assessment planning was done. Due to this, the limitations accumulated as each phase in the process of formative assessment depends on one another. The application of short tests as an assessment technique is another limitation. Learners who did the learning programme did not receive feedback during their learning progress towards achieving the outcome. The researcher is of the opinion that the application of formative assessment may be due to a lack of knowledge and/or experience by the assessor. Furthermore, during class visits prior to this investigation by the researcher it was found that the assessor did not know how to improve the quality of formative assessment. The researcher is of the opinion that formative assessment is applied according to how the assessor thinks it should be done. The present practice was therefore used as the first research activity in this study and will be elaborated upon in Chapter 3. Section 1.4.1 presents the key research question, which was formulated to guide the research process as outlined in this report.

1.4.1 RESEARCH QUESTION

In section 1.4 the problem statement has been described. The following research question has therefore been formulated:

“How can action research be used to improve the quality of formative assessment in the Initial Supply Support learning programme?”

In order to operationalise the research question two sub-questions emerged:

- *How is formative assessment applied in the Initial Supply Support learning programme?* By means of this question information could be obtained to determine how formative assessment is applied in comparison with how it should be applied to be able to improve quality.
- *What are characteristics of good quality formative assessment and how can formative assessment strategies be developed to ensure quality?* Information obtained from the literature enabled the researcher to determine the characteristics of good quality formative assessment, as well as, that what is needed for developing an assessment strategy to be able to improve quality.

The aim of this research study is thus to determine how the quality of formative assessment in the Supply Support environment can be improved, when using action research. To accomplish this aim, the goal of applying formative assessment as a process together with action research was formulated. To achieve the goal and hence accomplish the aim, the following objectives have been formulated for this study:

- To identify characteristics of quality formative assessment.
- To design an assessment strategy in order to adhere to quality.
- To determine how the quality of formative assessment can be improve.

1.5 RESEARCH APPROACH

To guide the execution of this study the input, process and output conceptual framework were used. The conceptual framework (see Chapter 3) used for this study aimed at developing recommendations in order to improve and enhance the quality of formative assessment as a process. The execution of quality formative assessment is guided by the process stage of the conceptual framework. By analysing the data and reflecting on the execution of formative assessment (process stage of the conceptual framework), recommendations for improving the quality of formative assessment can be formulated. This is indicated as the output in the conceptual framework. Using these recommendations for the planning and designing of formative assessment, in order to be applied, its quality can be improved.

It was the researcher's intention to determine the current practices, strengths and weaknesses relevant to the application of formative assessment in the Initial Supply Support learning programme. A survey was done amongst the learners to determine how they are experiencing the

application of formative assessment during the learning programme. The assessor, furthermore was interviewed and observed in terms of his understanding of formative assessment before commencing this study. The researcher carried out the research during the application of action research as a non-participant.

Action research was applied to investigate how the quality of formative assessment could be improved by using it as a process (see Chapter 3) (Hodgkinson & Maree, 1998). The research study was characterised by a cyclical nature of planning, implementing, observing and evaluating. This cyclical nature lends itself to provide information during “evaluation”, which can be used in “planning” that, will improve the quality of formative assessment. Using this approach furthermore promotes the integration of formative assessment with teaching. Characteristics of good formative assessment can also be identified when using it as a process (together with action research), which can be applied in the Supply Support learning programmes. For the duration of the learning programme only three cycles of action research was applied.

It is against this background that the five phases from Lategan and Van Rooyen (1998), as amended by the researcher, are used as a formative assessment process together with action research in order to investigate how the quality of formative assessment can be improved (see Chapter 2). Using formative assessment as a process can be characterised by a cyclical nature which include, initial planning, collecting and judging the evidence as well as making recommendations and providing feedback accordingly. It was decided by the researcher to use formative assessment as a process in conjunction with action research due to the cyclical characteristic, which was evident in both. Aligning the five phases (as amended) of formative assessment with the four stages of action research resulted in: planning and designing with the *planning* stage of action research, collecting evidence with *implementation*, judging evidence and making recommendations were aligned with *observation* and providing feedback and further development with the *evaluation* stage of action research.

From the literature, concepts (see section 1.1) were identified, which could be used to address the limitations as discovered from the application of formative assessment in the Initial Supply Support learning programme. Formative assessment, together with action research, was used as a process in order to improve quality. The assessor (participant), therefore, was provided with guidelines by the researcher to plan and design (*planning stage*) quality formative assessment. The assessor implemented (*implementing stage*) the planned formative assessment strategy, i.e. assessment

methods, techniques and tools whilst the researcher observed (*observing stage*) the implementation thereof. Evaluation was done on the entire formative assessment process and recommendations were made for improvement. The recommendations were made as a result of evaluating the observed evidence against the literature being reviewed and analysed (*evaluation stage*).

To enable the researcher to address the research questions, both quantitative and qualitative data were obtained during the stages of action research done (see Chapter 4). Questionnaires were used to obtain the learners' opinions and expectations of formative assessment (quantitative data) whilst observations (semi-structured interviews and documentation review) were used to determine how formative assessment was and should be applied (qualitative data). Formative assessment applications could easily be altered due to a one-on-one working relationship between the researcher and participants established for the purpose of the research study.

The significance of this research is that formative assessment can be aligned with action research and used together in a process for improving quality. Practical recommendations are also provided in terms of each phase of the formative assessment process. A designed framework in terms of a formative assessment process, aligned with action research, emerged from this study.

1.6 SCOPE OF THIS STUDY

The investigation was done on an Initial Supply Support learning programme in the DOD School of Logistical Training Satellite in Pretoria. Although the results of this study cannot be generalised, the quality of formative assessment in the Initial Supply Support learning programme could be determined. Semi-structured interviews and observations were done in assessing the assessor, whilst he presented the learning programme to a small group of 19 learners (N=19). To eliminate the limitations as identified in the application of formative assessment prior to the study, the assessor was provided with guidelines by the researcher from which formative assessment was planned and designed. The researcher identified several strengths and weaknesses during this stage, which led to the planning and implementation of another cycle of formative assessment. Three cycles of action research were applied for the duration of this study. Applying formative assessment as a process, together with action research in order to improve quality, resulted in a framework to be used by assessors.

1.7 LIMITATIONS OF THIS STUDY

Several limitations are applicable to this study. The research to determine how formative assessment in the DOD Supply Support environment can be improved was done on only one learning programme that was presented in the DOD School of Logistical Training Satellite in Pretoria. For this reason this study cannot be generalised to the whole Supply Support environment.

Time restrictions, due to the scheduling of the programme (which is out of the control of the researcher) added a definite limitation to the study. The learning programme is scheduled for six weeks at a time, which only allow for three cycles of action research to be done. To further improve the quality of a study like this, more cycles are needed.

1.8 SUMMARY

This chapter has given an overview of the study in terms of the problem, the investigation thereof, the research question and subsequent methodology. Action research was used as a research methodology. This study aim to improve the quality of formative assessment by using it as a process, together with action research, in the Initial Supply Support learning programme. This was done by means of planning, designing and implementing quality formative assessment, collecting, recording and judging evidence, providing recommendations as well as feedback, which should adhere to several principles. The cyclical nature of action research lends itself to the improvement of practice, namely formative assessment. Identifying certain limitations then necessitates a new cycle (planning, implementing, observing and evaluating) of applying formative assessment. Due to the cyclical approach the action does not necessarily end and opportunities for improvement are provided.

1.9 OUTLINE AND ORGANISATION OF THIS REPORT

The report is divided into five chapters. The layout of this research study consists of an introduction, literature review, research design and methodology, the results and analysis of the data obtained as well as conclusions and recommendations. Linking the literature review (Chapter 2) to the problem, formative assessment together with action research will be used as a process in order to improve quality. This will include the planning and designing (*planning*) of formative assessment using authentic assessment strategies to collect (*implementing*) and record (*observe*)

evidence regarding the knowledge, performance (behaviour), values and attitudes of the learner's progress towards achieving an outcome and providing feedback (*evaluating*) accordingly.

The research design and methodology, choice and reasons for using action research will be discussed in Chapter 3. An overview of what action research is, in conjunction with the application thereof will be dealt with. The research question and sub questions will accordingly be addressed. A short description of data sources (as well as the analysis thereof) used in the research study is given. Issues such as validity, reliability and ethical considerations applicable to the research study are also included.

A summary of the results and analysis applicable to the data obtained (observations, semi-structured interviews and questionnaires) during fieldwork are outlined in Chapter 4.

Conclusions and recommendations based on the analysis of the captured data form part of Chapter 5.

CHAPTER 2

2 LITERATURE REVIEW

2.1 INTRODUCTION

As mentioned in Chapter 1, the aim of this research study is to determine how to improve the quality of formative assessment in the Initial Supply Support learning programme. The limitations of the formative assessment as it is currently being conducted in the DOD were highlighted in Chapter 1. In order to address these limitations as found in the application of formative assessment in the Supply Support environment, a critical literature review was conducted. From this review, several concepts, i.e. the definition, purpose, use, assessment strategies and principles were identified and are further elaborated on in this chapter. Although the literature does not discuss formative assessment as a process, the researcher attempts to discuss how the identified concepts and principles can be used in a process. By using this suggested process, together with action research, it is the researcher's intent to improve the quality of formative assessment in the Supply Support environment.

When the intention is to "improve", a reflection first needs to be done on that what the status of the current formative assessment is. Following this, according to the researcher, three stages can be identified, namely inputs, action and outputs, which is called a process. The process should be ongoing for ensuring improvement. Referring to this study, the identified concepts and principles were used as the inputs in the process. The designed formative assessment activity was implemented (action) and the results (outputs) and data of the action were analysed and reflected upon. In the input, action and output process, several stages could be identified, namely planning, implementing, observing and evaluating. It was these stages, which were also identified in action research, that enabled the researcher to not only operationalise this investigation but also to ensure that it is an ongoing process. Both the formative assessment process as well as action research can be characterised by their cyclical nature of planning, implementing, observing and evaluating. It is for this reason that formative assessment is used as a process and aligned with action research.

In order to explain the researcher's reasoning for structuring, this chapter first clarifies the terminology of quality (see section 2.2) and formative assessment (see section 2.3). Clarifying the concept of formative assessment relevant to a process resulted in a definition, which includes all items necessary to improve quality. It is important that an assessor should have a goal to work towards; therefore the importance of the purpose and use as concepts, which have to be used as foundation in the process of formative assessment, are emphasised. To be able to plan from the identified goal, the work of Lategan and Van Rooyen (1998) regarding the five phases of *assessment* is significant to this study. The reasons for the alignment of these phases as amended by the researcher with the stages of action research to be used as a process for improving quality are explained. Furthermore, the researcher will provide suggestions to apply concepts and principles to each of these phases with the intention of improving the quality of formative assessment by means of applying it as a process. This chapter closes with how to enhance the quality of formative assessment.

2.2 QUALITY

The concept of "quality" according to Gawe and Heyns (2004) is described as "the extent to which the degree of excellence specified" (p. 162), is achieved. Considering the relevance of "quality" to formative assessment as a process, it is the researcher's suggestion that the assessor has to include several concepts in order to achieve a set of standards. To determine what these concepts are in order to achieve the standard, the concept of "formative assessment" is analysed and will be discussed in section 2.3. A set of standards applicable to this study is the adherence to several principles, which are built into each of the phases relevant to the process of formative assessment. Adhering to these principles in each phase will enable an assessor to improve quality. This suggestion by the researcher also corresponds with the quality assurance cycle as demonstrated by Lategan (n.d.) in which standards are used to achieve quality by means of an ongoing process.

2.3 FORMATIVE ASSESSMENT

At the outset it is important that a clear definition of formative assessment applicable to this research study is made. Different definitions emphasise different aspects of importance, as illustrated in the following examples:

Erasmus and Van Dyk (1996) define formative assessment as an approach of assisting learning, and

providing feedback regarding learning processes and outcomes.

...to determine the extent to which the course content was mastered; provide feedback to students; assist students in correcting errors ... (Erasmus & Van Dyk, 1996, p. 158).

According to Wolfson and Lancaster (1999) formative assessment is the assessment of a learner's performance to determine the degree of mastering a learning programme. It provides feedback, helps learners to correct mistakes and improve their learning performance in terms of mastering the outcome.

The learner's performance is evaluated to determine the extent to which the course was mastered, provide feedback to the students and assist the students in correcting errors and improving learning performance (Wolfson & Lancaster, 1999, p. 397).

Boston (2002) defines formative assessment as an opportunity to assess how learners are learning. Information gained from the applied assessment strategy can then be used to make facilitation adjustments by means of alternative approaches/strategies, and more opportunities for practise, which can lead to learner success.

...many opportunities to assess how students are learning and then use this information to make beneficial changes in instruction. The use of assessment to provide feedback to teachers and students over the course of instruction is called formative assessment (Boston, 2002, p. 1).

Against the background of these definitions it is possible to interpret different viewpoints of formative assessment. Both Erasmus and Van Dyk (1996) and Wolfson and Lancaster (1999) placed emphasis on learning and feedback in formative assessment. Wolfson and Lancaster (1999) expanded on this by stating that the degree of a learner's competence can be measured by applying formative assessment. In Boston's (2002) definition, the implementation of different assessment strategies, which can assist a learner in achieving an outcome, is included. The other authors do not explicitly mention the application of alternative or new assessment strategies.

For the purpose of this study, it is the researcher's opinion that in order to improve formative assessment by using it as a process together with action research in the Supply Support environment in the DOD, it is necessary to formulate a comprehensive definition that makes mention of all the aspects that form part of the process, including the planning, designing, collecting, recording and feedback of formative assessment. This will ensure that all the formative assessment concepts are

included and considered during the whole process. For this study, the following definition applicable to formative assessment as a process is formulated:

“quality formative assessment is an approach of planning, designing and applying various assessment methods, techniques and tools to collect and record evidence regarding the knowledge, skills, performance (behaviour), values and attitudes of a learner’s progress towards achieving an outcome and providing feedback accordingly.”

This definition enable the researcher to determine all the necessary concepts needed in the process of improvement. From this definition the following can be identified for improving quality in the Supply Support environment in the DOD. The assessment *approach*, which an assessor has decided on, must be well planned (see section 2.4.2). It is therefore important that the purpose and use should be determined before commencing with the process of *planning and designing* formative assessment. Once this is determined, assessment activities and an assessment strategy, i.e. assessment *methods, techniques and tools* need to be planned and designed before it can be implemented. The *evidence* must be *collected* by means of opportunities provided. The evidence must be *judged, recorded* and *feedback* be given on a learner’s progress. The process is also reflected in this definition namely, to plan and design assessment (*planning*) by providing opportunities for collecting evidence (*implementing*), to be judged and evidence to be recorded (*observing*) from which feedback and recommendations (*evaluating*) are provided.

2.4 QUALITY FORMATIVE ASSESSMENT

Addressing the problem in terms of improving the quality of formative assessment in the Supply Support environment, this section will commence with the purpose and use of formative assessment. These concepts are to be used as the foundation for the formative assessment process.

2.4.1 PURPOSE AND USE OF FORMATIVE ASSESSMENT

The literature (Airasian, 2001; Van der Horst & McDonald, 2003; Killen, 2003) confirms that a designer of assessment should be familiar with the purpose or reason and use of formative assessment. There is agreement regarding the purpose of assessment between Van der Horst and McDonald (2003) and Airasian (2001), which is to obtain information (applicable to knowledge, skills, performance (behaviour), values and attitudes), to be measured in order to make sound

decisions. Identifying the reasons for using formative assessment will enable a designer to work towards a set goal. To be able to determine the reasons, the researcher aligned the proposed definition of formative assessment as a process with the purpose of formative assessment as identified from the literature. The result of this alignment is that the monitoring and feedback of a learners' progress towards achieving an outcome are not included.

As mentioned earlier it is the researcher's intention to use formative assessment as a process for improving quality, therefore a purpose relevant to formative assessment as a process was formulated, i.e. to *monitor* the learner's progress towards achieving the outcome by means of collecting and recording evidence, providing quality *feedback* and making a decision. It is the researcher's viewpoint that the monitoring and feedback aspects need to be emphasised, as they are important for improving quality.

The suggested purpose of formative assessment as a process corresponds with the statement of Brooker, Muller, Mylonas and Hansford (1998) that formative assessment can be used for monitoring a learner's competence, and for informing him/her with regards to his/her learning progress. Therefore to use formative assessment effectively, a learner's progress has to be monitored against assessment standards and criteria, in order to provide quality feedback. Keeping the purpose of formative assessment in mind the assessor will be able to use formative assessment to its full potential.

Having identified both the purpose and use of formative assessment as a process the planning of formative assessment can commence. Although Lategan and Van Rooyen (1998) suggests that the five phases (they call it stages) are to be used for an assessment system, the researcher is of the opinion that it can be successfully applied to formative assessment as a process. It is suggested that certain amendments to the phases, applicable to a formative assessment process, need to be made. These suggestions will be discussed in the section below:

- **Initial planning.** Lategan and Van Rooyen (1998) uses this phase for the planning of all the activities relevant to an assessment system, for example the distribution of information, identify individuals to be assessed, capable assessors, etc. Relevant to formative assessment as a process it is suggested by the researcher to include all the planning and designed activities. It is during this phase that a designer has to plan assessment activities and a strategy according to the purpose and use of the formative assessment process. Although planning and designing are sometimes used in the same context, it is proposed that is should

be separated when using formative assessment as a process. It is the researcher's opinion that "planning" in this context entails a decision made on using a certain assessment strategy, containing several concepts. This strategy comes into "action" when the actual techniques and tools are created, i.e. "designing". To ensure improvement, the phase of initial planning is not only relevant to planning but also to the design of formative assessment. It is suggested that this phase should be adapted to include the designing of formative assessment strategies, i.e. methods, techniques and tools (see section 1.4.2).

- Collecting evidence. The researcher agrees with Lategan and Van Rooyen (1998) that collecting assessment evidence should cover a range of competencies. It is furthermore suggested by the researcher that during this phase, assessment opportunities have to be provided in order to collect evidence of a learner's performance (see section 1.4.3).
- Judging the evidence. The collected evidence is to be judged in terms of a learner's progress in achieving an outcome and the researcher is of the opinion that it should adhere to the principles as suggested by Killen (2000) as well as Van der Horst and McDonald (2003) (see section 1.4.4).
- Recommendation of assessment. Although the researcher is in agreement with Lategan and Van Rooyen (1998) that the assessor has to determine if a learner is competent or not yet competent and if there is progression in learning, it is suggested that the recommendations should be more specific in terms of achieving the outcome (see section 1.4.5).
- Feedback and further development. Although Lategan and Van Rooyen (1998) suggested that further development of a learner and/or assessor may be identified in this phase when using an assessment system, the researcher is of the opinion that the learner has to receive feedback in terms of the learning outcome, assessment criteria, assessment process and the decision made on his/her competence (see section 1.4.6).

Using these five phases, the researcher will focus on how to apply formative assessment as a process together with action research in order to improve quality. This will be discussed in sections 2.4.2 to 2.4.6. After a critical analysis of the concepts identified from the literature, the researcher applied them to each of these phases. Aligning these phases with action research enabled the researcher to operationalise the identified concepts and use it as a process for improving formative assessment. In each phase the relevant part of the formative assessment definition, together with the action research stage are used, which serve as guideline to determine which of the identified concepts are relevant to the specific phase of the process.

2.4.2 PHASE ONE: PLANNING AND DESIGNING OF FORMATIVE ASSESSMENT

Aligning the planning and designing phase of formative assessment and the planning stage of action research forms the starting point of the process. It is the researcher's opinion that detailed planning and designing activities should be pre-requisites before formative assessment can be applied. These plans serve as a foundation for the execution of using formative assessment as a process. According to the researcher, all the activities relevant to formative assessment as a process are to be planned during phase one. From this plan, the assessment methods, tools and techniques (i.e. assessment strategy) are to be designed. Knowing what the purpose and use of formative assessment are (see section 2.4.1) enables the designer to start with the planning and designing phase of the process. The part of the definition, "... *planning, and designing various assessment methods, techniques and tools ...*" refers to this phase.

Sources that were consulted in the literature (on high quality assessment within OBE) claim that it is based on the four principles (clarity of focus, designing back, high expectations and expanded opportunity) of OBE (Spady, 1988; Killen, 2000; Killen, 2003; Vandeyar & Killen, 2003; Van der Horst & McDonald, 2003; Du Toit & du Toit, 2004). The literature on formative assessment was reviewed specifically in relation to how its principles can be applied in line with the four OBE principles. The reason for including the four OBE principles relevant to this study relates to legislation (see section 1.1). It is therefore suggested by the researcher that the four principles of OBE, *clarity of focus, designing back, high expectations and expanded opportunity* (Spady, 1988), are to be applied in the planning and designing phase when using formative assessment as a process. It is proposed that in order to follow a logical sequence, the principle of *designing back* should be the starting point in the phase, which means that learning in terms of what learners have to achieve at the end of the learning programme should be clearly defined.

DESIGNING BACK

According to Killen (2000), *designing back* entails the decisions applicable to facilitation and assessment, which are done by tracing back from the end result (learning programme outcome) (Killen, 2000). Therefore the level of achieving a specific outcome has to be an accurate indicator of a learner's progress towards achieving the learning programme outcome. Using *designing back* in this phase of the process entails that the learning programme outcome should be taken into consideration when assessment activities relevant to the specific outcome are planned. The question, however, is which concepts and principles of formative assessment, as discussed in the

literature, can be considered in the *designing back* part of using formative assessment as a process to improve the quality thereof.

According to the researcher the importance of adhering to quality in the first phase, namely planning and designing formative assessment needs to be emphasised. Credible certification, which is a result of mastering the specific outcomes at the end of the learning programme, can only be obtained by means of quality assessment. Credibility means that everything that has to be done must be reliable. According to the SAQA document, *Criteria and Guidelines for Assessing of NQF Registered Unit Standards and Qualifications* (2001), credible assessment should adhere to the principles of fairness, practicability, validity and reliability. It is the researcher's suggestion that a designer should take these principles into consideration when planning formative assessment activities, which have to relate to both the specific outcomes and the learning programme outcome.

As SAQA (2001) pointed out, assessment should be *fair* and not in any way encumber or advantage a learner. Therefore the opportunities, resources and learning approaches provided should be sufficient when formative assessment is planned. Differences in terms of ethnicity, gender, age, disability, social class and race should be taken into consideration in order to be unprejudiced. The assessment process should be clear, transparent and available to learners.

The financial resources, facilities, equipment and time should be taken into consideration when assessment is planned and designed, the end result being that of *practicability* (SAQA, 2001). This suggestion by SAQA (2001) can be supported by Brualdi's (1998) statement that time constraints, availability of resources and the amount of data, which are needed before a decision can be made on the quality of a learner's performance, must be taken into consideration. When the best method of assessment requires specialised equipment and facilities, it could be done by means of simulation or collecting evidence in the workplace.

When an assessment activity is planned it should reflect the knowledge, skills, performance (behaviour), values and attitudes of a learner (Airasian, 2001; SAQA, 2001). The researcher is of the opinion that certain additions have to be made regarding the planning of an assessment activity in order to adhere to *validity* in terms of applying OBE. An assessment activity must be planned in such a way that valid inferences can be drawn from the above-mentioned performances of learners (Killen, 2003). Thus, to ensure validity the work of Killen (2003) regarding assessment is significant to this study. The researcher wants to emphasise the fact that formative assessment

should adhere to content, construct and criterion validity.

Planning an assessment task/activity should reflect the learning content and it should measure an appropriate representative sample of the important learning content components in order to adhere to *content-related evidence validity* (Killen, 2003). *Construct-related evidence validity* involves evidence, (processes that are inherent to an individual product and process) which state that the measurement is reliable (Killen, 2003). *Criterion-related evidence validity* is the inferences made in terms of a current event to determine if it correlates with a future event (Killen, 2003).

Planning an assessment activity should also adhere to *reliability* (Killen, 2003). The assessment activity should reflect the range of knowledge, skills, performance (behaviour), values and attitudes that learners have to master. The researcher wants to suggest that planning various opportunities for learners to demonstrate their competence will improve the quality of formative assessment. This as such enhances the principle of *reliability*. The quality of the planning phase in terms of that which has to be achieved by the learner can therefore be measured against the standards, i.e. the principles of fairness, practicability, validity and reliability.

CLARITY OF FOCUS

The second step in the planning and designing phase is *clarity of focus* (Killen, 2000). It is in this step that the competencies that have to be mastered by the learners are identified. This can only be done when what has to be achieved by the learner in terms of the learning programme and specific outcome, has been determined in the previous step of *designing back*.

According to literature the reason for choosing how these competencies should be assessed must always adhere to the golden rule of choosing the best method for the purpose of assessment (Killen, 2000). (Refer to the proposed purpose of quality formative assessment as a process relevant to this study, section 2.4.1.) What learners must know, understand and can do are the knowledge, skills, performance (behaviour), values and attitudes, i.e. the competencies, which have to be assessed (McTighe, 1996/1997). These competencies are composed of the three learning domains, i.e. the cognitive (intellectual abilities), affective (attitude, self-esteem, risk-taking, values) and psychomotor domains (large and small muscle skills). In analysing the literature in terms of the clarification of competencies, several limitations were identified in the assessment of the three learning domains during the application of formative assessment in the Supply Support environment. Therefore the researcher strongly agrees with the suggestions of Popham (2002);

Killen (2000); McTighe (1996/1997) that the focus of planning and designing assessment must be on all three learning domains as it also conforms to how knowledge, practical and reflexive competencies (applied competence) should be assessed (SAQA, 2001).

After the designer has defined which competencies in the respective learning domains (cognitive, affective and psychomotor) have to be assessed, an assessment strategy must be planned and designed. The advantage of designing an assessment strategy will enable the designer to assess the applied competencies of a learner. The researcher is of the opinion that the designing of an assessment strategy should be applied to the *clarity of focus* step of phase one. This will enable an assessor to design assessment methods, techniques and tools for assessing the competencies as mentioned earlier as well as to address the question of how assessment strategies can be developed in order to ensure quality.

DESIGNING AN ASSESSMENT STRATEGY (INCLUDES AN APPROACH, METHOD, TECHNIQUE AND TOOL)

Although the assessor provided authentic assessment opportunities to the learners in the Supply Support environment, he did not apply a variety of opportunities, nor did he assess all three learning domains. Referring to the problem in terms of the limitations found in the application of formative assessment in the Supply Support environment, literature was furthermore reviewed in terms of designing an assessment strategy by using various authentic assessment approaches. To address this limitation the importance of making a decision regarding an assessment approach will be emphasised in this section. To be able to make a reliable decision on using an approach, the researcher is of the opinion that an assessment strategy can be described as an approach to measure knowledge, skills, performance (behaviour), values and attitudes (the cognitive, affective and psychomotor domains), by means of applying a variety of assessment methods, techniques and tools. A decision on using an authentic assessment approach can be made amongst, alternative-, performance-, and holistic- or observation-based assessment (Van der Horst & McDonald, 2003).

When authentic assessment is applied during formative assessment, the ability of adhering to the principles of fairness, practicability, validity and reliability are enhanced. (Refer to the first step of *designing back*, section 2.4.2.) Furthermore, by using authentic assessment approaches learners are provided with various opportunities in which they can demonstrate their competence. These approaches also make provision for the demonstration of competencies in a real-life environment. Another reason is that it is in line with what is prescribed by legislation in terms of assessing

applied competencies (SAQA, 2001). Furthermore it is suggested by the researcher that an authentic assessment strategy can be applied in its totality when using formative assessment as a process. Therefore, a learner's performance for example, can be observed (observation) when he/she is demonstrating a skill (performance-based) by making use of simulation (alternative), while several outcomes are integrated (holistic).

Authentic assessment is characterised in that the learners' performance or demonstration of competence is assessed in a real-life environment. The problems that the learners have to face are more relevant than that of a controlled situation, they learn to evaluate their own work and adapt to goals set by them for self-improvement (Boston, 2002). Authentic assessment focuses on the assessment of processes, products and performances (Van der Horst & McDonald, 2003). The researcher is of the opinion that by discussing the meaning and application of each of these assessment approaches a designer will be able to make a reliable decision.

Applying OBE implies that tests are no longer the only way of assessing a learner's competence. Alternative assessment as an approach, according to Van der Horst & McDonald (2003) is the application of assessments other than traditional tests and examinations. Various assessment methods, techniques and tools can be applied to determine a learner's level of competence by using alternative assessment such as maps, log sheets, role-plays, portfolios, etcetera.

Another authentic assessment approach to be used, as suggested by Haertel (1999), is performance-based assessment. It is seen as the demonstration or accomplishment of tasks/activities by learners, where they are required to construct a response, create a product or demonstrate a skill. According to Airasian (2001) it must be applied in a real-life environment and assessed accordingly. Using performance-based assessment can add great value to learning as pointed out by Airasian (2001) when high-level thinking and/or problem-solving skills are applied. Furthermore, measures of assessing metacognitive skills and attitudes, collaborative skills and interpersonal skills are provided when performance-based assessment is applied. Using performance-based assessment also involves learners in formulating assessment criteria against which their performance is scored (Airasian, 2001). According to Haertel (1999) performance-based assessment limits generalisation, but it measures important kinds of outcomes, which multiple-choice questionnaires for example cannot do. It is the researcher's opinion that when performance-based assessment is applied, all three learning domains can be assessed. Furthermore, this assessment approach lends itself to conform to several aspects such as learner diversity, different learning styles and abilities as well as

culture diversity. (Refer to fairness as a principle in the step of *designing back*, see section 2.4.2.)

Measuring the achievement of integrated outcomes is described by Van der Horst and McDonald (2003) as holistic assessment, another authentic assessment approach. The competence of a learner is assessed as a whole and not in a fragmentary manner in terms of tasks. By using this assessment approach, the researcher is of the opinion that special attention should be given during the planning and designing phase to ensure that the intended end result is assessed because of the assessment, which takes place as a whole.

Another way of applying authentic assessment according to Van der Horst and McDonald (2003) is to observe learners. A learner can be observed when the facilitator has determined in advance what has to be achieved. It is suggested by the researcher that scoring rubrics can be used to record the observed evidence of a learner's performance.

A further limitation of the application of formative assessment in the Supply Support environment is the designing and using of formative assessment methods, techniques and tools, i.e. assessment strategy. To address this limitation, a distinction between the concepts will be given and the researcher will emphasise the use of assessment tools. For the purpose of this study the use of scoring rubrics will be elaborated upon. According to the definition mentioned earlier, the use of "...*various assessment methods, techniques and tools* to collect and record evidence regarding *knowledge, skills, performance (behaviour), values and attitudes...*" are applicable in the step of *designing back*.

It is imperative that every designer must be *au fait* with the design principles of all the different assessment methods, techniques and tools. It is of utmost importance that assessment methods, techniques and tools must be designed in such a way that it is valid and reliable, which will enable the designer to make valid and reliable inferences on a learner's competence. Needless to say, if assessment methods, techniques and tools do not adhere to validity and reliability, formative assessment cannot adhere to quality. Although the actual designing of assessment methods, techniques and tools will not form part of this research study due to the magnitude thereof, a concise summary of the terminology is provided. This will enable the designer to obtain clarity for designing each of these concepts.

It is crucial that the designer must use an assessment method, technique and tool, which best

enables learners to demonstrate the achievement of an outcome in an authentic and realistic environment (Killen, 2004). The way of assessing the outcome of an activity is the assessment method (e.g. observation, product evaluation, questioning – written/oral) (SAQA, 2001; DoE, 1998c). When designing an assessment technique (e.g. role-play, maps, assignment, oral presentation, etcetera) opportunities by means of tasks/activities are provided for learners to demonstrate their competence (SAQA, 2001; DoE, 1998c). The assessment tool (e.g. scoring rubrics, portfolios, etcetera) is used to record the evidence provided during the assessment technique (DoE, 1998c).

It is important to remember that no guidelines in terms of the application of assessment tools based on legislation are given in assessment policies relevant to the private sector (SAQA, 2001). The researcher wants to emphasise the importance of developing a quality tool when applying formative assessment as a process. Assessment tools form a crucial part of the recording of a learner's achievement. If the design of the tool is neglected it will not record what it is supposed to measure and therefore will be invalid. Various tools, i.e. scoring rubrics, class lists, work sheets, observation sheets, etcetera can be used to record the assessment technique (opportunities provided for the demonstration of a learner's performance, results in the collection of evidence), while applying formative assessment as a process. For the purpose of this research study, as earlier mentioned, emphasis is placed on the design of scoring rubrics, because of its prominence and usefulness as an assessment tool in OBE. The scoring rubric will be planned and designed during the phase of planning and designing formative assessment, which is aligned with the first stage of the action research approach, i.e. *planning*. Using rubrics can contribute to the improvement of quality when applying formative assessment as a process.

The researcher is of the opinion that the use of rubrics (with specific pre-established performance criteria), lends itself perfectly to assessing the evidence of a learner's performance when applying authentic assessment approaches. The researcher's reasoning can be justified by the composition of a rubric, which is criteria, grades of quality for each criterion as well as scores (Goodrich, 1996/1997). The criteria and performance levels are applicable to the knowledge, performance (behaviour), values and attitudes, which have to be mastered by a learner. (Also refer to step two, *clarity of focus*, earlier in this section.) The criteria are furthermore indicated as dimensions of performance, which must be demonstrated by a learner. The quality of each criterion is to be explained as performance levels of demonstration and scores are allocated to each of these levels. According to Tierney and Simon (2004) consistency is accomplished when both the criteria and the

performance level are clearly explained. To be able to incorporate competencies, a designer should be familiar with the type and use of the different scoring rubrics.

Referring to the research problem, as well as the question of how an assessment strategy can be developed, it is the researcher's suggestion that a holistic rubric can be used when applying the holistic assessment approach. When it is expected from the learner to create a response and where there is only one definite correct answer, a holistic rubric is used. This suggestion can be justified in terms of how Mertler (2001) describes a holistic rubric,

To score the overall process or product as a whole, without judging the components parts separately (p. 1).

This rubric will be used when the overall product or process is being assessed as an entity (holistic approach), without judging the component parts separately. When designing a holistic rubric, a thorough narrative description for excellent work on each attribute needs to be done.

The researcher is of the opinion that the most appropriate scoring rubric to use in formative assessment is the analytic rubric. The reason for this is that an analytic rubric makes provision for assessing the process/product, parts/components of the outcome separately (Mertler, 2001). Furthermore it is also due to this characteristic of "separation" that the researcher suggests that an analytic rubric must be used when applying the performance-based assessment approach (see section 2.4.2). As mentioned in section 2.4.1 of this chapter the purpose of formative assessment as process is to monitor a learner's progress. The learner's progress towards achieving an outcome can therefore be easily monitored by means of using an analytic rubric because it assesses the parts or components of a process or product. Monitoring a learner's progress can be done by determining the strengths and weaknesses towards achieving an outcome when it is measured against performance criteria. Using scoring rubrics will also improve the reliability and validity of conclusions drawn from the performances of learners.

HIGH EXPECTATIONS

The third step in the planning and designing phase of formative assessment as a process is the OBE principle of *high expectations* (Killen, 2000). According to Killen (2000), learning is reinforced and confidence is built to accept further learning challenges. It is therefore the researcher's point of view that challenging authentic and realistic assessment tasks/activities will stimulate a deep *understanding* of that what learners must *know* and *can do* and it encourages them for further

learning experiences. The quality of formative assessment will automatically be enhanced when these types of assessment tasks/activities are designed. This suggestion is strengthened by the earlier suggestion of assessing the three learning domains during the application of formative assessment as a process. Evidence will be generated from which valid and reliable inferences can be drawn (Killen, 2000). To achieve this, questions asked must be thought-provoking and reflective, not ones that request simple factual information (Boston, 2002). It is the researcher's viewpoint that self-assessment activities should be planned and designed in accordance with challenging tasks/activities to enable learners to monitor their own progress. Applying self-assessment will encourage learners to become life-long learners due to the fact that they are able to monitor their progress towards achieving an outcome.

EXPANDED OPPORTUNITIES

The fourth step relevant to the planning and designing phase, namely *expanded opportunity* (also the fourth OBE principle), means that further opportunities will have to be planned in order for learners to learn and demonstrate their learning. Learners who do not master the outcome the first time, must be provided with another opportunity to learn and demonstrate their learning (Killen, 2000). This statement of Killen (2000) is significant to the definition of formative assessment as a process in terms of using various methods, techniques and tools. When applied to formative assessment as a process, it means that alternative assessment methods, techniques and tools must be planned and designed for those learners who did not achieve the outcome the first time.

When a clear idea is formulated of the competencies relevant to that what learners have to master and appropriate assessment strategies (includes methods, techniques and tools) are planned and designed, the assessor will be able to draw valid and reliable inferences from the evidence provided. As such, this can contribute to the improvement of quality.

2.4.3 PHASE TWO: COLLECTING EVIDENCE

Aligning phase two with the implementation stage of action research when using formative assessment as a process will enable an assessor to collect assessment evidence. It is during this phase that the formative assessment strategy with its methods, techniques and tools planned and designed in phase one, are to be implemented. Part of the definition, “...*collect ... evidence regarding knowledge, skills, performance (behaviour), values and attitudes of the learner's progress...*” has reference to this phase.

Referring to the limitations in terms of the application of formative assessment in the Supply Support environment and therefore the reason for this study, the concept of evidence together with principles are identified from the literature and need to be included in this phase in order to achieve quality. Furthermore, by applying this phase will provide evidence, which in turn will address the research question in terms of the application of formative assessment.

Referring to SAQA (2001) the specific outcome(s), assessment criteria and range will determine the amount and kind of evidence needed to be collected from the learner. Using formative assessment as a process means that evidence has to be collected according to the assessment criteria. It is the assessor's responsibility to collect enough evidence in order to make an accurate judgment on a learner's performance (SAQA, 2001). It is the researcher's suggestion that the quality of assessment evidence should be verified in terms of adhering to the principles before a decision can be made. Adherence to the principles of validity, authenticity, sufficiency and currency will improve quality (SAQA, 2001).

The results of the planning and designing phase will have an influence on this phase. The researcher is of the opinion that if the planning and designing phase complied with the suggested concepts and principles, the evidence obtained from the assessment method, technique and tool would support the achievement of quality in the phase of collecting evidence. The evidence collected must be appropriate so that *valid* inferences can be drawn (SAQA, 2001). When the evidence provided reflects the expectations of the specific and learning programme outcome it will enable the assessor to draw valid inferences. The assessment activity should be planned in such a way that the evidence is *authentic* to a learner (SAQA, 2001). It is the researcher's suggestion that when conclusions are drawn relevant to the competencies of a learner it should be focused on an individual. A learner cannot be judged for his/her competence if the group completed a task/activity as was evident in the Supply Support environment. Evidence is only authentic when it can be attributed to a learner, in other words, it is the learner's own work. To be able to meet the criteria and range statements it is necessary that *sufficient* evidence must be collected (SAQA, 2001). According to the researcher, using a variety of assessment methods, techniques and tools can ensure that sufficient evidence is collected. In order to collect evidence for determining a learner's progression in terms of achieving an outcome it should be *current*. Three types of collecting evidence relevant to assessment are direct evidence (directly observed), indirect evidence (team output) and historical evidence (capabilities of the learner in the past) (SAQA, 2001).

According to SAQA (2001) direct evidence is the most valid type of evidence. The researcher is of the opinion that the two types of evidence to be collected when using formative assessment as a process are direct and indirect evidence. This opinion can be substantiated because collecting assessment evidence in a real-life environment/setting ensures authenticity. When occupied with the real life, the learner applies knowledge, skills, performance (behaviour), values and attitudes, which are the foundation for meaningful application. Knowledge can be created due to the fact that practice is investigated (McTighe, 1996/1997). Direct evidence relevant to formative assessment can be collected by means of direct observation of tasks/activities, questioning, i.e. oral, written, product and output evaluation.

Making use of collecting indirect evidence, verifies the authenticity of evidence collected by means of the above-mentioned. Indirect evidence can be collected by means of team output, training records and work completed at an earlier stage (SAQA, 2001). The researcher is of the opinion that when an assessor gathers evidence by making use of these types of evidence a decision on the learner's competence supports the process in achieving quality. Due to the participation of learners in the formative assessment process, the researcher furthermore suggests that learners must understand the main purpose of learning and they must know what is expected from them in order to achieve the outcome. For the learners to know and understand what they will be assessed on, it is imperative that the contents of, for example the rubric, must be known to them. Therefore, dialogue between the learner and assessor is important when collecting formative assessment evidence. This communication between the assessor and learner should be thoughtful, reflective and focused.

The researcher is of the opinion that conforming to the suggestions and principles of collecting evidence relevant to a learner's performance will improve the quality of formative assessment by using it as a process. The assessment evidence collected (product, process and/or performance) must now be judged by the assessor to be able to provide recommendations.

2.4.4 PHASE THREE: JUDGING THE EVIDENCE

The third phase in the formative assessment process is to judge the collected evidence. Part of the formative assessment process definition, "... *record evidence* ...", has reference to this phase. This phase together with the phase of making recommendations (phase four) are aligned with the third stage of action research, i.e. observation. The assessment evidence as collected during phase two is

observed by means of the third stage of action research to be able to judge the learner's performance.

The researcher wants to refer to the principles as proposed by Killen (2000) as well as Van der Horst and McDonald (2003), which are relevant to quality formative assessment. It is the researcher's opinion that an assessor has a responsibility towards learners in terms of making judgments applicable to the evidence collected. Judgments must be based on the applied competencies, which were identified during the phase of planning and designing and judged against assessment criteria. The judgment of the collected evidence should be trustworthy. Therefore it is the researcher's suggestion that trustworthiness be obtained by means of the adherence to the principles of quality formative assessment as proposed by Killen (2000) as well as Van der Horst and McDonald (2003).

The principles of efficiency, objectivity, reliability, validity, fairness, reflection and individuality are relevant to this study and specifically to the phase of judging evidence (Van der Horst & McDonald, 2003; Killen, 2000). Furthermore, adhering to these principles will ensure quality judgments because of fair inferences, which can be drawn from assessment results.

Each of these principles will be discussed in terms of how to use them in the formative assessment process. *Efficient* judgments can only be made when the planning and designing phase has been thoroughly executed and quality assessment methods, techniques and tools are designed, which are the best way of assessing the intended end result (Van der Horst & McDonald, 2003). The researcher agrees with s Van der Horst & McDonald (2003), that when scoring rubrics of good quality are used, the *subjectivity* may be eliminated when making judgments and therefore the trustworthiness is enhanced. It is during this phase that the assessment tool (example, scoring rubric) is applied to record the evidence collected whilst using the assessment technique (example, role-play, practical, presentations, assignment, etcetera). *Reliable* judgments only occur if the results reflect the full range of knowledge, skills, performance (behaviour), values and attitudes (Killen, 2000). Judgments can only be *valid* if it measures the desired outcome and judgments are then made on all the important content aspects (Killen, 2000). When the learner receives an opportunity to successfully complete the assessment, the judgments made will be *fair* (Killen, 2000). The evidence collected must *reflect* what the designer states as the desired specific outcome and end result of the learning programme in terms of the important knowledge and skills, which the learner has to master (Killen, 2000). As mentioned, self-assessment is a very important concept of

formative assessment, which necessitates a reflection on learning strategies and the judging of the learner's work by him/herself. The assessor should allow for *individuality* when assessment evidence is judged (Killen, 2000).

From the above-mentioned phase the researcher wants to emphasise the importance of the planning and designing phase. If effective planning and designing has been done it will enable an assessor to make quality judgments and therefore improve the quality of using formative assessment as a process. Capturing specific and focused observations applicable to a learner's progress enables an assessor to make recommendations for providing feedback.

2.4.5 PHASE FOUR: RECOMMENDATIONS ON FORMATIVE ASSESSMENT

The next phase in the formative assessment process (phase four) is to make recommendations on a learner's performance, based on the judgments done in phase three. This phase is aligned with the third stage of action research, i.e. observation. Part of the definition, "... *the learner's progress towards achieving an outcome...*" has reference to this phase.

To monitor the progress of learning the assessor has certain responsibilities towards the learner in terms of providing recommendations. These recommendations must be based on the evidence of a learner's performance, which is assessed against assessment criteria. Not only must gaps be identified, but recommendations for improvement must also be made. Accentuating the positive aspects in terms of a task/activity, suggesting ways whereby the learner can improve his/her skills and expand his/her understanding must also be indicated, i.e. strengths and weaknesses. Adhering to this the learner will exactly know his/her level of competence. A summary of the judgments and the quality in terms of the task, effort and capability must be provided.

Referring to the definitions of formative assessment as a process and its purpose relevant to this study (to improve the quality of formative assessment) a learner's progress has to be monitored in achieving the outcome. The researcher wants to refer to the literature in which McTighe (1996/1997), states that ownership of learning is established when the progress of learning is documented by means of using, for example a portfolio. From this, it is the researcher's point of view that a portfolio reflects a learner's efforts, progress and achievements towards achieving an outcome as well as establishing ownership towards learning.

The researcher is of the opinion that using formative assessment as a process for monitoring the learner's progress can lead to quality. This statement of monitoring a learner's progress by the researcher corresponds with an earlier suggestion of using formative assessment as a process as well as the alignment with action research (i.e. implementation, observation, evaluation, planning). Using it as such ensures a deeper understanding or high level of proficiency, which is obtained by means of trial, practice, correction, recommendations and the provisioning of opportunities for more practice.

These recommendations are to be made available to the learner when the assessor is providing feedback, which is the last phase in order to improve the quality of formative assessment as a process. Feedback is very important in the assessment process because it will improve learning and provide guidance to the learner in terms of his/her learning progress.

2.4.6 PHASE FIVE: FEEDBACK AND FURTHER DEVELOPMENT

The last phase of using formative assessment as a process, is to provide feedback, which can be used for further development (both the assessor and learner). The definition, "*...providing feedback accordingly*" has reference to this phase. Aligning feedback with the evaluation stage of action research implies that the assessor has to evaluate the learner's learning progress in terms of achieving the outcome. Feedback, in terms of the recommendations applicable to a learner's performance, is necessary before a declaration of quality formative assessment as a process can be made. Addressing the question of how feedback can be used to improve the quality of formative assessment, it is suggested by the researcher that it must be done according to a feedback strategy. Furthermore, reflection must be done on the complete process of applying formative assessment including planning, implementing, observing and evaluation.

STRATEGIES FOR QUALITY FEEDBACK APPLICABLE TO FORMATIVE ASSESSMENT

Assessment evidence, which is gathered during phase two when applying formative assessment, must be *used*. Using this information, which was judged in order to make recommendations, could be described as feedback. It is the researcher's suggestion that feedback, which has to adhere to quality, can be provided to a learner by means of using a feedback strategy. The researcher is of the opinion that a feedback strategy is a way of providing information to the learner in terms of his/her competence. Referring to the definition of formative assessment as a process relevant to this study, feedback should be given by including all the aspects used to formulate the definition. Therefore

quality feedback must be provided, relevant to the *learning outcome*, *assessment criteria*, *assessment process* and the *decision*. This proposal of the researcher is supported by two experimental research studies reported by Boston (2002).

...shown that students who understand the learning objectives and assessment criteria and have opportunities to reflect on their work show greater improvement than those who do not (Boston, 2002, p. 2).

Very important is that learners have to see feedback as a verification of their achievements and therefore feedback must not be personal because it can have a negative influence on a learner's attitude and performance. Using the feedback strategy as mentioned in the above-mentioned paragraph, the learner must receive feedback relevant to the *learning outcome*. The recommendations have to be specific in terms of the learner's mastering of the outcome and the learner must be informed accordingly. Feedback applicable to *assessment criteria* entails a description of a learner's competence (knowledge, skills, performance (behaviour), values and attitudes) in achieving the outcome. The feedback must focus on these competencies in terms of the learner's performance. During the formative *assessment process*, evidence of the learning progress towards achieving the outcome is collected. Feedback in terms of the formative assessment process will include monitoring information regarding the learner's strengths and weaknesses towards achieving the outcome. The feedback must be descriptive so as to include detail of why answers are correct or incorrect and provision must be made for constructiveness, reinforcement, corrections and remediation. Providing descriptive feedback will increase learning performance as stated on <http://www.aac.ab.ca/aboutqa.html>. Feedback must be given as to how and what a learner understands and misunderstood as well as what he/she must do to improve. In order to improve the quality of its application, the assessor must also use information obtained during the formative assessment process. *Decisions* relevant to a learner's competence entail the achievement or non-achievement of an outcome and the learner must be informed of this decision.

Applying feedback must be done according to the above-mentioned strategy and will therefore support the improvement of quality formative assessment as a process. This suggestion by the researcher can be strengthened by the fact that feedback is the point in the formative assessment process that ties everything together. Addressing all the aspects of the definition when providing feedback may establish a need for further development in terms of improvement from which the process of planning and designing starts again.

2.5 ENHANCING THE QUALITY OF ASSESSMENT

When the requirements and principles for using formative assessment as a process, which include planning and designing, collecting evidence, judging the evidence, providing recommendations and feedback and further development are adhered to, the quality of formative assessment can be improved. As already discussed, these phases of the process can also be aligned with the stages of action research namely planning, implementing, observing and evaluation. It is therefore proposed that applying the process of formative assessment within action research will improve the existing quality of the formative assessment in the Supply Support environment of the DOD. When the quality of formative assessment is improved it is necessary to enhance the application thereof. Aligning action research, (planning, implementing, observing and evaluating) enables a designer to constantly reflect by means of observation on what was planned and implemented in order to make amendments for the implementation of another cycle. How that was done in this study is documented in this report (see Chapter 3 and 4).

2.6 CONCLUSION

Prior to this study, learners were found competent in the Initial Supply Support learning programme by means of applying formative assessment, but they were not capable of applying that what they have learnt in the workplace. The aim of this research study was therefore to improve the quality of formative assessment so that a better alignment is attained between the competency levels as demonstrated in the formative assessment and the actual capabilities of learners/students to later display these skills in the workplace. An assessor and learners of the Initial Supply Support learning programme were the target group for the investigation of this study. According to the limitations as found in the application of applying formative assessment, literature was reviewed and analysed.

From the literature several concepts relevant to formative assessment were identified, for example the definition, purpose, use, assessment strategies (i.e. methods, techniques, tools), feedback and principles of formative assessment. To address the problems, these concepts were used in a process by the researcher to improve the quality of formative assessment. Identifying the cyclical characteristic in formative assessment as a process enabled the researcher to align it with action research. After analysing the identified definitions and purpose of formative assessment in literature, it was suggested that amendments must be made for the purpose of applying it to a

process. It became clear that all relevant aspects have to be incorporated when formative assessment is applied as a process. Following a critical review of the suggested definition and purpose of formative assessment to be applied in a process, several characteristics that are important for adhering to quality were identified.

The concepts as identified from the literature relating to the study, were analysed and applied to the five phases of Lategan and Van Rooyen (1998) as amended by the researcher. Each of these phases was aligned with action research to enable the researcher to use formative assessment as a process in order to improve the quality of formative assessment. This alignment resulted in a process of planning and designing (*planning*), collecting evidence (*implementing*), judging evidence, making recommendations (*observing*), providing feedback and further development (*evaluating*). In using formative assessment as a process by aligning the five phases with action research, the following need to be emphasised:

- The assessor must identify the purpose and use of formative assessment in order to use it as the foundation for applying formative assessment as a process.
- The suggested definition of using formative assessment as a process needs to be used. This will enable the designer to ensure that the relevant aspects are included when the planning of formative assessment commences.

The planning and designing phase is very important because the other phases in the process are dependant on this phase. It is suggested by the researcher that the four principles of OBE (Spady, 1988; Killen, 2000; Killen, 2003; Vandeyar & Killen, 2003; Van der Horst & McDonald, 2003; Du Toit & du Toit, 2004) should be used in the planning and designing phase. Several principles (standards relevant to this study) were identified from the literature and are applied to the steps in phase one, which must be adhered to in order to improve the quality of formative assessment. It is furthermore proposed by the researcher that authentic assessment approaches, including the three learning domains to be assessed, should be designed to improve the quality of formative assessment. It is furthermore suggested by the researcher that using an analytic scoring rubric during the application of formative assessment, conforms to the purpose of formative assessment as a process namely monitoring a learner's learning progression.

During phase two, the evidence collected must be authentic and relevant to the specific and learning programme outcome. In order to verify the quality of assessment evidence it must adhere to the

principles of validity, authenticity, sufficiency and currency (SAQA, 2001) (i.e. the standards relevant to this phase).

The judgments, which are made during phase three, must be based on the applied competencies. It is suggested by the researcher that the judgments that are made against assessment criteria should be trustworthy. To be able to achieve trustworthy judgments, the principles (i.e. the standards relevant to this phase), (efficiency, objectivity, reliability, validity, fairness, reflection and individuality) as suggested by Van der Horst and McDonald (2003) as well as Killen (2000) must be adhered to. The recommendations to be compiled during phase four, should be made in terms of a learner's progress towards achieving an outcome, i.e. monitoring learning progression.

During phase five it is suggested by the researcher that a feedback strategy has to be used, which should include the recommendations of phase four. These recommendations should be provided in accordance with the learning outcome, assessment criteria, assessment process and decisions. Quality formative assessment can assist the learner to learn more when quality feedback is given according to the information provided by the assessment evidence. Therefore it is of utmost importance that quality formative assessment must be developed, designed and executed.

Using action research as an approach for applying quality formative assessment lends itself to improving and enhancing quality. To enhance the improvement of the quality of formative assessment it is therefore proposed that formative assessment must be used as a process together with action research. How that was done in this study and the results thereof are further explained and discussed in the chapters that follow.

CHAPTER 3

3 RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

As mentioned in the first chapter, the research done in this study is to determine how the quality of formative assessment can be improved by using it as a process together with action research. Action research is characterised by a cyclical nature with the intention of improving practice. The four stages identified in action research as planning, implementing, observing and evaluating are a continuous process and do not necessarily end. This characteristic was also identified in using formative assessment as a process. Aligning formative assessment and action research enabled the researcher to apply formative assessment as a process. Literature pertaining to formative assessment was critically reviewed before a conceptual framework that served as the driving force for the investigation, could be designed. This process was guided by the primary research question as presented in Chapter 1 as well as section 3.4 of this chapter.

This chapter details the research design and methodology that guided the study. This study was conducted through the use of action research. A more in-depth discussion of action research to be used will be elaborated upon in section 3.2. Section 3.3 presents the reason for and how action research was used in this study following an application of a mixed methodology. In section 3.4 the research question, together with the sub-questions, as well as the research methods used to answer the questions, are presented. The application of action research in the field is portrayed in section 3.5. The sources of data and their analysis are described in section 3.6, followed by validity and reliability aspects relevant to data measurements in section 3.7. In section 3.8 the ethical considerations that were taken into account relevant to this study is explained.

3.2 ACTION RESEARCH

Action research lends itself to learn from one's own and each other's work and to improve and change situations and conditions (Zuber-Skerritt, 1992). It also deals with practical issues in the real world and therefore it aims to improve practice. It starts with a vague question, which will gradually clarify (Engelbrecht, du Preez, Rheeder & van Wyk, 2001). The findings of action

research are fed back directly into practice, therefore aiming to bring about change. The nature of this research study, namely to improve, therefore implies that an action research approach will be appropriate.

The development of action research is accredited to Kurt Lewin (1948), (Hodgkinson & Maree, 1998). He described it as a spiral process consisting of four steps, namely planning, action, evaluation and again action. This original concept of action research has been subsequently developed through the years by various researchers. Action research is differently defined and interpreted in various ways by researchers. Different definitions emphasise different aspects of importance as illustrated in the following examples:

Carr and Kemmis (1986) define action research as a self-reflection undertaken by the stakeholders in order to improve their own practices, the understanding of these practices and the situations in which the practices are carried out. Cohen and Manion (1994) define action research as a small-scale intervention in the functioning of the real world and an evaluation of the effects of such an intervention. According to Hodgkinson (1957), when using action research, a factor cannot be studied on its own, removed from the environment and then attempted to give it meaning. Zuber-Skerritt (1992) defines action research as collaborative and a critical enquiry by the respondents themselves into their own practice/environment applicable to their own problems. Furthermore Zuber-Skerritt (1992) defines action learning as “learning from concrete experience and critical reflection on that experience, through group discussion, trial and error, discovery and learning from one another”.

From these definitions Hodgkinson and Maree (1998) compiled the following common characteristics of action research based on the views of prominent researchers in the field namely, situational (identifying a problem in a specific context and attempting to solve it in the context), collaborative (usually it involves more than one person), participatory (the researcher is actively involved in doing research with co-workers concerned with practical problems and its actual improvement), self-evaluative (evaluate the situation continuously to improve practice), practical and theoretical (a combination of these two aspects, improving practice by getting a deeper knowledge and understanding of the situation), interpretative (a solution is based on views and interpretation of people involved), critical (respondents act as critical and self-critical change agents) and continuous (its an ongoing process, respondents continue to review, evaluate and improve practice).

Several principles underpin action research for example a free flow of communication that must be present between respondents whilst the communication is extensive, open, not restricted, collegial, informal and collaborative (Cohen, Manion & Morrison, 2000). The researcher is of the opinion that when action research is being executed according to these principles it can be characterised by the above-mentioned characteristics.

The cyclical nature of data collection and analysis are two of the characteristics of action research that will be elaborated upon. This cyclical nature guides the process of action research. Four basic steps can be identified in an action research approach namely, identification of a problem, collection of data, analysis of data and the actions taken in order to solve the problem. The research is carried out by the researcher him/herself when conducting action research (Gay & Airasian, 2003). This cyclical nature refers to an understanding of the world by changing a specific part of reality and learning from the consequences of such change and how to improve the situation.

The idea of a spiral seems to be the common process when the action research process is illustrated as a model. Such a model is used by Zuber-Skerritt (1992) and is described as a spiral of cycles of action research. Zuber-Skerritt's four-moment spiral action research model includes four steps namely, planning, acting, observing and reflecting. The spiral action does not necessarily end. The first step of the model is planning, which entails the analysis of the problem and the formulation of a strategic plan. The strategic plan is implemented during the second step of action research, which is acting. The third step is that of observation, which necessitates the evaluation of action by means using appropriate methods and techniques. The fourth and last step is a reflection on the results of the evaluation and the entire action research process (Zuber-Skerritt, 1992). A new problem is then identified and a new cycle of planning, implementing, observing and evaluating will start (Hodgkinson & Maree, 1998).

Hodgkinson and Maree (1998) suggest that several activities need to be executed during the four, as they describe it, stages. The activities contained in each of these steps are illustrated in the table below:

Table 3:1 Activities that take Place during each of the Stages of Action Research

Stage	Activities
Planning	Identify general idea or vision. Formulate problem in context. State questions to be addressed. Review literature. Modify or refine questions/problem. Define strategy. Prioritise activities. List tasks.
Implementation	Identify performance criteria. Implement intervention.
Observation	Gather evidence. Classify & analyse data. Monitor effects. Note problems.
Evaluation	Review outcomes. Judge effectiveness. Establish cost-benefit. Provide recommendations. Revise plan.

3.3 MAKING USE OF ACTION RESEARCH IN THIS RESEARCH STUDY

One of the strongest motivations for using action research in this research study of using formative assessment as a process was that it is considered a useful framework to plan, design, implement, observe and evaluate formative assessment because it is a systematic inquiry that is done to understand and improve practice. Initial information is reconsidered and sharpened again and again in a process that continues until there is an agreement, or until additional cycles fail to generate significant new information. Action research provides respondents with the opportunity to work participatively and collaboratively with colleagues and other stakeholders.

Improving the quality of formative assessment by using it as a process is characterised by a cyclical nature of planning, implementing, observing and evaluating. Formative assessment can be used as a process by aligning it with action research. Applying action research as a method lends itself to

improving the quality of formative assessment, which makes it the most appropriate approach for this research study.

The same stages as proposed by Hodgkinson and Maree (1998) applicable to action research will be used namely planning, implementation, observation and evaluation. The activity plan reflecting the intended activities relevant to this research study, is illustrated in Table 3.2.

Table 3:2 Activity Plan for this Research Study: Aligning Action Research with Formative Assessment to be used as a Process to Improve the Quality of Formative Assessment

Stage	Activities	Research Study
Planning	Identify general idea or vision. Formulate problem in context. State questions to be addressed. Review literature. Modify or refine questions/problem. Define strategy. Prioritise activities. List tasks.	Initial planning and designing of formative assessment: <ul style="list-style-type: none"> Principles of Outcomes-Based Education. Authentic assessment strategies. Assessment methods, techniques and tools. Quality scoring rubrics.
Implementation	Identify performance criteria. Implement intervention.	Collecting Evidence: <ul style="list-style-type: none"> Specific outcome. Assessment criteria and range. Principles.
Observation	Gather evidence. Classify & analyse data. Monitor effects. Note problems.	Recommendations relevant to judgement of evidence: <ul style="list-style-type: none"> Principles. Learner performance. Summary of judgment. Self assessment.
Evaluation	Review outcomes. Judge effectiveness. Establish cost-benefit. Make recommendation. Revise plan.	Feedback: <ul style="list-style-type: none"> Strategy. Learning outcome, assessment criteria, assessment process and decisions. Enhancement.

A conceptual framework (see Figure 3.1) was designed for application in order to improve the quality of using formative assessment as a process as a result of literature that was reviewed. This

could only be done by including all the aspects necessary to improve quality during the planning, designing, implementation and evaluation of formative assessment. An illustration of the conceptual framework, which consists of inputs, process and outputs are portrayed in Figure 3.1.

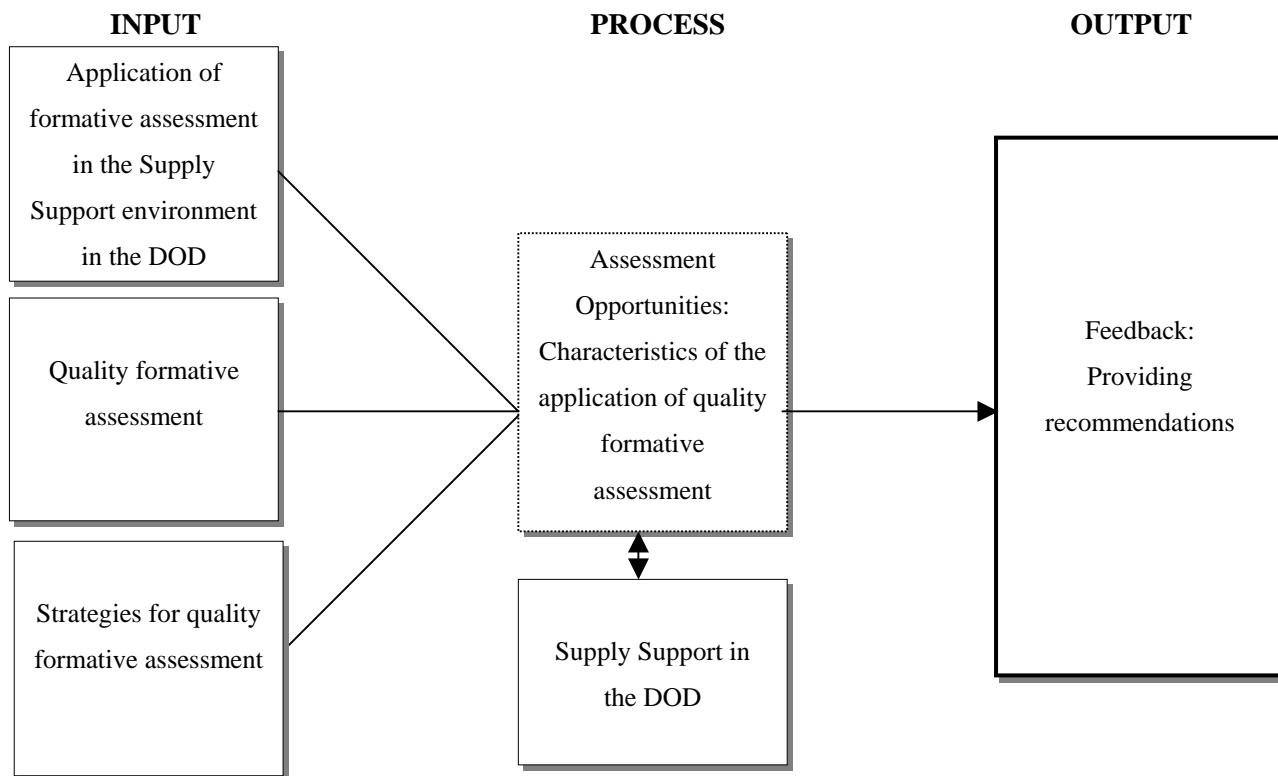


Figure 3:1 Conceptual Framework for using Formative Assessment as a Process

The identified inputs relevant to formative assessment are the planning and designing of assessment methods, techniques and tools i.e. assessment strategies as well as feedback strategies. The collection and recording of assessment evidence by providing assessment opportunities can be described as the process. The output is the recommendations that are provided by means of feedback in terms of a learner’s progress towards achieving an outcome. (See Appendix A: Using Formative Assessment as a Process together with Action Research).

The fact that learners completed the Initial Supply Support learning programme, but could not achieve the outcomes in the workplace, necessitated an investigation. Class observations (visits) before this study indicated several limitations in the application of formative assessment in the Supply Support environment. Addressing the mentioned problem resulted in this research study. From the literature reviewed, guidelines in terms of planning and designing formative assessment,

assessment strategies and feedback were given to the assessor by the researcher. The assessor *planned* and designed formative assessment to be *implemented*. The assessor furthermore *observed* the learners' progress in terms of achieving the specific outcome, while the researcher observed the implementation of formative assessment according to the principles identified through the literature review. The assessor evaluated the learners' achievements and furthermore provided feedback on the recommendations that he compiled. The researcher evaluated the evidence and compiled recommendations for feedback to the assessor in terms of the quality of the application of formative assessment. Identifying certain limitations necessitated a new cycle of planning, implementing, observing and evaluating.

Using action research provided the opportunity to critically evaluate the application of formative assessment as a process. Based on these results other assessment tasks/activities could be planned and designed for implementation by the assessor. Formative assessment could then be observed and evaluated by the researcher in order to be able to decide on its quality. Due to the cyclical approach, the action does not necessarily end. This characteristic lends itself to every aspect of this research study, i.e. to improve the quality of using formative assessment as a process.

3.4 RESEARCH QUESTION

A research question together with two sub-questions were generated and used for the systematic inquiry to understand and improve the application of formative assessment in the Supply Support environment. The following research question is the focus point in addressing the problem as experienced.

“How can action research be used to improve the quality of formative assessment in the Initial Supply Support learning programme?”

3.4.1 SUB-QUESTIONS

To be able to answer the research question, two sub-questions together with indicators (see section 3.5.1) addressing each one were constructed. In this study both an inductive (qualitative) as well as deductive (quantitative) investigation of analysis into the inquiry were used. Questionnaires, documentation, observations and semi-structured interviews were selected as data collection methodologies to obtain data in order to address the problem. The following sub-questions for this research study were formulated:

- *How is formative assessment applied in the Initial Supply Support learning programme?*
Questionnaires (Appendix B), semi-structured interviews (Appendix C), observation (Appendix D) and documentation were selected to be designed in addressing the above-mentioned sub-question.
- *What are characteristics of good quality formative assessment and how can formative assessment strategies be developed to ensure quality?*
Documentation, semi-structured interviews (Appendix C), and observation (Appendix D) were selected to be designed in addressing the sub-question above.

3.5 APPLYING ACTION RESEARCH IN THE FIELD

3.5.1 BACKGROUND INFORMATION RELATING TO THE IMPROVEMENT OF USING FORMATIVE ASSESSMENT AS A PROCESS

Several indicators were identified for use in the cyclical process of action research, in order to determine and improve the quality of formative assessment as a process:

- Concept and expectations of formative assessment.
- Planning and designing of formative assessment.
- Formative assessment criteria and national standards.
- Formative assessment strategies.
- Formative assessment evidence.
- Feedback applicable to formative assessment.
- Self-assessment.

Special attention was given to the concepts and principles to be able to adhere to the characteristics of quality formative assessment as a process. The assessor planned and designed formative assessment according to the guidelines given by the researcher. At the end of each cycle recommendations were provided in terms of the limitations identified by the researcher and a new cycle of action research started. Biographical information relevant to the target group who participated in this study is reflected in section 3.5.2.

3.5.2 BIOGRAPHICAL RESULTS OF THE TARGET GROUP

Quantitative data was obtained by means of a questionnaire in order to address the question of using formative assessment as a process in the Initial Supply Support learning programme. In order to obtain information for this study regarding the group of respondents who were also the learners attending the Initial Supply Support learning programme, a summary of the biographical information results are discussed below.

The population relevant to this study is indicated as “N” and are described as respondents that took part in the research study. A total of 24 respondents (N=24) completed the first questionnaire, which was piloted and amended, resulting in the second questionnaire. This led to the removal of some questions and to the clearer formulation of others. The variables (formative assessment, assessment techniques, tools, criteria, national standards, feedback and self-assessment) adequately reflect information to be obtained relevant to the research question. A total of 19 respondents (N=19) completed the second questionnaire. The difference in the total of respondents could be due to reasons such as sick leave or absence from the learning programme. This particular learning programme, i.e. Initial Supply Support is the first of three programmes (see Chapter 1) in the Supply Support environment for learners to complete. Although most (52,6%) of the respondents who completed this learning programme are between 18 – 27 years, a high percentage of 37% are older than 27 years of age (see Figure 3.2). The distribution of males (78,9%) and females (21,1%) attending this learning programme were not very good (see Figure 3.3).

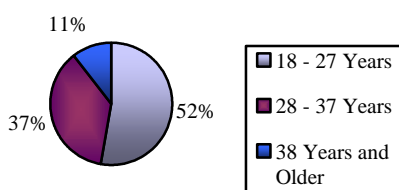


Figure 3:2 Target Group: Age

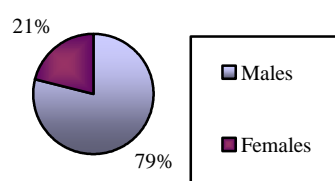


Figure 3:3 Target Group: Gender

Black respondents (73,7%) dominated the participation (completed the learning programme) in this study. The remaining 26,3% represented the other nationality groups (see Figure 3.4).

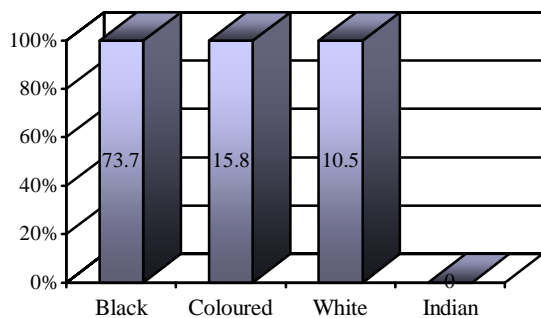


Figure 3:4 Target Group: Nationality Groups

A very high percentage (89,5%) of the respondents had a school qualification of Gr 11-12 in relation with the 10,5% of respondents with a qualification of Gr 8 – 10 (see Figure 3.5). Less than 75% of the respondents were in possession of a tertiary qualification.

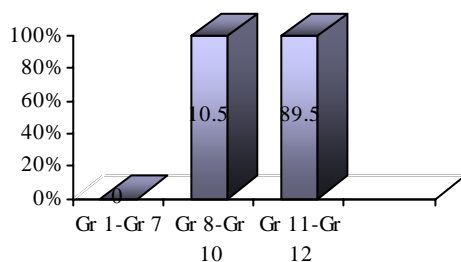


Figure 3:5 Target Group: School Qualification

It is fair to conclude that the majority of the respondents are:

- Between ages 18-27 (52,6%).
- Dominated (78,9%) by males.
- Dominated by black respondents (73,7%).
- In possession of a Gr 11-12 (89,5%) school certification.

LEARNING PROGRAMME RESULTS

The results, given in percentages, of the respondents’ opinions towards the learning programme are reflected in this section. Although three quarters of the respondents were satisfied that the learning programme met their expectations, 68,42% completed the programme for promotion purposes (see Figure 3.6). More than three quarters (89,47%) responded that the subjects facilitated are applicable to their working environment, 15,7% responded that there were subjects presented that

are not used in the working environment (see Figure 3.7). It is fair to conclude that the majority of the respondents were completing the learning programme for promotion purposes.

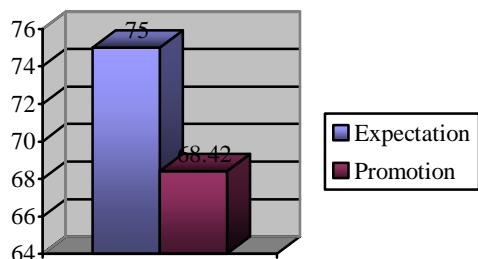


Figure 3:6 Expectations of the Learning Programme

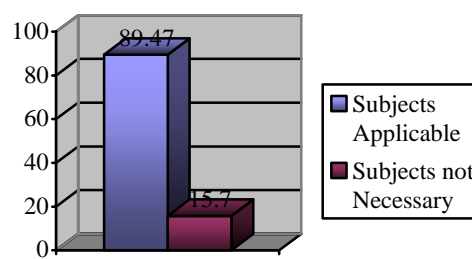


Figure 3:7 Subjects Facilitated

3.5.3 APPLICATION OF ACTION RESEARCH IN THE FIELD

Action research, consisting of the four stages as mentioned in section 3.3, aligned with the phases of formative assessment was applied as a process in the field. As an introduction to the study a meeting was held with the assessor to discuss the role of the assessor and learners participating in this study. This was followed by an interview with the assessor to determine his opinion of formative assessment, as well as how formative assessment is planned and designed by him, for application. After the interview the assessor assessed learners formatively from which it was expected from learners to compile a stocktaking programme. Practical as assessment method, a stocktaking programme as assessment technique and a checklist as assessment tool were used. A stocktaking programme is compiled for a financial year running from 1 April – 31 March where a time frame is coupled to each applicable commodity e.g. furniture, stationary, clothing etc, when the physical stock of that commodity must be counted and verified against the main ledger (on which the totals are reflected). Resulting from the interview, as well as the observation of this assessment activity, several limitations according to the literature were identified. The assessor was provided with guidelines compiled from a critical literature review by the researcher to address the limitations. It was then expected of the assessor to plan an assessment activity, for the next cycle of action research, which had to include an assessment strategy (i.e. assessment methods, techniques and tools) as well as feedback. These guidelines included the following:

Assessment methods. The assessor had to plan and design different assessment methods together with techniques and tools applicable to the challenging assessment activity.

Assessment criteria and outcomes. The assessment criteria and outcomes had to be available to the learners. The availability thereof could be done by means of using either transparencies or paper. It

also had to be mentioned orally to the learners.

Applied competence. During the planning and designing phase, special attention had to be given to include applied competence in the assessment criteria.

Scoring rubrics. The assessor had to design a scoring rubric according to guidelines given by the researcher.

Feedback. To provide feedback to learners the assessor had to include aspects such as: how to improve the quality of the completed task, capability, effort, as well as the learners' strengths and weaknesses.

The application of action research in the field relevant to this study was done in three cycles. The first cycle was the planning and designing of formative assessment applicable to packing, unpacking and transportation of materiél, (materiél is the colloquial name in the DOD for stock, i.e. furniture, clothing, stationery, etc.). The second cycle entailed the receipt and dispatch of this materiél followed by the third cycle which is the identification and compilation of bin numbers (bin is an appropriate storage facility utilised in the DOD to ease the issuing and stocktaking process). A short summary of each cycle will be presented in the section below.

PLANNING

The establishment of effective communication between the assessor and the researcher is a determinant for success. Effective communication influences the cooperation of the assessor during the planning of the formative assessment process. After the guidelines in terms of using formative assessment as a process were provided by the researcher to the assessor, an assessment task/activity was planned for the implementation thereof. The learners had to prepare a parcel for delivery, which was their challenging assessment task/activity. The assessor used practical as an assessment method, product as an assessment technique and a scoring rubric as an assessment tool.

The researcher observed and analysed the data obtained from the first cycle of action research and provided recommendations for the application of formative assessment to be applied during the second cycle of action research. The assessor was provided with written guidelines and examples of scoring rubrics by the researcher. The recommendations were based on the reviewed literature and included the following:

National standard(s). The national standard(s) applicable to the assessment task/activity had to be available to the learners.

Critical outcomes. The critical outcomes applicable to the assessment task/activity had to be available to the learners.

Assessment criteria. The assessment criteria had to be available to the learners.

Outcome(s). The outcome had to be available to the learners.

Feedback. The assessor had to include a space for signatures of both the learner and himself. Space had to be provided for written feedback. The learners' strengths and weaknesses had to be indicated, relating to the completed assessment task/activity. Feedback had to be given in terms of their effort and capability of the completed task.

Self-assessment. A self-assessment sheet had to be designed for the learners so that they can assess themselves in terms of their learning progress.

During the second cycle the assessor planned and designed formative assessment according to the above-mentioned recommendations for the receipt, storage and dispatch of matériel. The assessor used observation as assessment method, a flowchart and role-play as assessment techniques and a scoring rubric as assessment tool for recording the assessment results.

Although there was improvement in the design and execution of formative assessment there were areas that needed amendments, which necessitated a third cycle of action research. These recommendations included the following:

Although the assessment criteria were included in the assessment task, certain alterations had to be done for example, applying more specific and clearer criteria. Although an assessment task/activity was formulated, it could be amended to a more challenging one. The formulation of attributes used in the scoring rubric was too vague. Recommendations were made to include/design a scoring rubric for the role-play as well as to formulate a challenging assessment activity accordingly.

Again, the assessor used the above-mentioned recommendations for the application of formative assessment in the third cycle of action research. In the third cycle of action research the assessor designed assessment applicable to the use of bin numbers. Practical was used as the assessment method, observation as the technique and a log sheet as assessment tool for recording the results.

IMPLEMENTATION

Action research makes the implementation of actions where improvements are considered to be implemented, possible. By means of this research study it was intended to improve practice, i.e. to improve the quality of formative assessment by using it as a process. It is important to

communicate the content of quality formative assessment to the assessor to enable him to implement the planned and designed assessment. Furthermore these guidelines were provided in written format, which was accessible to the assessor. Establishing a climate of trust, internal motivation and participation, ensured the success of developing quality formative assessment as a process.

OBSERVING

The researcher deemed it necessary to determine the quality of using formative assessment as a process by means of observation. Data collection and analysis accompanied by critical reflections throughout the process of action research enabled the researcher to constantly provide recommendations (according to literature) for the amendment and improvement of the formative assessment being applied. During the application of action research, observation activities included the collection and analysis of data applicable to formative assessment, which was measured against the application of formative assessment as a process. Limitations in the application of using scoring rubric criteria and the problems such as assessment criteria that was not known to the learners, were observed. Good action research generates evidence to support evaluations about the quality of formative assessment. The evaluations of the observation activities stipulated that something was either good or that it should be changed or improved. Strengths were, for example the use of authentic assessment activities and the use of the most appropriate assessment methods. Weaknesses were, for example, limitations in the planning of using formative assessment as well as the provisioning of feedback when compared to recommendations from the literature. The researcher observed and analysed the designed assessment, as well as the implementation thereof, against the results of literature being reviewed.

EVALUATION

Based on data collected during the observations, reflection was done and guidelines for improving the quality of using formative assessment as a process were provided, based on the results of the observation. Formative assessment documentation (planning and designing, learner portfolio's, etc.) as well as the execution of the assessment were observed and analysed. Assessment concepts and principles were used as guidelines to determine the quality of the application of formative assessment as a process. Evaluation relates to the next step (planning) by informing a new revised plan. This gave rise to the next cycle of planning, implementing, observing and evaluation of using formative assessment as a process.

3.6 SOURCES OF DATA AND ANALYSIS

Many data sources, both qualitative and quantitative, are relevant to action research (Gay & Airasian, 2003). The qualitative data was obtained by means of semi-structured interviews, document review as well as observations. The quantitative data was obtained by means of a questionnaire.

The analysis of qualitative research data commences after the data has been organised. To analyse qualitative data, three main analytic strategies are used: negative case analysis, analytic induction and constant comparison (Gay & Airasian, 2003). The analytic induction process as an analytic strategy for analysing qualitative data was used in this research study. This process is used to examine data, to develop or test a theory. To be able to execute this process, four stages can be followed: a preliminary focus or explanation of a phenomenon (formative assessment), develop a hypothesis which explains the data (The quality of formative assessment can be improved by using it as a process together with action research.), collect data to test the hypothesis (by means of semi-structured interviews, observations and questionnaires) and to accept or reformulate the hypothesis. An analysis of data requires four iterative steps namely, reading/memoing, interpreting, classifying and describing (Gay & Airasian, 2003). The first step entails the familiarising of data, the second step the identification of pre-determined categories and the evaluation of data in order to present a detailed description of the participant and activities. Thirdly, data is categorised, coded and grouped into the pre-determined categories. Lastly the organised data is synthesised to be able to write conclusions based on the results obtained.

Statistics are a method of organising and analysing quantitative data. Descriptive statistics are a category of statistical techniques and are used to summarise, organise and reduce large numbers of data sets (McMillan & Schumacher, 2003). Using descriptive research applicable to this study (questionnaires) describes the characteristics of the group and reports the way things are. The variables provided biographical results in order to describe the target group that participated in this study (see section 3.5.2). The variables furthermore provided information of the expectations and opinions of the target group relevant to formative assessment (see Chapter 4). Each of the mentioned research methods will be discussed in more detail as well as how the data was obtained and analysed.

3.6.1 OBSERVATIONS

Participant observation is a method of gathering data in which the participant, the assessor in this case, is observed (Gay & Airasian, 2003). The researcher observed both the assessor and the learners during the application of formative assessment. The observer's (researcher) role was that of a non-participant during the assessment activities. The researcher observed the assessor while he was providing the learners with an assessment task/activity. The researcher furthermore observed the learners while they were busy executing these tasks/activities, which included presentations, role-play, etc. The researcher observed the assessor whilst he provided feedback to the learners in terms of the completed assessment task/activity. During these observations the researcher made notes. An advantage of using this methodology is that the researcher gained insight into the views of the assessor whilst a one-on-one working relationship developed between the assessor and researcher. The research question and sub-questions were used as baseline to formulate a structure for what had to be observed. After the observations were transcribed, the data were grouped under the pre-determined categories (i.e. application, planning and designing, formative assessment criteria, national standards, assessment strategies, self-assessment, feedback, improvement and enhancement).

DATA ANALYSIS

Content analysis was used to analyse the data from the observations during the duration of the Initial Supply Support learning programme. This entailed a process of collecting, analysing and reflecting on data gathered. Step one of the analysis entailed the observation of the assessor by the researcher. Records of what were seen, heard, experienced and thought by the researcher during the observation were noted as data sources. The descriptions of notes were done by means of detailed written observations, descriptions of events and activities as well as key words. Memorandums and field notes of the data were made during the observation. The data obtained were interpreted during step two of the analysis phase by the researcher. The third step involved the sorting of data with shared characteristics according to predetermined categories. The fourth step was a description of the synthesised data by means of a summary.

3.6.2 QUESTIONNAIRES

The questionnaire was designed to obtain information from respondents regarding their expectations and opinions of formative assessment. Two questionnaires were given to the

respondents, i.e. one in the middle and the second at the end of the learning programme. The first questionnaire was piloted which resulted in the second questionnaire. Several indicators were used for compiling the questionnaire namely, biographical, learning programme, concepts and expectations of formative assessment. Data was collected by means of providing the questionnaire to the learners who attended the Initial Supply Support learning programme. Both men and women participated in this study. The nationality groups included in this study were Black, Indian, Coloured and White. Information regarding the learners' views on assessment was also obtained by means of this questionnaire. The questionnaire (see Appendix B) consists of the following information:

- Background information needed from the population. Questions relevant to this information (questions 1 – 6) describe the population group that participated in this research study.
- Learning programme. In this area of the questionnaire, the reasons for attending the learning programme as well as the relevance of subjects presented are determined (questions 7 – 10).
- Concept and expectations of formative assessment. By asking questions in this section of the questionnaire (questions 11 – 29), the learners' opinions and expectations of formative assessment are determined. Topics addressed are learning programme, concept and expectations of formative assessment. A total of 19 respondents (N=19) took part in the study. Respondents from the Initial Supply Support learning programme in the DOD were targeted as the population group for this study. The questionnaire that was used will be discussed by addressing the key concepts of data, variables, attributes, measurement scale and items in the section below.

Constructs

A construct is something that cannot be directly observed (Gay & Airasian, 2003) and in this study it is the expectations and opinions of the respondents. In order to measure or observe these two constructs, they must first be defined. Expectations and opinions are defined in terms of the learning programme, formative assessment, assessment techniques and tools, assessment criteria and national standards, feedback as well as self-assessment. These definitions are the variables relevant to this study. The expectations and opinions of the respondents in terms of formative assessment are explained by means of the data, collected.

Variables

A variable used to separate subjects in two or more categories is a categorical variable. When the attribute of the object can be assumed to be an infinite number of values within a range the variables

are continuous (McMillan & Schumacher, 2003). Age (continuous), gender (categorical), nationality (categorical), highest school qualification and tertiary qualification were the five variables that were used for obtaining the background information. Six variables (continuous) were used to obtain information regarding formative assessment, namely learning programme, formative assessment as concept, assessment techniques and tools, national standards, assessment criteria, feedback and self-assessment.

Attribute

Two attributes namely male and female for the variable gender were used in the questionnaire. Four attributes for the variable nationality group were used in the questionnaire namely, Black, Indian, Coloured and White.

Measurement Scale

The nominal measurement scale was used to classify the gender of the respondents in male and female. It was also used to determine the various nationality groups in terms of Black, Indian, Coloured and White that attended the learning programme. A Likert scale, which is the most popular one amongst measurement scales to measure opinions and typically used in action research, was used in the questionnaire. The rank order scale (used in action research) was also used in this questionnaire.

Items

Five (5) questions were formulated to obtain data for background information. Fifty-nine (59) statements were formulated to collect data for determining the expectations and opinions of respondents regarding formative assessment.

DATA ANALYSIS

Scales that are typically used in action research include Likert, semantic differential, and rating scales (Gay & Airasian, 2003). Descriptive statistics were used to describe the population used in this study. Likert and rank order scales as well as open and closed questions were used in the questionnaires. Data was coded by assigning a number to each answer in the questionnaire. The data was then captured on the Microsoft Excel programme and statistics could be drawn from the Statistical Package for the Social Sciences (SPSS) programme from which conclusions were drawn (Pallant, 2001).

3.6.3 DOCUMENTATION REVIEW

Examples of classroom projects, tasks, assessment documentation and portfolios of learners were reviewed and analysed by the researcher during the action research cycles of this study. Documents, books, journal articles, etc. were examples of literature that were reviewed and analysed by the researcher before this study to obtain data for determining how the quality of formative assessment can be improved by using it as a process together with action research.

DATA ANALYSIS

Field notes of the data were made during the observation of documents reviewed. Content analysis was used to analyse the data. During the first step of the analysis data obtained from literature, classroom projects, examples of tasks, assessment documentation, were read and memorandums were written. A detailed description of the interpreted data was done during step two of the analysis phase. The categories (i.e. assessment methods, techniques, tools, evidence, self-assessment and feedback) were pre-determined and coding procedures were standardised to the highest degree possible during step three. The pre-determined categories were done according to the indicators as identified to be used in the cyclical process. During the fourth step data was analysed, synthesised and the researcher made conclusions.

3.6.4 SEMI-STRUCTURED INTERVIEWS

The interview was done with one assessor who facilitated the Initial Supply Support learning programme over a 6-week period, presented in Pretoria. Two semi-structured interviews were conducted with the assessor by the researcher, one before the first and the second after the third cycle of action research, from which information was gathered. Structuring the interviews adds to the validity of action research (Gay & Airasian, 2003). The questions asked by the researcher were formulated before the interview and asked accordingly. The information was recorded by writing down the responses as provided. It was re-read by the researcher after the interview so that missing information could be added. After the interview had been transcribed, topics and pre-determined categories were identified from the data obtained. Topics can be described as data pieces from the interview, which are grouped together into categories. A category can be described as a classification of ideas or concepts according to shared characteristics (Gay & Airasian, 2003).

DATA ANALYSIS

The data obtained from the semi-structured interviews were analysed by means of content analysis. During the first step of analysing the data obtained from the semi-structured interviews, it was carefully scrutinised together with making notes. This enabled the researcher to prepare for the next step in analysing the data. During the second step the data was interpreted by providing a detailed description of the activities/participant. The results of the interview was transcribed and given to the interviewee for approval and agreement, i.e. member checking. After the interview(s) have been transcribed and approved by the interviewee, topics were identified (planning, implementing, feedback) and the information was coded during the third step of analysis. The categories were pre-determined (i.e. formative assessment, planning and designing, formative assessment criteria, national standards, assessment strategies, evidence, feedback, improvement and enhancement) and coding procedures were standardised to the highest degree possible (see Table 3.3). The pre-determined categories were done according to the indicators as identified to be used in the cyclical process. Thereafter it was synthesised (step four) from which conclusions were drawn by the researcher.

Table 3:3 Examples of Using Codes during the Data Analysis of the Semi-Structured Interview

Codes	Explanation
DB	Designing Back
CoF	Clarity of Focus
HE	High Expectations
EO	Expanded Opportunities
PoE	Portfolio of Evidence
PA	Peer Assessment
AT	Assessment Tool
Atech	Assessment Technique
AM	Assessment Method

3.7 VALIDITY AND RELIABILITY

Both reliability and validity are required when research instruments are to be used (Gay & Airasian, 2003; McMillan & Schumacher, 2003; Cohen *et al.* 2000). Reliability is a precondition for validity. A valid test is therefore reliable but a reliable test is not necessarily valid. Reliability refers to whether an instrument is measuring what it is supposed to measure. A measure is reliable

when it would give the same result over and over again (Cohen *et al.* 2000). Reliability and dependability were achieved by means of piloting the questionnaire for correctness. Objectivity and conformability were achieved by means of field texts/data, which were gathered explicitly, pre-categorised, analysed and interpreted by the researcher.

Internal validity and credibility can be achieved by analysing all the data for correctness (see section 3.7.3) (Cohen *et al.* 2000; Gay & Airasian, 2003). Internal validity and credibility relevant to this study were achieved by letting the interviewee approve the transcriptions of the semi-structured interviews being held. A careful description of the time, place, context and confirmation of how the quality of formative assessment can be improved by using it as a process together with action research was investigated and it ensured that external validity (Cohen *et al.* 2000) and transferability were achieved (Gay & Airasian, 2003).

Triangulation was established by making use of different sources for finding consistency in the evidence. The triangulation approach was used to increase the reliability of the study. This process is recommended by Gay and Airasian (2003); McMillan and Schumacher (2003) and Cohen *et al.* (2000). In this study triangulation meant that the learners, assessor and the researcher's opinions on formative assessment were compared and contrasted. To be able to draw comparisons and contrasts, multiple data collection methods were used. The collection of data included the observation of the assessor, document review of learner records, literature review, etc., semi-structured interviews with the assessor and questionnaires to obtain learners' opinions and expectations regarding formative assessment.

3.7.1 OBSERVATIONS

Observations included the gathering of both oral and visual data. For reasons of validity and credibility observations were structured. To overcome the possibility of threats that could have influenced the validity and reliability of the study, the researcher used triangulation (use of multiple data collection) as a research method. This method is recommended by Gay and Airasian (2003); McMillan and Schumacher (2003) and Cohen *et al.* (2000). Using triangulation in this study included the selection of an appropriate research methodology approach, namely action research, an appropriate time scale, as well as the use of semi-structured interviews, which were chosen to answer the research question.

3.7.2 QUESTIONNAIRES

The reliability of the questionnaire was measured by the demonstration of Tukey’s reliability method, which was done on SPSS, with a reliability of .7667. The questionnaire included information relevant to the research question (see section 3.4), which enhanced the validity thereof.

RELIABILITY

Table 3:4 Reliability of the Questionnaire, Using Tukey’s Alpha

Using Tukey’s Alpha	
Summary for scale:	
Mean	102.0000
Variance	85.0000
Std Dev	9.2195
Variables	N: 59
Alpha	.7667

Tukey’s test for additivity is a test for linear dependency between the entered variables. A test has a high reliability if the Alpha value is .7 and higher (Pallant, 2001). The questionnaire used in this study had a high reliability because of an Alpha value of .7667 (see Table 3.3). The Alpha value (when an item is deleted) of a question relevant to the variables is also high (see Table 3.5).

Table 3:5 The Alpha Value when an Item is deleted: Questionnaire

Variables	Questions	Alpha if Item Deleted
Learning programme	Question 7	.7723
Assessment concept	Question 11	.7602
Assessment techniques	Question 22a	.7716
Feedback	Question 24a	.7619
Self-assessment	Question 28	.7644

3.7.3 SEMI-STRUCTURED INTERVIEWS

To ensure reliability/dependability applicable to this research study, semi-structured interviews, together with possible probes were designed. Inter-rater reliability was ensured by means of the coding of the responses. The coding was done according to the indicators selected for this study (see section 3.5.1). Validating/credibility of the interview was achieved by providing the transcribed semi-structured interviews to the participant for confirmation. When the participant did not understand any of the questions asked, it was re-phrased, which also ensured the validation of data.

3.8 ETHICAL ISSUES

Before commencing this research study, permission was obtained from the Director Logistic Resources Management. The participant (assessor) was informed about the ethical issues applicable to the research study. The ethical issues that were addressed and accepted by the participant were voluntary participation and that he could have withdrawn from the research at any stage. He was fully informed about the research process and purposes. He gave his consent for participation in the research. He was not placed at risk or harmed in any way.

The confidentiality and anonymity of the human respondents (both the assessor and the learners) were protected at all times. The human respondents were not submitted to any acts of deception or betrayal in the research process or its published outcomes. The respondents in the classroom were informed by the researcher about the research project before the completion of the questionnaires. The information required from the respondents was explained in detail. Emphasis was placed on the fact that participation in this research study was voluntary and confidentiality was guaranteed. This was achieved due to the anonymous nature of the questionnaire.

3.9 CONCLUSION

This chapter outlined the research design and methodology relevant to this study. The intention of this study was to investigate how the quality of formative assessment in the Initial Supply Support learning programme can be improved by using it as a process together with action research. Several key concepts from the literature were identified and used in the conceptual framework that acted as the driving force for this study. It was operationalised by means of applying action research in

order to investigate the research problem. Both quantitative and qualitative research methodology in terms of questionnaires; semi-structured interviews, observations and document review were applied in order to obtain data for this study. The data obtained from the questionnaires were analysed by means of using a quantitative analysis approach, i.e. SPSS. The data obtained from the semi-structured interviews, observations and document review were analysed by means of using qualitative analysis approaches. Validity and reliability in terms of the research methods are described. This chapter concluded with a discussion on ethical issues pertaining to this study.

CHAPTER 4

4 RESULTS AND ANALYSIS OF RESEARCH

4.1 INTRODUCTION

This chapter provides information on the results and analysis of data obtained by means of questionnaires (completed by the learners), semi-structured interviews conducted with the assessor and observations by the researcher. Both quantitative and qualitative data obtained during each cycle of action research are discussed, depicting the five phases of planning and designing formative assessment as a process. After the completion of a cycle, reflection was done on the data obtained during that cycle, which required a new cycle of action research. As mentioned earlier in this study the duration of the learning programme restricted the researcher to the application of only three cycles of action research.

The results are presented in terms of what happened during each cycle, followed by a discussion of the analysis from the data obtained, i.e. the findings of the investigation. This is done according to the sub-questions (listed below), which were formulated to address the research question, namely how the quality of formative assessment in the Initial Supply Support learning programme can be improved by using action research.

- How is formative assessment applied in the Initial Supply Support learning programme?
- What are characteristics of good quality formative assessment and how can formative assessment strategies be developed to ensure quality?

4.2 THE APPLICATION OF FORMATIVE ASSESSMENT IN THE INITIAL SUPPLY SUPPORT LEARNING PROGRAMME

Initially, before the application of this action research, an interview was held with the assessor to determine how formative assessment was being applied in the Initial Supply Support learning programme. The reason for the interview was to obtain information applicable to the assessor's knowledge and opinion of formative assessment and furthermore to determine how formative assessment was applied in relation to that what was found in the literature. After analysing the data as obtained from the above-mentioned, the researcher used action research to operationalise

formative assessment as a process in order to address these limitations as well as the identified problems in the Supply Support environment (see section 1.1). Action research and formative assessment as a process were used together to determine how the quality of formative assessment could be improved and enhanced. This will ensure that learners and assessors can benefit more from it. After the interview the assessor planned and designed formative assessment according to the guidelines given to him by the researcher. This enabled the assessor to use formative assessment as a process to improve the application of formative assessment (see sections 4.3.1 – 4.3.5). The researcher further wanted to obtain the learners' opinions and expectations of formative assessment. Applying formative assessment as a process may enable learners to use formative assessment to their own benefit by accepting responsibility for their own learning as well as to improve their learning (see section 4.3.2).

In this section the results and analysis of data obtained by means of the first interview (before action research) held with the assessor, as well as the opinions and expectations of learners by means of the questionnaire, are discussed. Although the assessor had completed a learning programme in both facilitation and assessment it is the researcher's opinion that he is not yet competent in the foundational knowledge concerning the principles, strategies, etc of formative assessment. This analysis can be defended by the assessor's response on how to plan and design formative assessment. He said: "The principles of formative assessment are a preparation medium, to guide a learner in order to achieve the outcome." In terms of a question on the principles of OBE the assessor said: "It is the achievement of an aim that learners set for themselves without frustrating each other." Furthermore, according to the assessor, written and oral questions, which are assessment methods classified (according to him) as assessment techniques and tools. On a question by the researcher on the difference between an assessment technique and tool, the assessor could not explain it. As already mentioned in Chapters 1 and 2 the application of using various assessment tools for the recording of assessment evidence, is a problem in the Supply Support environment. According to the assessor, assessment is recorded on a computer by typing the results onto a spreadsheet. The researcher is of the opinion that the reason for not using various assessment tools could be due to a lack of knowledge on the assessor's part.

From the responses of the assessor during the interview, it can be deduced that he knows about the use of formative assessment. He said: "Formative assessment is stepping-stones towards achieving outcomes. It is a medium to determine if the learner is on track." He also sees formative assessment as a continuous process of assessing a learner to determine his/her progress. The

researcher interviewed the assessor in terms of the planning and designing of an assessment strategy (i.e. assessment methods, techniques and tools). According to the assessor he did not do any formal written planning for formative assessment and/or activities. According to the assessor the ideas were implemented in the classroom without any prior planning. This statement by the assessor proves to be true as was observed by the researcher prior to the action research. The only documentation that could be provided by the assessor was the learning task designs without an indication of how formative assessment was going to be applied. The assessor uses a learning task design for planning the learning activities that will be applied in the class. The assessor is supposed to plan for formative assessment activities as well as to design assessment strategies for application. In the learning task designs there were no indication of the assessment methods, techniques and tools to be used for assessing the learners. The way of assessing the outcome of an activity is the assessment method (e.g. observation, product evaluation, questioning – written/oral) (SAQA, 2001; DoE, 1998c). An assessment technique (e.g. role-play, maps, assignment, oral presentation, etcetera) is a task/activity provided to learners to demonstrate their competence (SAQA, 2001; DoE, 1998c). The assessment tool (e.g. scoring rubrics, portfolios, etcetera) is used to record the evidence provided during the assessment technique (DoE, 1998c). Due to the non-existence of planning, the purpose and use of formative assessment were not determined.

The assessor made the statement that the use of an assessment strategy is determined by the specific outcome as well as personal experience. The assessor's response to the question on assessment strategies was that authentic assessment is an assessment strategy that can be used in the OBE environment where peer assessments as well as asking questions are applied. The assessor stated that the authenticity of assessment is dependent on the outcome e.g., when it is expected from the learner to be competent in the packing of a product, the assessment will be designed accordingly. The assessor said that he applies formative assessment by means of grouping learners. The researcher observed the truth of this response by the assessor. An individual learner was seldom formatively assessed. As stated by the assessor, the individual learner was formatively assessed when he/she did not show progress in learning. For the individual learner the assessor provided the opportunity to demonstrate his/her competence by asking him/her oral questions. This statement by the assessor of applying oral questions as an opportunity for the learner to determine learning progress supports the earlier comment of the researcher that the assessor is not knowledgeable in the application of formative assessment. It is furthermore in contradiction with the assessor's statement that an outcome will be assessed in the most appropriate way.

The learners' opinions and experiences on the application of formative assessment were obtained to determine when formative assessment was used, if the learners were ready to be assessed and if they were informed that an assessment would be done. More than half (54,17%) of the respondents responded that they were not informed about writing an exam. Three quarters (75,00%) of the respondents responded that they completed an assessment before writing an exam. According to the respondents various types of assessments were used. More than half (57,89%) of the respondents responded that they were informed in advance about being formatively assessed and 66,67% of the respondents responded that they did not ask to be formatively assessed by the assessor (see Figure 4.1).

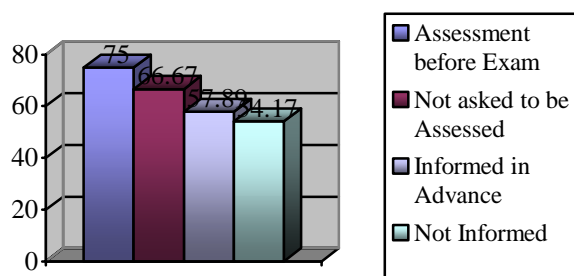


Figure 4:1 The Learners' Opinions of the Application of Formative Assessment

By using questionnaires, semi-structured interviews and observations the researcher wanted to determine if the assessor was using national standards and relevant assessment criteria that were available to the learners. Only 36,84% of the respondents strongly agreed that assessment criteria were available prior to the assessment and 31,58% strongly agreed that the national standards were known prior to the assessment (see Figure 4.2). According to the assessor the learners were informed of the national standards relevant to the outcome. Furthermore, according to the assessor, the respondents were also informed that the national standards, assessment criteria and specific outcomes were available in the learner study guide as well as in the worksheet, which were given to the respondents. According to the assessor, the assessment criteria were formulated according to foundational, practical and reflexive competence. The circumstances under which the outcome had to be demonstrated were included in the task, which the learners had to complete for assessment purposes. According to the observation and document review done by the researcher, the national standards and assessment criteria were not indicated on the worksheet/task/assignment, which was given to the learners during the first cycle of formative assessment (see Figure 4.2). Although the national standards were reflected in the study guide it was only during the second and third cycle of

action research that national standards and assessment criteria were included on the worksheet/task/assignment.

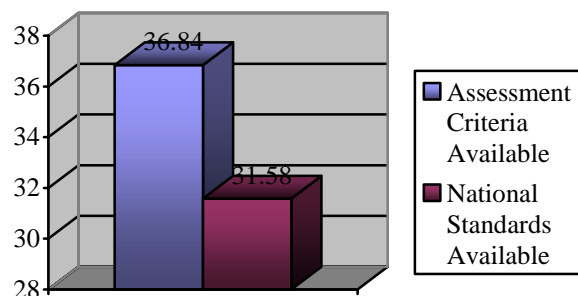


Figure 4:2 The availability of National Standards and Assessment Criteria to the Learners Prior to the Application of Formative Assessment

The assessor's opinion on how formative assessment could be improved was henceforth determined. He said: "It might be achieved by means of the application of self-reflection." According to the assessor, reflection would be done after the completion of a learning programme. The assessor stated that feedback from the learners in terms of their experiences of formative assessment could also be used to improve formative assessment. It could be improved by means of the implementation of self-assessment and the quality of assessment activities (assessment methods, techniques and tools, all-inclusive) can be improved if it is scrutinised by colleagues.

The researcher obtained data from the learners to determine if they knew what the benefits are of the application of formative assessment. Although 57,89% of the respondents responded that formative assessment promotes learning, only 42,11% responded that their learning progress could be determined through the use of formative assessment. Slightly less than half of the respondents agreed that formative assessment could have provided information in terms of their performance in mastering the outcome, whilst 52,63% responded that they knew what was expected from them in terms of knowledge and the executing of tasks (see Figure 4.3).

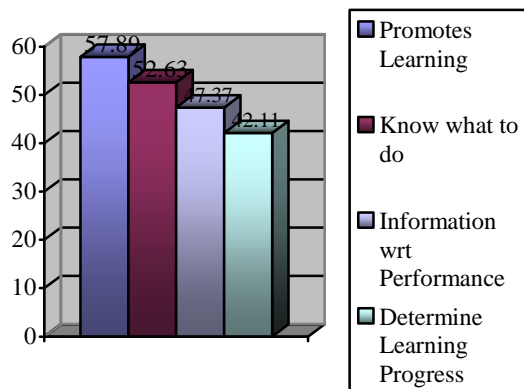


Figure 4:3 The Learners' Opinions of the Benefits in terms of Using Formative Assessment

DISCUSSION ON HOW FORMATIVE ASSESSMENT IS APPLIED IN THE SUPPLY SUPPORT ENVIRONMENT

In this section the analysis of the results of applying formative assessment as obtained will be discussed in line with the proposal of applying formative assessment as a process. Research studies that were reported by Boston (2002) indicated that learners who understand assessment criteria and have opportunities to reflect on their work show greater improvement than those who do not. The researcher therefore suggests that national standards and assessment criteria should be available to the learner prior to the application of formative assessment. According to the results of this study it can be concluded that formative assessment is applied before summative assessment. According to the assessor the learners were given real-life problems in their written assignments to solve. Although the national standards and assessment criteria were available, the learners did not understand the concepts of assessment criteria (see Figure 4.2), against which their performance is assessed. Furthermore, an explanation should be provided to the learners in terms of the national standard and its content relevant to the outcome. It is suggested that the assessor should explain the importance of assessment criteria and how the learner can use it to prepare him/her to master the outcome.

As previously mentioned, the planning and designing phases of formative assessment, as a process were not incorporated into the practice of the assessor prior to the action research. The assessor's limited knowledge of formative assessment was a limitation that could be determined before this research and it is therefore suggested by the researcher that an assessor should be aware of what formative assessment is in order to apply it. To be able to improve formative assessment by using it as a process, the definition as suggested by the researcher is relevant; *quality formative assessment*

is an approach of planning, designing and applying various assessment methods, techniques and tools to collect and record evidence regarding the knowledge, skills, performance (behaviour), values and attitudes of the learner's progress towards achieving an outcome and providing feedback accordingly. It is suggested by the researcher that the definition must be used as a starting point of applying formative assessment. It can guide the designer in the planning process and assist in ensuring that all the important aspects are addressed and included for the application of quality formative assessment as a process. To determine the purpose and use of formative assessment as stated by Brooker *et al.* 1998; Airasian, 2001; Van der Horst and McDonald, 2003; Killen, 2003 is crucial. Determining the purpose and use as suggested by the researcher is important before any planning and designing of formative assessment can commence. Determining the purpose of formative assessment will enable the assessor to have a set goal to work towards and to obtain information for monitoring (i.e. the use of formative assessment) a learner's learning progress in achieving the outcome by assessing the performance against assessment criteria and to provide feedback accordingly. It is suggested that an assessor must have knowledge of the principles of OBE (Spady, 1988; Killen, 2000; Killen, 2003; Vandeyar & Killen, 2003; Van der Horst & McDonald, 2003) as well as the principles included in the phases of formative assessment proposed by the researcher to be added when using formative assessment as a process, in order to plan, design and execute quality formative assessment. The researcher is of the opinion that these principles are seen as a set of standards to which an assessor must adhere to in order to improve the quality of formative assessment.

Although the assessor indicated that formative assessment could be improved by implementing self-reflection and the active participation of colleagues, no self-reflection and participation of colleagues took place during this study as observed by the researcher. It is the researcher's opinion (see Figure 4.3) that learners do not know what the value of formative assessment is, either because of the short duration of the study or because the learners could not experience a positive continuum increase in terms of learning.

After a critical literature review several limitations in the implementation of formative assessment prior to the action research in the Initial Supply Support learning programme were determined. The researcher applied the suggestions of using formative assessment as a process together with action research to eliminate the limitations and therefore to improve the quality. In the section below the five phases of formative assessment as a process, together with action research, as applied in this research study, are outlined. An analysis of the data (obtained by three cycles of action research) as

well as a discussion of the results relevant to the formative assessment phase is presented in sections 4.3.1 to 4.3.5. These discussions are done according to suggestions made by of the researcher is using formative assessment as a process, which includes relevant concepts and principles from which quality formative assessment can be characterised.

4.3 QUALITY FORMATIVE ASSESSMENT AND THE DEVELOPING OF FORMATIVE ASSESSMENT STRATEGIES TO BE USED AS A PROCESS IN THE SUPPLY SUPPORT ENVIRONMENT

4.3.1 PHASE ONE: PLANNING AND DESIGNING OF FORMATIVE ASSESSMENT

ACTION

The action relevant to this study was taken in three cycles of action research. During the *first cycle* of the action research approach an assessment in the form of a worksheet, applicable to the specific outcome of packing, unpacking and transportation of materiél was designed for the learners by the assessor. A real-life assessment task/activity had to be performed by the learners in terms of preparing a parcel for dispatch. The learners had to physically prepare a parcel as well as to include the necessary specifications (see Appendix E). The learners themselves could decide what had to be included in the package. The packaging material together with the information, which had to be written on the outside of the package, had to correlate with the content of the package. A scoring rubric sheet was designed as an assessment tool for assessing the assessment technique, i.e. the parcel, which had to be assembled. During the learning activity the assessor asked specific learners in groups to provide an answer to his questions. Not every learner was given an opportunity to answer questions being asked.

Planning formative assessment for the *second cycle* of the action research approach entailed the receipt and dispatch of materiél. An assessment in the form of a worksheet for the learners was designed by the assessor and included an assessment task/activity, which the learners had to complete. The national standards, critical outcomes, specific outcome(s) and assessment criteria were included in the worksheet. No planning was done in terms of additional formative assessment techniques and tools. A scoring rubric was designed for recording the assessment technique, namely the parcel, which had to be distributed. The role-play, which was used during cycle two, was not part of the planning for formative assessment, but was spontaneously included by the

assessor during the course of the assessment activity. The assessor decided, while the first group was busy presenting their poster indicating the process for dispatching a parcel, that role-play will be more effective for learners to demonstrate their competence. The groups were asked to demonstrate the procedures applicable to the receiving and dispatching of parcels in the Supply Support environment in the DOD. The learners themselves selected the allocation of role-responsibilities relevant to the role-play.

Planning formative assessment for the *third cycle* of the action research approach entailed the identification and compilation of bin numbers. An assessment in the form of a worksheet for the learners was designed by the assessor, which included the national standard, critical outcomes, specific outcome(s), assessment criteria and assessment task/activity. Provision for written feedback was made on the worksheet in terms of effort, capabilities, strengths and weaknesses of a learner's learning progress. The assessor asked questions applicable to the storage of materiel, such as "Explain how a bin number works". The learners had to confirm their understanding and use of bin numbers by explaining the meaning of the five groups of numbers (two numbers per group) that a bin number consists of by means of practical examples.

During the action research, general information was obtained from the respondents by the researcher to determine what the assessor expected from them to do during formative assessment. More than four fifths (84,21%) of the respondents responded that it was expected of them to construct a response. Examples of responses were: "What is accountability? What does the first group of numbers represent in a bin number?" Examples of the 31,5% of respondents who responded that it was expected of them to create a product were: "Assemble and send a parcel to a Force Structure Element" as well as, "Design a flow chart, which represents the receiving of materiel." Examples of the 15,79% of respondents who responded that it was expected of them to demonstrate a skill were: "Pack and unpack the receiving of materiel" and "Store a parcel on the correct shelf by providing the applicable bin number" (see Figure 4.4).

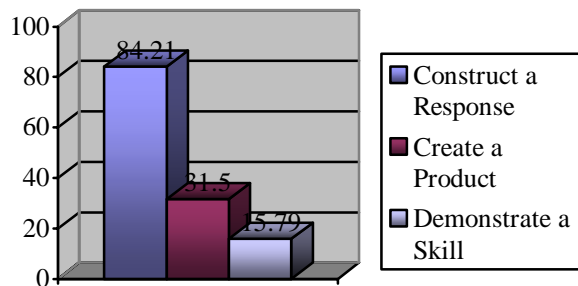


Figure 4:4 Response of Learners' Experiences in terms of Constructing a Response, Creating a Product and Demonstrating a Skill

To determine the learners' experiences of the application of formative assessment strategies during action research, the researcher obtained information relevant to assessment methods, techniques and tools. According to the respondents various types of assessment were used, which could be identified during the observations as group evaluations, small tests, individual tests, worksheets and oral questions. Although 91,67% of the respondents responded that various methods of assessment were used, 47,37% responded that various assessment techniques were used during the application of formative assessment (see Figure 4.5). The assessor made provision for applying different formative assessment opportunities to groups for demonstrating their competencies such as role-play, demonstration and practical assessment as observed by the researcher. Observation in terms of using various assessment methods as experienced by the learners proved to be true. Observation, product evaluation and questioning (written/oral) were used as assessment methods during the application of formative assessment. Examples of the assessment techniques used during the application of formative assessment were assignments, questions, oral questioning, practical, questionnaires, short/small tests, matching questions, portfolios, posters (flow chart) and role-play. The assignments were observed by the researcher as the assessment task/activity, which the learners had to complete. The other assessment techniques, which were mentioned by the respondents were observed by the researcher and are discussed in the section to follow.

Completion and oral questions were provided during the facilitation of the specific outcome. Practical assessment was done by means of a parcel, which had to be assembled by the learners for dispatching. Other questions were used during an assessment activity, i.e. "Explain how a bin works". Posters (flow chart), as well as role-play, were used during the assessment task/activity for the receiving and dispatching of a parcel. The respondents responded that written assignments, checklists, portfolios, work sheets and observation were used to record their competence in

mastering the outcome. A portfolio of evidence was available for learners, in which the “evidence of their competence” was filed. The researcher could observe portfolios and checklists in terms of recording their competence.

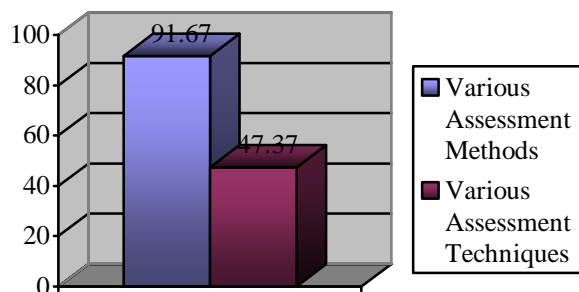


Figure 4:5 The Learners' Experience of Assessment Methods and Techniques, which were used during the Application of Formative Assessment

DISCUSSION OF PHASE ONE: PLANNING AND DESIGNING: USING FORMATIVE ASSESSMENT AS A PROCESS

As suggested by the researcher the four principles of OBE must be applied to the planning and designing phase of using formative assessment as a process. Using these principles during phase one of the process enhances the quality of formative assessment (see Chapter 2). Several other principles are included in phase one to be used as a set of standards for achieving quality when using formative assessment as a process (see Chapter 2). It is therefore crucial that an assessor must first determine what the learners have to achieve (*designing back*) (Killen, 2000). Everything that is planned throughout the planning process must be trustworthy. To ensure trustworthiness, the planning of assessment tasks/activities relevant to step one, i.e. *designing back* should adhere to the principles of fairness, practicality, validity and reliability. Due to the fact that the assessor did not execute formal planning relevant to assessment activities, it resulted in an assessment technique being used, which was not the best way of providing an opportunity for learners to demonstrate their competence (see *cycle two* of this section). The learners had to demonstrate their competence in the dispatching of a parcel by means of illustrating the process on a poster. During the presentation of one of the groups the assessor decided that role-play would be more appropriate. The learners were not encumbered or advantaged in any way, thus the assessment was fair. The assessment adhered to practicality in the sense that resources needed for the completion of the assessment activity were available. The assessment planning of an assessment task/activity did not

adhere to construct validity (see section 2.4.2), which is inherent to an individual's product and process and therefore no valid inferences could be drawn because the activity was done in group context (Killen, 2003). The assessment activities adhered to criterion-related validity in the sense that a decision could be made, which correlated with a future event (Killen, 2003), i.e. procedures to be followed when a parcel must be sent. The planning of assessment did not adhere to reliability (e.g. the flow chart) of the process for dispatching of a parcel.

An assessment task/activity should reflect the range of knowledge, skills, performance (behaviour), values and attitudes that a learner has to master in order to be reliable (Airasian, 2001). By means of observation it was proved that it was expected of learners to create a product or to demonstrate a skill but the most dominant was to construct a response. To conclude it can be said that it was mostly expected from learners to construct a response(s) during the application of formative assessment. Therefore insufficient *clarity of focus* was established, i.e. the determination of the competencies that are to be mastered by the learners (Killen, 2000; McTighe, 1996/1997; Popham, 2000).

To be able to assess the competencies of a learner an assessment strategy must be planned. A decision on using an authentic assessment approach, which has to be designed, needs to be made (Van der Horst & McDonald, 2003; Airasian, 2001; Haertel, 1999). Although the assessor stated that foundational, practical and reflexive competence were included in assessment criteria, only a small percentage was used during this study. The assessment techniques, which were applied, were relevant to real-life situations e.g. assembling of a package. Following the decision on an authentic assessment approach to be used, assessment techniques and tools have to be designed, which best enable learners to demonstrate their competence (Killen, 2000). Although questions were frequently asked, other assessment techniques such as practical assessment, role-play, tests and demonstrations were applied. These techniques were in accordance with the outcome. Assessment tools used by the assessor were checklists, rubrics and questionnaires. Using the analytic scoring rubric as suggested by the researcher lends it perfectly to the application of formative assessment (Goodrich, 1996/1997; Tierney & Simon 2004; Mertler, 2001). Using this scoring rubric enables an assessor to determine the strengths and weaknesses of a learner's progression in achieving an outcome thus monitoring of progress takes place and the purpose of formative assessment is achieved. Although the planning and designing of scoring rubrics improved during the three cycles of action research, changes still need to be made in order to continue enhancing the quality thereof.

For designing *high expectations* the assessor responded that current work-related problems were used to design assessment tasks/activities, e.g., in Potchefstroom the learners had to organise the warehouse, which included concepts such as the first-in, first-out approach of materiel, item control numbers and the stocktaking process. Planning assessment activities have to be challenging and thought provoking. A view supported by Killen (2000) and Boston (2002). Challenging assessment activities were planned during the research study according to current work-related problems, which stimulated a deep understanding of that what the learners had to know and accomplish. Although the assessor did not ask pro-active questions during the first cycle of formative assessment, he focused on asking them during cycles two and three of the action research. It is the researcher's suggestion that self-assessment activities should also be planned and designed in accordance with challenging assessment tasks/activities (see section 2.4.2) because of the improvement it can bring about on learning (Boston, 2002). The assessor did not plan and design self-assessment activities.

Expanded opportunities have to be designed in order to provide other ways of demonstrating competence (Killen, 2000). According to the assessor he did not plan to use other formative assessment techniques and tools, as the need could be determined during assessment and based on this decision, it could be implemented or not. He said: "Planning means that I have to change the assessment activity, which I first designed". From the interview it was found that the assessor made provision for a learner to demonstrate his/her competence more than once, although this had not been planned initially. This response could be observed during the assessment by the researcher. The learners were asked to explain bin numbers and they had to indicate the location of a product after they were provided with a bin number.

4.3.2 PHASE TWO: COLLECTING OF EVIDENCE

ACTION

The assessor divided the class into 5 groups, consisting of 4 - 6 learners each. During the *first cycle* of the action research approach, formative assessment was applied through learners having to assemble a parcel for dispatch. Assessment evidence was collected in terms of assessing the detail that should appear and correlate with the content of the parcel.

During the *second cycle* of the action research approach for collecting assessment evidence the learners had to construct and present a poster (flow chart) (assessment technique) that depicted their

understanding of the process involved in sending a parcel. A scoring rubric was used to collect evidence in terms of the specific outcome, namely to send a parcel. During the flow chart presentation the assessor decided that role-play would be a more appropriate technique of collecting assessment evidence of the learners' competence. A checklist applicable to the role-play was designed afterwards on which the learners' competence was recorded.

During the *third cycle* of the action research approach the assessor gave each learner a bin number, and he/she had to practically (assessment technique) indicate the location thereof. During the application of this formative assessment some learners did not master the identification of a bin number. Another assessment technique was applied (no prior planning was done), where the learners were once again required to indicate the location of a parcel by means of providing the bin number. The assessor placed a parcel on a shelf from which the learner had to orally provide the bin number in which the parcel was stored. It was also expected of the learner to explain the meaning of the five groups of numbers.

DISCUSSION OF PHASE TWO: COLLECTING EVIDENCE: USING FORMATIVE ASSESSMENT AS A PROCESS

Direct and indirect assessment evidence of the learners' competencies was collected during the application of formative assessment as a process. Direct evidence was collected in a real-life environment by means of assembling a parcel and the identification of bin numbers. Indirect evidence was collected by means of team output (see section 2.4.3). The indirect assessment evidence was collected by means of the role-play that learners had to do when illustrating the dispatching process of sending a parcel. As suggested by the researcher, the quality of collecting evidence should adhere to the principles of validity, authenticity, sufficiency and currency. The assessment evidence of the activities reflected the expectations of the learning programme and specific outcomes. Authentic evidence refers to evidence provided which is specific to the learner (see section 2.4.3). The assessment evidence was authentic but the evidence is not sufficient in that it indicates the competency of the group as opposed to the individual. All the formative assessment was done in groups; for example, to assess and record the dispatching procedure of a product the assessor used role-play, demonstration and practical work as an assessment technique and a checklist and rubrics as assessment tools. The evidence collected during formative assessment adheres to sufficiency in that a variety of assessment activities were used, which included

demonstrations and oral questions as assessment techniques and checklists, scoring rubrics and portfolios for recording the demonstration of a skill. The learners' current competence was assessed, thus the evidence is current.

To determine the learners' opinions and expectations of formative assessment in general the first questionnaire, which was piloted, was given to the learners at the end of the second week of the learning programme. The second questionnaire was given to the learners at the end of the learning programme. Their opinions relevant to collecting evidence will be discussed in section 4.3.2. Examples of the assessment methods, techniques and tools applied during the three cycles of action research were the only ones, which were recalled by the learners when they had to complete the second questionnaire. This may be a positive as it indicates that the learners recalled what was done due to the applicability and real-life problems relevant to the assessment activity, and thus learners benefited from formative assessment as a process. To use action research together with formative assessment as a process can improve the quality of formative assessment as shown by the results of the questionnaires.

4.3.3 PHASE THREE: JUDGING THE EVIDENCE

ACTION

The assessor made use of written questions, oral questions and demonstrations as assessment methods to assess the learners formatively. Observation of assessment evidence being judged by the assessor indicated that written tests were used to assess learners' competence applicable to terminology they need to know in the Supply Support environment.

To record the evidence of formative assessment the assessor applied checklists, rubrics and products in this learning programme. Usually a holistic scoring rubric designed by him and indicating a performance level of 1 to 4, is used. These scoring rubrics were used for group work. The assessor once used the Internet for obtaining an example of a scoring rubric.

Peer assessment was also applied by means of assessing each other's tasks. The assessor explained to the learners how peer assessment should be performed. Peers assessed each other by indicating either an incorrect, correct or not sure mark next to the answers. They were not allowed to use the learning manual during the assessment and therefore they marked the answers according to their own knowledge. The learner(s) then determined if their peer(s) was/were competent or not yet

competent. It was then handed back to the peer. The learner then decided, based on the results of the marked assessment, if the learner/assessor was competent or not yet competent. The assessor assessed these peer assessments afterwards. The assessor gave feedback on the results of peer assessment to the learners the following day.

DISCUSSION OF PHASE THREE: JUDGING THE EVIDENCE: USING FORMATIVE ASSESSMENT AS A PROCESS

Efficient judgments can be made when thorough planning has been done in terms of assessment methods, techniques and tools as well as when determining the competencies to be assessed (see section 2.4.4). Judgments should adhere to the principles of reliability, validity, fairness, reflection, individuality, efficiency and objectivity (Killen, 2000; Van der Horst & McDonald, 2003). The judgments made on the assessment evidence were not always efficient due to the lack of effective planning. A view supported by Van der Horst & McDonald (2003). Although the assessor planned an assessment task/activity for the learners to complete, he did not address the competencies to be assessed. According to Killen (2000) the results of evidence must reflect the full range of the applied competencies in order to adhere to reliability (see section 2.4.2). Unreliable judgments were made on the evidence as a result of group assessment because the assessor evaluated the learner on the evidence provided by the group. Valid judgments were made because it reflected important content aspects and thus the specific and learning programme outcome (Killen, 2000). Judgments by the assessor were made on assessment evidence, which was collected by applying various assessment techniques, i.e. written and oral tests, role-play, demonstrations and practical work as well as peer assessment, which reflected content aspects.

Judgments are fair if the learner receives another opportunity to demonstrate his/her competence (see section 2.4.4) (Killen, 2000). Learners who were found not yet competent by the assessor received another opportunity to demonstrate their competence and thus the assessments adhered to fairness. Rubrics were designed in order to eliminate assessor subjectivity (see section 2.4.4) (Van der Horst & McDonald, 2003). Using scoring rubrics should allow the assessor to address the learner's strengths, weaknesses, etc. in terms of achieving the specific outcome. Although provision was made for the strengths and weaknesses to be indicated on the scoring rubric sheets, it was not addressed and feedback was not provided to individual learners. Judgments should allow for individuality (Killen, 2000), which the assessor did not allow for in this study because the learners were assessed in groups.

4.3.4 PHASE FOUR: RECOMMENDATIONS ON FORMATIVE ASSESSMENT

ACTION

A portfolio was used for the filing of every assessment task/activity, which the learner had to complete during the learning programme. The computer was used as an electronic device to print the formative assessment results. The assessor recorded the results on computer. Feedback was provided either by supplying computer printouts or by verbally announcing it to learners, indicating their competence in mastering the outcome, as competent or not yet competent by the assessor.

DISCUSSION OF PHASE FOUR: RECOMMENDATIONS ON FORMATIVE ASSESSMENT: USING FORMATIVE ASSESSMENT AS A PROCESS

Portfolios can be used to reflect learning progress. Reflecting on the learning progress of learners by using a portfolio establishes ownership of learning (McTighe, 1996/1997). Recommendations made should reflect the learner's competence in achieving the outcome (see section 2.4.5). The assessor indicated the learners' competence in mastering the outcome, as competent or not yet competent. Observation of the portfolios by the researcher indicated that it should reflect the progress of an individual's learning and that it should not be used as a filing system. Recommendations made by the assessor must be based on the assessment evidence of a learner's performance. The recommendations did not include suggestions for improvement, neither was it a summary of the quality of the task, effort and capability relevant to an *individual learner's* progress made by the assessor.

4.3.5 PHASE FIVE: FEEDBACK AND FURTHER DEVELOPMENT

ACTION

During the *first cycle* of action research, the assessor provided feedback to the group by providing answers incorrectly answered by the learners. Feedback in terms of the learner's competence was immediately applied after the assessment had taken place, either on a one-to-one basis or in a group context. According to the respondents' response, (94,74%) they received feedback applicable to their performance in mastering an outcome. Verbal feedback was the medium in which the respondents (47,37%) received feedback. Observing the feedback by the researcher after the formative assessment task/activity, the receiving of feedback as experienced by the learners proved

to be true. Demonstrating the correct procedure and/or an explanation of how something should have been done was provided via feedback. The assessor gave an alternative suggestion in terms of tasks incorrectly performed to the learners. The response in terms of feedback according to the respondents were excellent in terms of effort (52,63%), 47,37% in terms of capability, and 57,89% in completing a task (see Figure 4.6).

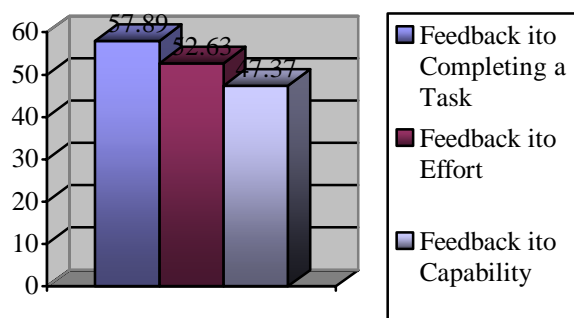


Figure 4:6 Learners' Experiences of Receiving Feedback in terms of Effort, Capability and Completion of a Task

After the first group had finished their role-play illustrating the process of dispatching a parcel, during the *second cycle* of the action research approach, the assessor gave feedback to the class. The respondents (52,63%) responded that they received feedback in terms of completing tasks according to the rubric as was observed by the researcher. The assessor provided no strengths and weaknesses applicable to the completion of a task or critical outcomes to the learner. After the assessment was finalised he designed a checklist applicable to the role-play, which was the result of reflection done by the assessor.

During the *third cycle* of action research, the assessor formatively assessed learners on their competence in using bin numbers where they had to store materiel onto the correct shelf. Although 79,17% of the respondents responded that they received feedback after the assessment, it was mainly done by means of informing each individual that he/she was competent or not yet competent as observed by the researcher. The respondents (21,05%) who were found not yet competent when formatively assessed were given another opportunity to demonstrate their competence by the assessor.

DISCUSSION OF FEEDBACK AND FURTHER DEVELOPMENT: USING FORMATIVE ASSESSMENT AS A PROCESS

Although feedback was provided, it was very low in terms of effort, capability and the completion of a task and it was done according to the group's assessment evidence. When the learners did not provide the correct answer/action the assessor commented with a "No" to their answer/action and answered/showed them the correct procedure. After the first cycle of action research, the assessor focused on asking more pro-active questions, such as: "What now?" It is suggested by the researcher that learners should receive feedback after the whole class has completed the formative assessment task/activity. It was therefore unfair to the first group who received feedback before the other groups presented their task/activity in terms of the process relevant to dispatching a parcel because the groups could amend their shortcomings accordingly. Although provision was made for written feedback during the third cycle of action research, the feedback in terms of the learners' strengths and weaknesses did not fulfil the requirements for achieving quality, mainly because of group assessment (see section 2.4.6). Although the researcher provided guidelines to the assessor in terms of applying self-assessment it was not implemented. Self-assessment did not form part of planning done by the assessor and neither did the assessor implement it. According to two experimental research studies that were reported by Boston (2002), it is important for learners to reflect on their own work. Implementing self-assessment activities enabled learners to reflect on their own work and they show greater improvement than those who do not.

According to the interview with the assessor after using formative assessment as a process by means of action research, the assessor appeared more positive towards using feedback as a teaching tool. According to the information obtained from the interview the assessor identified gaps in the feedback that was given, i.e. the provisioning of mainly oral feedback in terms of effort and capability when the learner had completed a task. When feedback is provided for the purpose of learning it must be descriptive (see section 2.4.6). This will increase learning, therefore feedback cannot be provided to a group when an individual's learning must be monitored, i.e. the purpose of formative assessment. As suggested by the researcher feedback must be provided in terms of the learning outcomes, assessment criteria, assessment processes and the decisions made by the assessor (see section 2.4.6). Although the assessor provided feedback in terms of the competence of a learner in mastering the learning outcome, it can be done in a more descriptive way. Feedback was not provided to the learners specifically in terms of knowledge, skills, performance (behaviour), values and attitudes. In terms of the assessment process, feedback provided should indicate the learning progress of an individual learner, which the assessor did not do.

4.4 CONCLUSION

4.4.1 CHANGES THAT OCCURRED AS A RESULT OF USING ACTION RESEARCH

Although the assessor did not use the purpose of formative assessment, (i.e. to monitor a learner's progress and to provide feedback) prior to the action research, it improved thereafter.

To be able to apply formative assessment as process, comprehensive planning needs to be done according to the suggested five phases. Although the assessor gradually improved the planning and designing of formative assessment after each cycle of action research, there are areas that need more refinements such as the planning and designing of other assessment techniques and tools, scoring rubrics and feedback to monitor a learner's progress.

The assessment techniques provided to learners to demonstrate their competence, were real-life situations e.g., to assemble a parcel for dispatch, as well as to identify bin numbers. For each of the assessment activities, scoring rubrics were developed and used by the assessor. The design of scoring rubrics included performance dimensions and levels of demonstrations. The learners' performances were assessed according to these criteria.

Although the assessor designed authentic assessment tasks/activities to be applied in real-life situations, it could have been formulated using a more challenging real-life problem. Attention should be given to the formulation and asking of pro-active questions.

Prior to the action research no feedback was given to the learners. Although the assessor provided feedback to the learners applicable to their performance during the action research, there are areas that need refinement before it will adhere to quality. Descriptive feedback must be provided in terms of corrections, remediation, constructiveness, reinforcements, and comments/suggestions regarding improvement, weaknesses and strengths. The feedback must indicate the learner's level of performance, which is done by assessing the learner against assessment criteria in relation to the specific outcomes.

Evidence of all the assessment activities was documented by making use of portfolios. Marks were allocated when the scoring rubrics were used. The assessor decided if a learner was competent or not yet competent and the findings were provided to the learners verbally.

4.4.2 IMPROVEMENTS THAT OCCURRED AS A RESULT OF USING ACTION RESEARCH

The learner's progress can be monitored against national standards and assessment criteria by means of using the information as provided from the evidence. Although the national standards and assessment criteria were available to the learners prior to the action research, the assessor did not use the information provided effectively, as seen from the respondents' low response rate (see Figure 4.6). It is suggested that the assessor must inform the learners about the use of both the national standards and assessment criteria in order to apply it to their benefit.

Notwithstanding the improvement of the quality of performance levels and dimensions of performance applicable to scoring rubrics for the duration of this study, there were areas that need refinement. The rubrics that were designed adhered to content validity (it reflected the outcome), but not to construct-related validity (processes inherent to an individual). Assessment activities were applied by making use of real-life situations and therefore the rubrics adhered to criterion-related validity. The performance levels and criteria of each dimension used in scoring rubrics were not always well defined and therefore it did not adhere to reliability. Although the scoring rubrics were available to the learners, the assessor did not engage them in the actual designing process. To support the achievement of quality formative assessment, the researcher suggests that learners must be engaged in the planning and designing process of scoring rubrics. The learner's progress can be monitored by means of information from assessment evidence provided when a scoring rubric is used. The strengths and weaknesses of a learner could not be identified due to its application in a group context.

4.4.3 NO CHANGES WHICH HAD OCCURRED AS A RESULT OF ACTION RESEARCH

To verify the level of achieving the outcome, a clear focus of what learners have to achieve, has to be determined. While formative assessment was done the focus was not clear. Therefore the assessment activity could not support the purpose of assessment, i.e. to monitor a learner's learning progress. The assessment technique chosen was not always the best way of assessing, as was found from the evidence of applying firstly posters (flow-chart) and during the presentation role-play as an assessment technique for illustrating the process of dispatching a parcel. The foundational, practical and reflexive competence of learners was not effectively assessed, as a result of ineffective planning. Although a scoring rubric was developed during the application of action research the

assessor did not assess all three learning domains (cognitive, affective and psychomotor). Quality in this instance was not achieved, because of the emphasis placed on the assessment of the cognitive domain. Adherence to legislation in terms of including all three learning domains was forfeited (SAQA, 2001).

The assessment evidence did not reflect the important knowledge, skills, performance (behaviour), values and attitudes, which had to be mastered by the learner. The judgment of evidence collected did not adhere to principles of fairness, reflection and individuality. It was unfair to formulate a judgment on a learner's competence if the group was assessed. Due to group assessment, a learner could not express his/her individuality. A *learner's* progress can be monitored when formative assessment is applied, therefore a judgment on an individual's performance could not be formulated when a group was assessed.

In assessing the entire group by means of applying a scoring rubric, accurate judgments in terms of validity, authenticity, sufficiency and currency could not be done on an individual learner's performance. The learners knew the scoring rubric sheet and its content. The strengths and weaknesses of learners were not effectively determined when assessment evidence was collected. The collection of evidence regarding the knowledge, skills, performance (behaviour), values and attitudes of the learner's progress did not adhere to quality.

No self-assessment activities/opportunities were included in the planning, designing and application of formative assessment, therefore the learner could not assess him/herself in terms of his/her learning progress. During this study peer-assessment was only implemented once. The assessor did not plan any further or other assessment opportunities however, learners were given the opportunity to demonstrate their competence more than once.

CHAPTER 5

5 CONCLUSION

5.1 SHORT OUTLINE OF THE RESULTS

This final chapter summarises the research in terms of the research question, the process embarked on to answer the question and the results, conclusions and recommendations that emerged from the study. A summary of the report is presented in section 5.2 followed by a discussion on the research and its results in section 5.3. This chapter concludes with recommendations for policy and practise as well as for research and development for further work. A summary of the results in response to the research question of how the quality of formative assessment in the Initial Supply Support learning programme can be improved by using action research are presented in this section.

Although several areas of formative assessment improved by using action research as tool for improvement, these areas need to be refined. These areas are discussed in the section below.

- Prior to the action research it was found that the assessor was not utilising the purpose of formative assessment in the Initial Supply Support learning programme as the foundation for planning and designing formative assessment as a process.
- To be able to apply formative assessment as a process, comprehensive planning needs to be done according to the suggested five phases of formative assessment (Lategan & Van Rooyen, 1998). Before the action research the assessor did not do any planning relevant to formative assessment. During the action research the assessor planned and designed formative assessment, which gradually improved with each cycle of action research (see sections 4.2 and 4.3).
- Although the assessment techniques were used in relation to real-life situations they were not always the best way of assessing the specific outcome.
- Although the designing of scoring rubrics improved during the study, there are areas that could be refined. The assessor also has to engage the learners in the design process of using scoring rubrics.
- Although the learners received feedback in terms of competent or not yet competent, as well as feedback in terms of effort, capability and the completion of a task, they received feedback that was relevant to the assessment evidence of the group. The feedback should be

descriptive in terms of corrections, remediation, constructiveness, reinforcements, strengths and weaknesses of a task/activity completed by the learner. The feedback must also indicate the level of performance by assessing the learner's performance against assessment criteria in relation to the specific outcome.

Although the under mentioned guidelines, which were provided to the assessor by the researcher, were addressed in the action research, these areas need to be improved, in order to ensure that quality can be improved by using formative assessment as a process.

- Although the assessor made the national standards and assessment criteria known to the learners, it is suggested by the researcher that they should be informed on how to use and interpret the information as relevant to the outcome.
- The assessor should determine a clear focus of what learners must achieve at the end of the learning programme (Airasian, 2001; Van der Horst & McDonald, 2003; Killen, 2003). All three the learning domains were not effectively assessed by the researcher. The assessor can focus on asking more pro-active questions in order to stimulate a deep understanding of concepts.
- Although the learners received opportunities to demonstrate their competence more than once, no planning for these opportunities was done. Peer assessment was applied once during the duration of this study. It is suggested by the researcher that the evidence of the learners' competencies, which was filed by making use of a portfolio should be used to monitor a learner's progress.

5.2 SUMMARY

The aim of this research study was to investigate how the quality of formative assessment in the Initial Supply Support learning programme can be improved by using it as a process together with action research.

The Directorate Logistic Resources Management is responsible for the research and development of all the Supply Support learning programmes. The Supply Support personnel in the DOD must complete three learning programmes in the mentioned area (see section 1.1). The Initial Supply Support learning programme is the first of the three programmes, which was developed and presented. Learners of all Services (SA Army, SA Air Force, SA Navy and SA Medical Health Services) have to complete these learning programmes. Learners doing this learning programme

are introduced to elementary concepts of the Supply Support environment. For learners to be able to apply the knowledge, skills, performance (behaviour), values and attitudes of what they have learnt in the workplace, it is necessary that their learning progress should be monitored for the duration of a learning programme. Monitoring a learner's learning progress can be done by applying formative assessment.

The learners who attended the Initial Supply Support learning programme in May/June 2004 together with the assessor responsible for presenting the programme, were selected as the target group for this study. The reason for selecting this particular target group was that it was the only Initial Supply Support learning programme that was presented during the course of this research study. The study was conducted in the DOD School of Logistical Training Satellite in Pretoria, over a 6-week period. The intention of this study was to equip the assessor (who already completed an OBE facilitator/assessor learning programme) with guidelines/recommendations for improving the quality of formative assessment by using it as a process together with action research. It was furthermore the intention of the researcher to also enable learners to benefit from the application of using formative assessment as a process.

From the researcher's point of view it was necessary to implement formative assessment as a process in order to improve the existing quality thereof in the Initial Supply Support environment in the DOD. The decision was made after shortcomings in the existing formative assessment were identified (see sections 1.1 and 1.2). In an attempt to address these shortcomings, a literature review was carried out that examined these problems in relation to a selection of texts identified on formative assessment. Due to action research's, "cyclical" characteristic the researcher decided to use it as a research method in investigating how it could be used to improve the quality of formative assessment in the Initial Supply Support environment in the DOD.

Furthermore, action research also provides a systematic inquiry approach in order to understand and improve practice. This cyclical characteristic provides a useful framework for planning, designing, implementation and evaluation. Therefore the stages of action research as proposed by Hodgkinson and Maree (1998), (planning, implementing, observing and evaluating) were used in this study in order to improve the quality of formative assessment by applying it as a process. Due to the cyclical nature of action research it does not necessarily end and therefore it lends itself to every aspect of this study, i.e. improving the quality of applying formative assessment as a process.

Furthermore, from literature the five phases that Lategan and Van Rooyen (1998) used in an assessment system were considered. From a critical literature review several concepts and principles of formative assessment were identified and applied to each of these phases as amended by the researcher. The researcher investigated the results of applying action research as tool for improving the quality of formative assessment.

The investigation was done with a small group of participants and one assessor; and provided an opportunity to work in close contact with the participants. Both quantitative and qualitative research methodology were used in this study (see Chapter 3). The data collection was done by means of questionnaires (completed by the learners), semi-structured interviews (with the assessor), observation of the action, and document review (assessments, learning task designs and portfolios) by the researcher. The questionnaires were analysed by using an inductive approach. The other data was analysed by using a deductive approach. Triangulation was present in this study by making use of these different sources of data collection. The data collected by means of the action research and the findings thereof was presented in Chapter 4.

5.3 DISCUSSION

The previous part of this chapter presented an outline of the results with regard to the research question and provided a summary of this report. Section 5.3.1 reflects on the methodological aspect, and section 5.3.2 compares results of this research with research in the same area. Section 5.3.3, which concludes this section, is a scientific reflection on the contribution of this study in terms of improving the quality of formative assessment by using it as a process together with action research.

5.3.1 METHODOLOGICAL REFLECTION

Action research was used in this study. The investigation in terms of how the quality of formative assessment can be improved by aligning it with action research was done with a small group of 19 learners (N=19) and one assessor. Due to the time limitation, only three cycles of action research were applied during this study.

Several concepts and principles of formative assessment could be identified from literature being critically reviewed. The researcher integrated and applied these concepts and principles into the

five phases as amended by the researcher for planning and implementing formative assessment as laid out by Lategan and Van Rooyen (1998). To investigate how the quality of formative assessment can be improved it was aligned with action research, thus forming a process. The alignment resulted as follows: phase one; planning and designing with the planning stage of action research, phase two; collecting evidence were aligned with the implementation stage, phase three and four; judging evidence and making recommendations were aligned with the observation stage and phase five; feedback and further development with the evaluation stage of action research.

From the limitations as observed in the application of formative assessment in the Supply Support environment (see sections 1.1, 3.5.3 and 4.1) prior to the action research, guidelines were provided to the assessor by the researcher. The assessor designed formative assessment tasks/activities, by using the provided guidelines.

The application of the designed assessment was observed and reflected upon by the researcher. Recommendations were provided to the assessor in terms of the evaluation, which necessitated further cycles of action research. Three cycles of action research were applied during this study, characterised by the same actions as mentioned above. During each cycle data were obtained, which could be analysed in order to improve the quality of formative assessment by using it as a process through aligning it with the stages of action research.

Although small, the results from this study indicated an improvement regarding the quality of applying formative assessment as a process. The short duration of this study could be the reason for the small indication of improvement. It is therefore strongly suggested that formative assessment as a process should be applied to more than one learning programme and/or for a longer period. There was a visible improvement in the areas of planning formative assessment and the designing of scoring rubrics. The design of an assessment technique also improved after each cycle of action research (see sections 4.4 and 5.1).

5.3.2 SUBSTANTIVE REFLECTION

As was found from the reviewed literature, only the concepts and principles of formative assessment are addressed. To combine these concepts and principles to be used in a process, the researcher used the five phases (as amended by the researcher) of Lategan and Van Rooyen (1998) as the framework for the process. From an academic point of view, this research study added great

value to the application of formative assessment. The value of using formative assessment as a process is elaborated upon in the section below.

It is of utmost importance that a clear definition should be used as a guide for the planning and designing of formative assessment that is relevant to using formative assessment as a process. The suggestion by the researcher to use the definition relevant to formative assessment as a process will ensure that all relevant aspects are considered during the whole process. The researcher also applied several concepts and principles relevant to each of the amended five phases of formative assessment as a result of literature reviewed. Every phase is essential as is the adherence to the principles to be included as suggested by the researcher. *Not one* phase can be excluded in the process, as they depend on each other in order to ensure quality for improving formative assessment as a process. The principles in the phases are to be used as a set of standards, which have to be adhered to in order to improve quality. It is suggested that the five phases including the concepts and principles, together with action research should be used as a formative assessment process for improving the application thereof (see Chapter 2).

5.3.3 SCIENTIFIC REFLECTION

As mentioned in section 5.2, the concepts and principles of formative assessment are to be included in each of the phases of using formative assessment as a process. Adhering to the principles will ensure that a set of standards are achieved and will thus improve quality. To improve the quality of formative assessment while using it as a process, each phase can be aligned with the stages of action research. Aligning action research with formative assessment as a process resulted in: planning stage (phase one, planning and designing), implementation stage (phase two collecting evidence), observation stage (phase three and four, judging evidence and making recommendations) and evaluation stage (phase five, feedback and further development). It is therefore suggested that formative assessment should be used as a process in conjunction with action research.

A definition that includes all aspects relevant to formative assessment to be applied in a process was constructed by the researcher from a critical review of the available definitions in the literature. Furthermore, the researcher integrated the identified concepts and principles in each of the amended five phases of formative assessment. Including these concepts and principles will enable an assessor to be familiar with the function of a specific phase (see section 2.3). It is suggested by the researcher that an assessor should also be familiar with the purpose of formative assessment, before

commencing with the planning and designing phase to be able to monitor a learner's progress in terms of achieving an outcome (see section 2.4.1). The literature was furthermore reviewed on formative assessment specifically in relation to its principles, which can be applied with the four principles of OBE, which are furthermore applied to phase one of using formative assessment as a process.

The alignment of each assessment phase together with action research will be discussed in this section. The four principles of OBE (Spady, 1988; Killen, 2000; Killen, 2003; Vandeyar & Killen, 2003; Van der Horst & McDonald, 2003; Du Toit & du Toit, 2004) are to be used in phase one, i.e. planning and designing formative assessment. The assessor should first decide what learners have to achieve at the end of the learning programme (*designing back*, Killen, 2000). The researcher furthermore applied the principles of fairness, practicability, validity and reliability to the *designing back* step. All the competencies (i.e. knowledge, skills, performance (behaviour), values and attitudes) that have to be assessed must be identified in this step of *clarity of focus* (Killen, 2000). It is suggested that the focus should be on assessing all three learning domains and not only on the cognitive domain. Adhering to this suggestion enables an assessor to adhere to legislation (SAQA, 2001). In order to operationalise this plan, an assessment strategy has to be designed, inclusive of authentic assessment approaches, methods, techniques and tools. Challenging tasks (*high expectations*, Killen, 2000) together with other opportunities (*expanded opportunities*, Killen, 2000) have to be designed in accordance with the specific and learning programme outcome (see section 2.4.2).

The researcher is of the opinion that direct and indirect evidence should be collected when formative assessment as a process is applied during phase two. The quality of assessment evidence collected can be verified by adhering to the principles of validity, authenticity, sufficiency and currency (SAQA, 2001). Enough evidence (determined by the specific outcomes and assessment criteria) should be collected to be able to make an accurate judgment in terms of the learner's performance (see section 2.4.3).

An assessor has a responsibility towards a learner in terms of making judgments during phase three and four. Judgments should be characterised by the principles of efficiency, objectivity, reliability, validity, fairness, reflection and individuality (Van der Horst & McDonald, 2003; Killen, 2000). Adhering to all these principles can improve the quality of judgments made on evidence provided (see section 2.4.4). Recommendations are made in accordance with the judgments relevant to the

assessment evidence. These recommendations should be based on the performance of the learner in terms of achieving the outcome. A summary in terms of the task, effort and capability should be provided, which should include the learner's strengths and weaknesses (see section 2.4.5).

Feedback should be provided in terms of the learner's performance with reference to achieving the outcome during phase five. To enable an assessor to achieve this, it is suggested that feedback should include information relating to the learning outcome (mastering of the outcome), assessment criteria (competencies of a learner), assessment process (learning progress) and decision (achievement or non-achievement). The learner must receive descriptive feedback in this regard via sessions, which includes their strengths, weaknesses, constructiveness, reinforcements, corrections and remediation of assessment tasks/activities completed (see section 2.4.6).

Including the principles and concepts as suggested by the researcher to each of the five phases of formative assessment, supports the attempt of improving quality. These principles are a set of standards to which an assessor should adhere in order to improve formative assessment by using it as a process together with action research (see section 2.2).

5.4 RECOMMENDATIONS

This final section of the report includes recommendations to be considered for policy and practice relating to the improvement of the quality of formative assessment as a process and further research and development relevant to this study.

5.4.1 POLICY AND PRACTICE

Currently policy exists for the workplace environment in terms of formative assessment, but comprises only of several concepts and principles of assessment. Furthermore it contains aspects and procedures of how a learner can appeal against the decision of an assessor relevant to his/her competence. No policy exists for the improvement of formative assessment in the workplace.

Due to the fact that formative assessment must be implemented as prescribed by legislation, every education and training institution has to comply with it (see section 1.1). Different perceptions of what formative assessment are, its purpose and how it should be implemented exist, which result in different applications thereof (see section 2.3). The Department of Education, in conjunction with

SAQA, should consider designing a policy relevant to formative assessment, by applying it as a process in conjunction with action research for the improvement of quality.

5.4.2 FURTHER RESEARCH AND DEVELOPMENT WORK

It is recommended that the concepts and principles as identified from the literature and applied as suggested by the researcher should be included in each of the formative assessment phases. Action research provides the opportunity to plan, implement, observe and evaluate, which can improve the quality of formative assessment when using it as a process. It is therefore recommended that the five phases of formative assessment should be aligned with action research and be used as a process (see Appendix F, Framework for Using Formative Assessment as a Process together with Action Research). Applying these recommendations will enable an assessor to develop and apply quality formative assessment.

Training of assessors on formative assessment is imperative. A prerequisite for applying formative assessment is that an assessor should be *au fait* with the foundational knowledge of formative assessment. Although there was improvement in the quality of applying formative assessment as a process in this study, more refinement is required by means of using action research as tool for improvement.

Finally it is suggested that further research could also be done to determine if *learning* has taken place by means of applying formative assessment as a process, while using action research as a tool for “improving”.

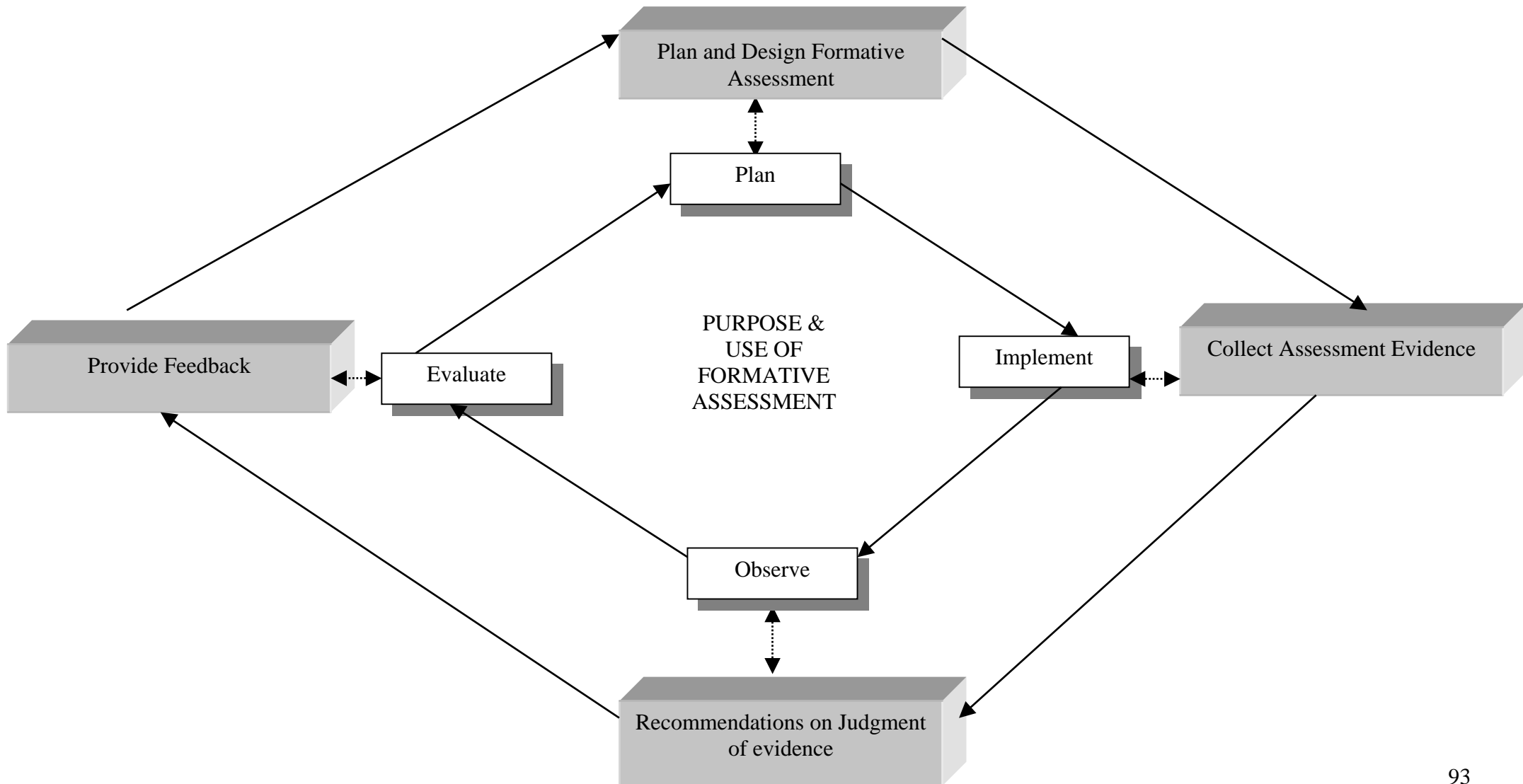
REFERENCES

- About Classroom Assessment FOR Learning (Q&A). An Alberta Assessment Consortium (AAC) Resource. Retrieved January 30, 2004, from <http://www.aac.ab.ca/aboutqa.html>.
- Airasian, P.W. (2001). *Classroom Assessment Concepts and Applications*. McGraw-Hill, Boston.
- Black, P., & William, D. (1998). *Inside the Black box: Raising Standards through Classroom Assessment*. Retrieved November 20, 2003, from www.pdkintl.org/kaplan/kbla9801.htm.
- Boston, C. (2002). The concept of formative assessment. *Practical Assessment, Research & Evaluation*, 8(9). Retrieved February 2, 2004, from <http://PAREonline.net/getvn.asp?v=8&n=9>
- Brooker, R., Muller, R., Mylonas, A., & Hansford, B. (1998). Improving the assessment of practice teaching: A criteria and standards framework. *Assessment & Evaluation in Higher Education*, 23(1).
- Brualdi, A. (1998). Implementing performance assessment in the classroom. *Practical Assessment, Research & Evaluation*, 6(2).
- Carr, W., & Kemmis, S. (1986). *Becoming Critical: Education, Knowledge and Action Research*. Basingstoke, Hants: Falmer, Press.
- Cohen, L., & Manion, L. (1994). *Research Methods in Education*. Fourth edition. London: Routledge.
- Cohen, L., Manion, L., & Morrison, K. (2000). *Research Methods in Education*. 5th Edition. London: Routledge Falmer Taylor & Francis Group.
- Department of Education (DoE). (1998a). Preparing for the twenty-first century through education, training and work. *Education White Paper 4: A Programme for the Transformation of Further Education and Training*. Pretoria: Department of Education.
- Department of Education (DoE). (2002b). *Guidelines for Outcomes-Based Assessment in all Grades in Foundation, Intermediate and Senior Phases Implementing OBE (excluding Grade 9)*. Pretoria: Department of Education.
- Department of Education (DoE). (1998c). *Assessment Policy in the General Education and Training Band. Grad R to 9 and ABET*. Pretoria: Department of Education.
- Du Toit, G.F., & du Toit, E.R. (2004). Understand Outcomes-Based Education (OBE). In Maree, J.G. & Fraser, W.J. (Eds.) *Outcomes-Based Assessment*. Heinemann. Sandown.
- Erasmus, B.J., & Van Dyk, P.S. (1996). *Training Management*. A practical approach. International Thomson Publishing (Southern Africa) (Pty) (Ltd).

- Engelbrecht, E., du Preez, C., Rheeder, R., & Van Wyk, M. (2001). Changing existing qualifications into outcomes-based qualifications at Technikon SA: an action research report. *South African Journal of Higher Education*, 15(2).
- Gawe, N., & Heyns, R. (2004). Quality assurance. In Maree, J.G., & Fraser, W.J. (Eds.) *Outcomes-Based Assessment*. Heinemann. Sandown.
- Gay, L.R., & Airasian, P. (2003). *Educational Research*. Competencies for analysis and applications. 7th Edition. Upper Saddle River, New Jersey: Pearson Education.
- Goodrich, H. (1996/1997). Understand rubrics. *Educational Leadership*, 14-17.
- Haertel, E.H. (1999). *Performance Assessment and Education Reform*, 80(9).
- Hodgkinson, H.L. (1957). Action research – a critique. *Journal of Educational Sociology*, 31(4).
- Hodgkinson, C.A., & Maree, J.G. (1998). Action research: some guidelines for first-time researchers in education. *Journal of Education and Training*, 19(2).
- Killen, R. (1998). *Outcomes-Based Education: Some Issues to consider in the South African Context*. University of Newcastle: Australia.
- Killen, R. (2000). *Outcomes-Based Education: Principles and Possibilities*. Unpublished manuscript, University of Newcastle, Faculty of Education. Retrieved November 20, 2003, from www.schools.nt.edu.au/curricbr/cf/outcomefocus/Killen_paper.
- Killen, R. (2003). Validity in outcomes-based assessment. *Perspectives in Education*, 21(1), 1-14.
- Killen, R., & Hattingh, S.A. (2004). A theoretical framework for measuring the quality of student learning in outcomes-based education. *South African Journal of Higher Education*, 18(1), 72-86.
- Lategan, A., & Van Rooyen, M. (1998). *How to Implement Outcomes-Based Assessment*. Cutting Edge, 1(2), February 1-8.
- Lategan, A. (n.d.). *Quality Assurance Systems for Providers of Education and Training*. Cutting Edge, 11-21.
- Lewin, K. (1948). *Resolving Social Conflicts: Selected Papers on Group Dynamics*. London: Harper & Row, Publishers, Inc.
- Mc Millan, J.H. (2000). Fundamental assessment principles for teachers and school administrators. *Practical Assessment, Research & Evaluation*, 7(8). Retrieved February 2, 2004, from <http://PAREonline.net/getvn.asp?v=7&n=8>
- McMillan, J.H., & Schumacher, S. (2003). *Research in Education*. A conceptual framework. 5th Edition. New York: Addison Wesley Longman, Inc.
- McTighe, J. (1996/1997). What happens between assessments? *Educational Leadership*, 54(4).
- Mertler, C.A. (2001). Designing scoring rubrics for your classroom. *Practical Assessment, Research & Evaluation*, 7(25).

- Moore, K.B. (2002). Using assessment tools that are developmentally appropriate and effective aids to curriculum planning. *Early Childhood Today*, 16(4).
- Pallant, J. (2001). *SPSS Survival Manual*. Buckingham: Open University Press.
- Popham, W.J. (2002). *Classroom Assessment: what teachers need to know*. Allyn and Bacon, Boston.
- SAQA. (2001). *Criteria and Guidelines for the Assessment of NQF Registered Unit Standards and Qualifications*. SAQA. Pretoria.
- Spady, W.G. (1988). Organizing for results: The basic of authentic restructuring and reform. *Educational Leadership*, 46(2), 4-7.
- Tierney, R., & Simon, M. (2004). What's still wrong with rubrics: Focusing on the consistency of performance criteria across scale levels. *Practical Assessment, Research & Evaluation*, 9(2). Retrieved January 30, 2004, from <http://PAREonline.net/getvn/asp?v=0&=2>
- Van der Horst, H., & McDonald, R. (2003). *Outcomes-Based Education: Theory and Practice*. Tee Vee Printers, Irene.
- Vandeyar, S., & Killen, R. (2003). Has curriculum reform in South Africa really changed assessment practices, and what promise does the revised National Curriculum statement hold? *Perspectives in Education*, 21(1), 119-134.
- Wolfson, R., & Lancaster, K. (1999). Managing human resource development. In Meyer, M. (Ed.) *An Outcomes-Based Approach*. Butterworths. Durban.
- Zuber-Skerritt, O. (1992). *Action Research in Higher Education: Examples and Reflections*. London: Kogan Page.

USING FORMATIVE ASSESSMENT AS A PROCESS TOGETHER WITH ACTION RESEARCH



QUALITY OF FORMATIVE ASSESSMENT

1. You, as student (learner), have been chosen to complete this questionnaire. It is important to complete the questionnaire in order to receive your inputs regarding, formative assessment during the learning programme.
2. Each questionnaire will be handled with confidentiality. It is not necessary to indicate any personal information on the questionnaire. After the data has been processed the questionnaires will be destroyed.
3. The aim of this research is to determine how the quality of formative assessment in the Initial Supply Support learning programme can be improved.
4. After completion of the questionnaire it will be personally collected.
5. Thank you for the time spent to complete the questionnaire.

This research is being done for obtaining a M-Ed. Any enquiries can be forwarded to:

Ms I. Janse van Rensburg
Department of Defence
Chief Joint Support
(Logistic Sub-division)
Directorate Logistic Resources Management
Private Bag X 319
Pretoria
0001

Telephone:

Answer each question by **circling** an appropriate number in a **shaded** box or **writing** your answer in the **shaded space**.

BACKGROUND INFORMATION

1. What is your age?

Q1

18 - 27 Years	1
28 - 37 Years	2
38 - Years and older	3

2. Gender?

Q2

Male	1
Female	2

3. Nationality group?

Q3

Black	1
White	2
Indian	3
Coloured	4

4. What is your highest school exit qualification?

Q4

Gr 1 - Gr 7	1
Gr 8 - Gr 10	2
Gr 11 - Gr 12	3

5. Do you have any tertiary qualifications?

Q5

Yes	1
No	2

6. If you answered Yes in question 5, name the qualification.

Q6

LEARNING PROGRAMME

7. How satisfied are you with this learning programme?

Q7

Very Good	Good	Satisfied	Unsatisfied	Poor
5	4	3	2	1

8. What are your expectations for completing this learning programme?

Q8

Promotion	1
Widen your knowledge	2
Improvement of task	3

For Office Use Only

9. Why have you enrolled in this learning programme?

Q9

10. Indicate if you agree or disagree with the following statements?

	Agree	Disagree
a. The subjects facilitated are applicable in my working environment.		
b. Some of the subjects facilitated are unnecessary.		

Q10a

Q10b

ASSESSMENT

11. How would you describe formative assessment?

Q11

Promote my own learning	1
Does not promote my own learning	2
Use it to determine my learning progress	3
Can't be used to determine my learning progress	4

12. Indicate your agreement or disagreement with the following statements:

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. Applying formative assessment in the class provides information about my performance in terms of mastering the outcome.				
b. If formative assessment is applied I know exactly what is expected from me in terms of knowledge and the executing of tasks.				

Q12a

Q12b

13. Which of the following assessment techniques were used during formative assessment?

For Office use only

Assignments	1
Case studies	2
Completion questions	3
Matching questions	4
Oral questioning	5
Personal interviews	6
Portfolio	7
Posters	8
Practical	9
Questionnaires	10
Role play	11
Short/small tests	12
Simulations	13
Other, please specify	14

Q13

14. Indicate your agreement or disagreement with the following statements regarding your competence:

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. The facilitator supplied me with various assessment techniques.				
b. The facilitator informed me when I was going to be formatively assessed.				
c. The facilitator informed me well in advance, before I was formatively assessed.				
d. The assessment criteria were known, prior to formative assessment.				
e. The national standard(s) were known, prior to formative assessment.				
f. I believed that I was prepared (competent) to be formatively assessed.				

Q14a

Q14b

Q14c

Q14d

Q14e

Q14f

15. There were negative factors that have influenced my preparation for formative assessment.

Q15

Noise	1
Study environment	2
Other, please specify.....	3

16. What were you expected to do during the assessment?

Q16

Construct a response, e.g. Answer of a question	1
Create a product, e.g. Bake a cake	2
Demonstrate a skill, e.g. driving a vehicle	3

17. What were you expected to do during the construction of a response in this learning programme? (provide an example of a question asked by the facilitator and your answer to him)

Q17

18. What were you expected to do during the creation of a product in this learning programme? (provide an example)

Q18

19. What were you expected to do during the demonstration of a skill in this learning programme? (provide an example)

Q19

20. Were you found not yet competent during any formative assessment?

Q20

Yes	1
No	2

21. If you answered yes, did you receive another opportunity to demonstrate your competence?

Q21

Yes	1
No	2

22. Which of the following were used to determine if you are competent or not yet competent?

Q22

Checklist	1
Rubric sheet	2
Memorandum	3
Portfolio	4
Worksheet	5
Observation Sheet	6
Exhibition	7
Class lists	8
Written Assignments	9
Other, please specify	10

23. Did you receive any feedback after you have been assessed?

Q23

Yes	1
No	2

24. How was feedback given?

Q24

Written feedback	1
Verbal feedback	2
Combination of both	3
None	4

25. Rate the feedback you were given on a scale of 1 to 4, in terms of:

Q25a

	1 (Excellent)	2 (Good)	3 (Moderate)	4 (Poor)
a. Your effort,				
b. Your capability,				
c. Your completion of the task.				

Q25b

Q25c

26. Rate the following statement on a scale of 1 to 4: The facilitator indicated what my strengths were in completing a task.

Q26

1 (Excellent)	2 (Good)	3 (Moderate)	4 (Poor)
------------------	-------------	-----------------	-------------

27. Rate the following statement on a scale of 1 to 4: The facilitator indicated what weaknesses I could improve upon.

Q27

1 (Excellent)	2 (Good)	3 (Moderate)	4 (Poor)
------------------	-------------	-----------------	-------------

28. Would you say that you are familiar with self-assessment?

Q28

Yes	1
No	2

29. How did you use self-assessment as a tool in this learning programme?

Q29

SEMI-STRUCTURED INTERVIEW

A. CONCEPT OF FORMATIVE ASSESSMENT

- Could you explain to me what formative assessment means to you? (probes: characteristics, principles)

- Could you describe how you would use formative assessment in your practice? (probes: How, when, relevancy, listen carefully what is said because strategies might be mentioned and then I could pick up on that)

- According to you, what are the assessment strategies that can be used in the outcomes-based environment? (probes: authentic assessment: i.e. alternative-, performance-, holistic- and observation-based assessment)

- According to you, what are the different kinds of tools and techniques that can be used? (probes: Techniques: Project work, collage, research projects, assignments, roll play, oral, brain charts, posters, tables, written presentations. Tools: Portfolios, observation sheets, journals, worksheets, class lists, test/exams, written assignments)

- What principles of OBE would you say you apply in your facilitation? (probes: clarity of focus, designing back, high expectations and expanded opportunity)

- What would you say could you do/use to improve the quality of formative assessment?

- What would you say constitutes quality feedback?
-
-

B. PLANNING AND DESIGNING OF FORMATIVE ASSESSMENT

- What assessment opportunities are worked into your learning programme?
-
-

- What type of planning activities do you undertake in terms of assessment?
-
-

- What type of planning do you undertake in terms of other formative assessment techniques and tools? (probes: when learning doesn't take place)
-
-

C. FORMATIVE ASSESSMENT CRITERIA AND NATIONAL STANDARDS

- Do you discuss the national standards with your learners? (Probe: How, by means of?)
-
-

- How do you make the specific assessment criteria for the assessment about to take place, known/explicit to the learners?

- Are the circumstances under which the outcome must be demonstrated indicated in the assessment criteria?

D. FORMATIVE ASSESSMENT STRATEGIES

- Which assessment techniques and tools do you use to assess and record the following:
 - Construct a response?
 - Create a product?
 - Demonstrate a skill?

- How do you ensure the authenticity of assessment? (probes: focus on processes, products and performances, real-life environment, construct a response, create a product or demonstrate a skill)

E. ASSESSMENT EVIDENCE

- Which formative assessment tools are you using to record the assessment evidence?

- Would you say that you make use of rubrics?

- What type of rubrics do you use?

- Do you design your own rubrics or do you use rubrics obtained elsewhere?

F. FEEDBACK APPLICABLE TO FORMATIVE ASSESSMENT

- Would you say that you make use of feedback as a teaching tool? (probe: How)

- How do you give feedback to the learners on the ways in which they have been assessed in terms of task (improving the quality), effort, capability? (probe: How does this occur? Who does it, and how often?)

- How do you address the strengths and weaknesses of learners when giving feedback?

G. IMPROVEMENT AND ENHANCEMENT OF ASSESSMENT

- Which strategies are in place to improve and enhance formative assessment?

APPENDIX D

OBSERVATION

1. How is formative assessment being applied in the context of the Initial Supply Support learning programme?

- How are assessments conducted, by whom and how often?
 - Plan incidents (carefully designed, pro-active questions, questioning)

- Which assessment strategies, are being used?

- When is the assessment being used?

- How relevant is the assessment?

- What are the assessment methods, tools and techniques that are being used?

- Authenticity of assessment?

- Is a feedback strategy being planned and implemented?

- Does it consist of:
 - Informing the learners.
 - Focus feedback on task and strategies.
 - Feedback descriptive.

- Private/group feedback.
 - Oral/written feedback.
-
-

- How are learners given feedback on the ways in which they have been assessed? How does this occur? Who does it, and how often?
 - Does the feedback consist of information regarding what learners need to know what to do and what they can do to improve?
-
-

- Does it adhere to assessment principles such as reliability, validity, etc.
-
-

- Is self-assessment being implemented? (both a reflection on learning strategies and analysis/critique on the work.)
-
-

- Do the learners know the goals, criteria and standards?
-
-

- Which strategies are in place to improve formative assessment?
-
-

- Which strategies are in place to enhance formative assessment?
-
-

APPENDIX E

INITIAL SUPPLY SUPPORT LEARNING PROGRAMME
PACKING, UNPACKING AND TRANSPORTATION OF MATERIÉL
SST 01-05

GROUP ASSIGNMENT 1

(To be submitted to the Instructor/Assessor in the next 2 (two) working days after receiving this assignment.)

CONTEXT

A professional store man has to prepare a parcel for delivery.

TASK

Prepare a parcel that has to be delivered to a destination of your choice using air as a method of delivery. The following matters need to be comprehensively addressed:

Appropriate register to be filled in.

Container according to prescripts.

Usage of applicable container.

Method of transportation

Appropriate forms prepared applicable to the method of transportation.

ASSESSMENT (Specific Outcomes)

In assessing this assignment, the following will be taken into account:

Whether the group could interpret and utilize available recourses

Whether the group have mastered relevant knowledge, facts and concepts

Whether the group demonstrated insight about the assignment

Whether the group have focused on the purpose of the assignment

CRITICAL CROSS-FIELD OUTCOMES

In assessing this assignment, the following will be taken into account:

User friendly

Group work

Leadership

Assessment criteria

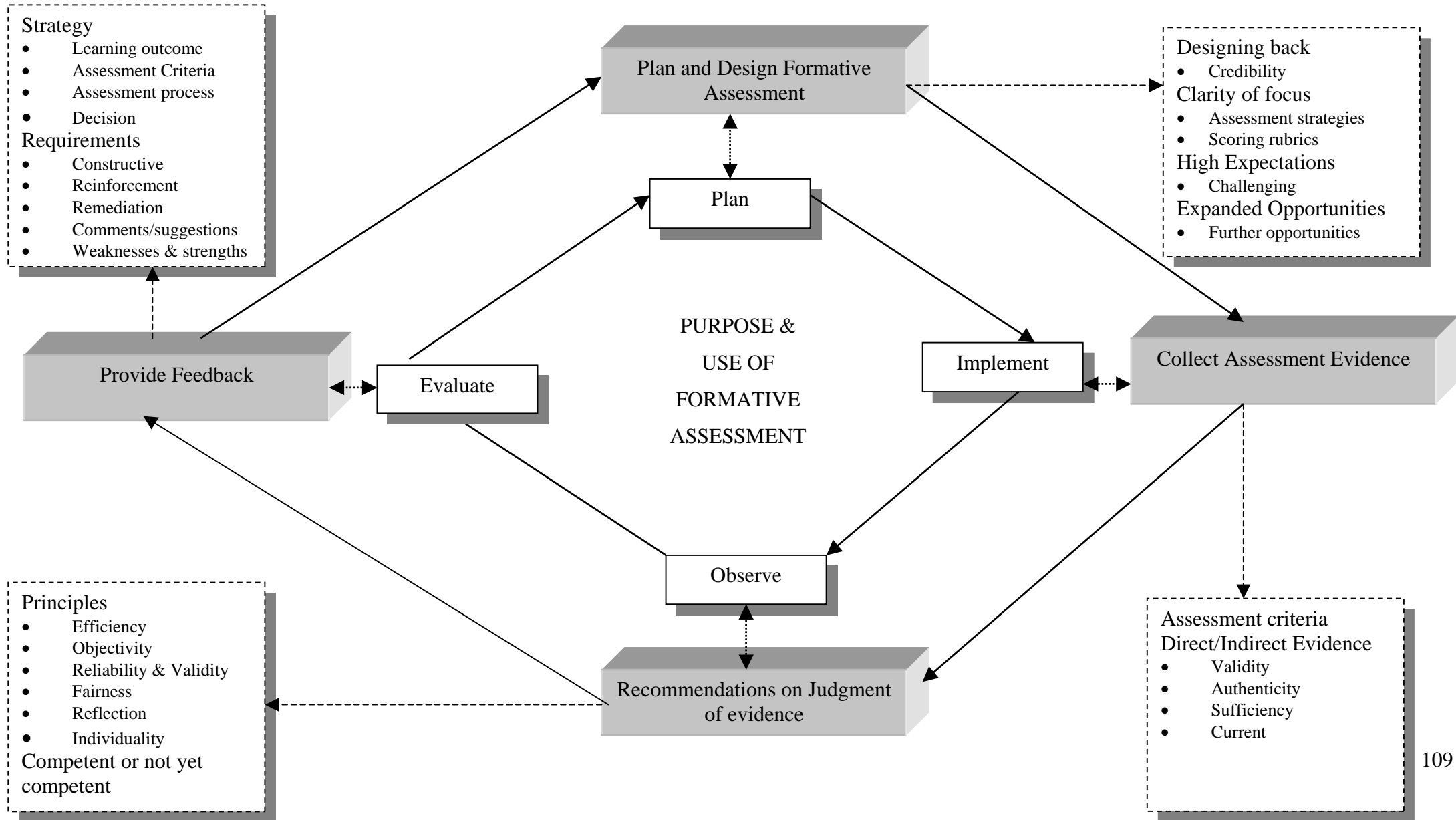
Group number: _____

When on completion of the group work, where the following criterion's addressed?

	1	2	3	4
1. Correct registers	Did not use a register at all	Used the incorrect register	Used only one register	Used the correct registers
2. Consignee's particulars clear and correct	No mentioning of the consignee	Consignee's particulars' incorrect	Consignee's particular's correct, but incomplete	Consignee's particulars correct
3. Consigner's particulars correct and clear	No mentioning of the consigner	Consigner's particulars' incorrect	Consigner's particular's correct, but incomplete	Consigner's particulars correct
4. Correct type of material being mentioned	No mentioning of the type of material	Type of material incorrect	Type of material correct, but incomplete	Type of material correct
5. Containers clearly numbered and corresponding with the info in the register	Containers not clearly numbered	Container numbered but not corresponding with the register	Container numbered corresponding with the register but incomplete	Container numbered corresponding with the register
6. The correct transport register complete	No transport register filled in	Incorrect transport register filled in	Correct register filled in but incomplete	Correct transport register filled in
TOTAL	< 6 Group not yet competent. Group training and to redo but this time by road.	> 6 and < 12 Group not yet competent. Group training and to redo but this time by road	12 and < 18 Group not yet competent. Determine mistakes and re-assess	18 and < 24 Group competent. Move onto summative assessment

APPENDIX F

FRAMEWORK FOR USING FORMATIVE ASSESSMENT AS A PROCESS TOGETHER WITH ACTION RESEARCH



LETTER OF APPROVAL FOR EXECUTION OF RESEARCH STUDY

MEMORANDUM



DLRM/R/103/2/1

Telephone:

Facsimile:

Enquiries: Ms I. Janse van Rensburg

From: Ms I Janse van Rensburg

To: DLRM

RESEARCH: MED: QUALITY ASSURANCE AND ASSESSMENT

1. As part of my academic studies at the University of Pretoria in Quality Assurance and Assessment, I have to do a dissertation this year.
2. I request to apply my research in formative assessment in the DOD School of Logistical Training Satellite.
3. The aim of this research will be to determine how the quality of formative assessment can be improved in the Initial Supply Support learning programme by using action research. I am planning to execute the research during the month of May, June 2004. The personnel (facilitators) and students (learners) will be participating in the research by means of completing questionnaires, interviews, observations, etc.
4. The facilitators (instructors) and learners (students) will form part of the research. This will be done with very little interruption of the learning programmes. The results of my research task will be available for future application in the DOD.
5. I hereby, request permission for the execution of the research in the DOD School of Logistical Training Satellite as well as to liaise in this regard directly with the OC of the Satellite and facilitators (instructors), identified by him.

**(I. JANSE VAN RENSBURG)
RESEARCHER: MS**

APPENDIX H

ETHICAL ISSUES

ETHICAL STATEMENT

1. VOLUNTARY PARTICIPATION

To participant(s) in this research is voluntary and may withdraw from the research at any time.

2. INFORMED CONSENT

The participant(s) will be fully informed about the research process and purposes. He/They will be given consent to his/their participation in the research.

3. SAFETY IN PARTICIPATION

The participant(s) will not be placed at risk or harm of any kind.

4. PRIVACY

The confidentiality and anonymity of human respondents will be protected at all times.

5. TRUST

The human respondent will not be respondent to any acts of deception or betrayal in the research process or its published outcomes.

The above-mentioned was discussed with me and I understand the content and implications thereof.

Signed on 2004 at

()