CHAPTER 6

# RESEARCH METHODOLOGY AND METHODS USED

## 6.1 INTRODUCTION

This study was conducted to develop a root cause analysis process that will uncover the root cause(s) of uncontrolled variation in human performance and prevent the recurrence of events causing the variation. The purpose of this chapter is to explain and document the research methodology and testing strategy followed in this study. The following aspects are covered in this chapter:

- the research design;
- the research approach; and
- ensuring ethical conduct.

## 6.2 RESEARCH DESIGN

The type of research undertaken in this project was action research. Action research has been described as “an informal, qualitative, formative, subjective, interpretive, reflective and experiential model of inquiry” (MacIsaac, 1996). The primary intent of action research is to provide a framework for qualitative investigations (MacIsaac, 1996).

Action research was chosen as the best research method for this study because it is a cyclical, iterative process that is rigorous, responsive, flexible, and would contribute to the development of a root cause analysis process, as undertaken in this research project.

Table 6.1 (see next page) provides a summary of the characteristics of action research as applied in this study.

**Table 6.1 Summary of the characteristics of action research applied in this study**

| Characteristics of action research | Application to this study |
|---|---|
| **It is collaborative.** | All the participants in this study contributed to the development of the root cause analysis process. |
| **It compiles evidence.** | The researcher collected and applied the evidence to gain a better understanding of the problem and the required solution. |
| **It is ever-changing.** | The root cause analysis process was continually updated to accommodate new information. |
| **It allows critical analysis.** | All the participants contributed to the development of the root cause analysis process through critical analysis and feedback. |
| **It is cyclical / a self-reflective spiral.** | This study took place over two and a half years of iterative and cyclical activities that eventually resulted in a root cause analysis process for variations in human performance. |
| **It is experiential.** | The process was tested against real-life situations and a case study. |
| **It is flexible.** | The flexible nature of this study provided for changes in the process to develop a better understanding of root cause analysis practices. |
| **It is formative.** | Changes were made continuously during the study and to the root cause analysis process that was being developed. |
| **It can be informal.** | The researcher, supervisors, facilitators, and participants all contributed to the solution. |
| **It allows for keeping a record.** | The researcher kept a record of activities, the feedback received and the changes that were made to the root cause analysis process. |

**Table 6.1 Summary of the characteristics of action research applied in this study (continued)**

| Characteristic of action research | Application to this study |
|---|---|
| **It is participative.** | The researcher and participants were involved as active participants in the research process to improve their own root cause analysis and performance management practices. |
| **It encourages problem-solving.** | All the participants gained problem-solving skills by testing the root cause analysis process. |
| **It is qualitative.** | Qualitative data collection methods, such as feedback and interviews, were used in this study. |
| **It permits a reasoned justification.** | Enough evidence was collected to validate judgements. |
| **It starts small.** | This study started by applying the root cause analysis process to only one person's performance variation. |
| **It is not subjective.** | Discussions between the researcher, facilitators and participants helped avoid subjectivity. |
| **It encourages systematic learning.** | This study was a systematic process during which people acted deliberately to bring about the changes. |
| **It allows theorising.** | This study was about the theory to change present root cause analysis practices in human performance management. |

Source: Adapted from De Jager (2002:8-9)

## 6.3 RESEARCH PROCESS

The root cause analysis process that was initially developed was tried out, then modified time after time in the light of what was observed, or the feedback that was received. Thus, the protocol followed in this study was iterative or cyclical and was aimed at developing a deeper understanding of the problem and the required solution.

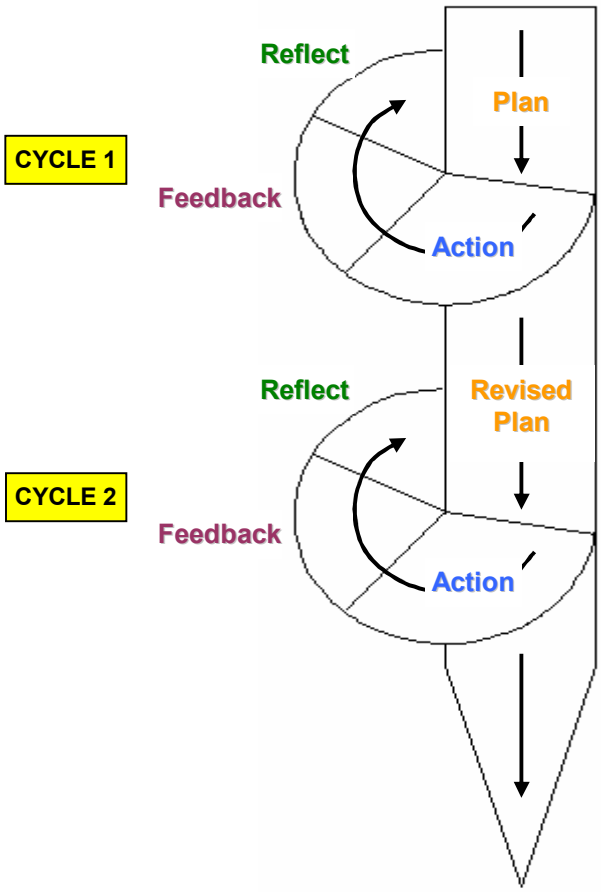


**Figure 6.1 The iterative nature of the study**

Source: Adapted from Hopkins in MacIsaac (1996)

Figure 6.1 displays the iterative nature of action research. The process consisted of the following steps:

- *realising a problem* – realising that some kind of improvement or change was needed to the cause analysis approach that is currently used in performance management;

- *planning* – developing a better understanding of the problem and planning for the intervention;
- *action* – carrying out the intervention;
- *feedback* – collecting pertinent feedback during and around the intervention; and
- *reflection and revision* – using reflection to develop a new intervention from the body of previous knowledge; and carrying out a new intervention, until a sufficient solution for the problem was achieved.

The above steps occurred in more or less the same sequence every time during the study. The realization of the problem led to planning and the planning was embedded in the action, feedback and reflection and revision. The steps repeated themselves until a sufficient solution to the problem that was initially identified had been developed, namely the development of a root cause analysis process for uncontrolled variations in human performance.

The action research process that was followed in this study is outlined in Figure 6.2 (see next page). There were three cycles, as discussed below.

### 6.3.1 Cycle 1

#### *6.3.1.1 Identifying the initial problem*

This study evolved from the shortcoming that currently exists in the field of human performance management. Most performance management models acknowledge that there is a need to identify the cause(s) of a performance gap by conducting a cause analysis. However, as indicated in Chapter 1, the cause analysis techniques and tools that are currently used are limited, have little or no logical structure, and do not allow for objective analysis. This situation is aggravated by the fact that people are so solution-oriented that, instead of first analysing the performance problem for causes, they jump straight into focusing on “solutions”.

To address this shortcoming, the study aimed to develop a systematic root cause analysis process that would uncover, solve and prevent the root cause(s) of an uncontrolled variation in human performance. It also aimed to develop a human performance management model.

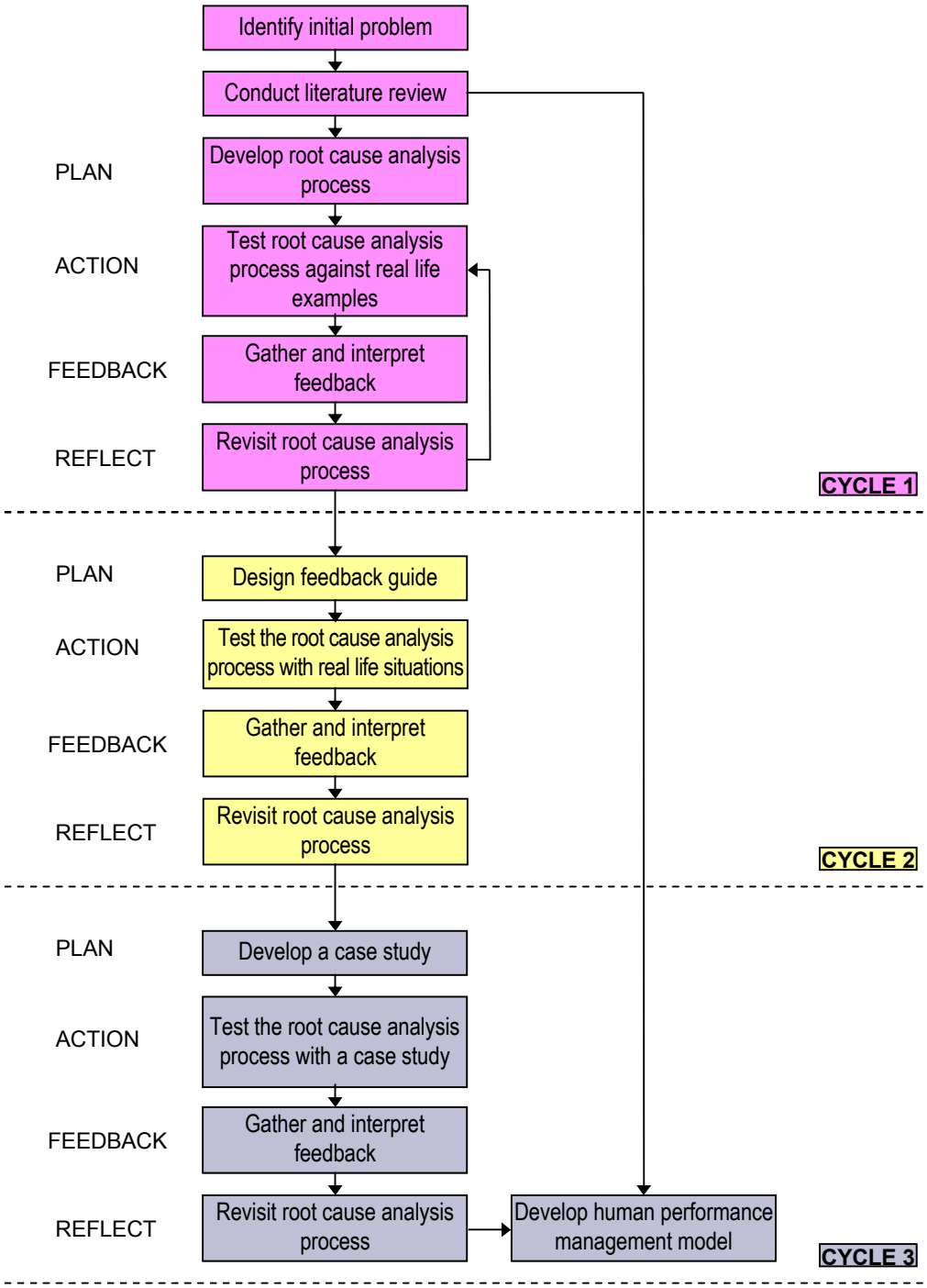


**Figure 6.2 The action research process**

#### *6.3.1.2 Conducting the literature review*

An extensive review was done of books, journals, conference papers, theses, dissertations and articles to achieve the following:

- gather important information and gain deeper insight into the fields of human performance management, improvement and root cause analysis in order to deepen the significance of this study;
- develop a sufficient knowledge base to develop a human performance management model and a root cause analysis process that would be suitable to identify uncontrolled variations in human performance;
- determine what is already known about human performance management and root cause analysis and how this study fits into the larger universe of these fields, to ensure that the results of this study will make a distinctive contribution; and
- become better acquainted with the design and methodologies of action research, to direct the study more efficiently and prevent potential problems that could lead to invalid findings and/or conclusions.

#### *6.3.1.3 Developing the root cause analysis process*

Developing a root cause analysis process that would be suitable for uncontrolled variations in human performance required, first, a good understanding of the different root cause analysis tools and techniques and, second, a thorough understanding of the different factors that affect human performance.

Previous studies, such as the ones mentioned in Chapter 2, showed that the list of factors that have an impact on human performance is almost endless. To make the list more manageable, and for the purposes of this study, the factors were clustered into the following main categories:

- information;
- resources;
- task performance;
- consequences;
- knowledge and skills;
- performer (of the task); and
- environment.

The first version of the root cause analysis process consisted of the following five steps:

*Step 1: State the performance variation*

The first step of the root cause analysis process (Version 1) focused on the performer, as well as the undesirable performance that required attention. The significance of the problem was also questioned in the first step.

*Step 2: Define the problem*

This step focused on data collection, to help understand the details of the problem. It was developed in the format of an "is-is not" matrix – an "is-is not" matrix clarifies what the problem is and is not about. This approach shows contrasts more clearly, helps identify issues that are definitely not related to the problem, and helps determine areas that need to be investigated more closely. *The "is-is not"* matrix *was the method of choice because it is one of the very few existing problem-solving techniques that establish an objective data point against which possible causes can be evaluated on paper first, before investing time and money to prove them in real life.*

This step of the process consisted of "is" and "is not" questions for each of the following dimensions: who, what, where, when, how, and to what extent.

*Step 3: Identify causal factors*

This step started with an activity flow diagram, so that it was possible to understand better what happened, how the task was performed, and what the task requirements were. In the second part of this step, the actual performance was compared to the standard for each of the following factors: information, resources, task performance, consequences, knowledge and skills, performer, and environment. When there is a variation in performance, it is rarely caused by a single factor and, therefore, the purpose of this step was to identify all the factors that were either missing or ineffective. Step 3 consisted of 59 process questions.

*Step 4: Determine root cause*

In this step, possible causes for the human performance variation were hypothesized. The main aim of this step was to select the best available theory of those available and to reject the possible causes that did not fit the evidence. In this way, wasting further effort and time on invalidated theories was avoided. The focus then shifted to the most plausible theory and to finding ways to check it in practice and double-check the information and assumptions that led to the conclusion.

*Step 5: Develop corrective actions*

The primary objective of Step 5 in the root cause analysis process (Version 1) was to develop an action plan that would correct the performance variation.

#### *6.3.1.4 Testing the root cause analysis process*

The development of a root cause analysis process evolved from continuous testing and refinement. The purposes of testing the root cause analysis process were

- to determine whether the process managed to uncover all the information required to solve the variation in performance;
- to determine whether there was a logical flow to the process;
- to identify any problem areas, so that they could be corrected; and
- to determine whether the process questions were easy to understand and interpret.

The first version of the root cause analysis process was tested by applying it during the following sessions:

- a one-on-one consultation with the manager of a sales consultant who was not growing the business through existing and new customers;
- a one-on-one consultation with a supervisor of a front-line employee who was tardy at doing certain jobs and following work procedures; and
- a case study about a repairman who was not following the company's sales lead programme.

In qualitative research, a researcher's objectivity is of the utmost importance. According to Glesne and Peshkin (in Thomas, 2003:2), care must be taken to prevent the researcher from "contaminating" the data through personal involvement with the research subjects. To avoid contamination of the data, the following guidelines were applied during the testing process:

- being open to the ideas and views of the people to whom the root cause analysis process was applied;
- trusting the root cause analysis process and not following a usual way of thinking and working; and
- not taking shortcuts, but rather putting energy and effort into the application.

Instead of referring to “objectivity”, Lincoln and Guba (in Hoepfl, 1997:60) prefer to talk about the “confirmability” of the research. This refers to “the degree to which the researcher can demonstrate the neutrality of the research interpretations” (Lincoln and Guba in Hoepfl, 1997:60), by providing an audit trail. The following audit trail was kept from the above process applications, to comply with the requirements of confirmability:

- raw data;
- process notes;
- personal notes; and
- the preliminary development information.

*6.3.1.5 Gathering and interpreting feedback*

Based on observations and the feedback that was received, the following aspects worked well in the first version of the root cause analysis process:

- the process managed to make a clear distinction between what the problem is and is not;
- the process also indicated gaps in the information – standards often either did not exist, or had not been properly communicated or explained to the performer; and
- the process helped generate a list of possible causes and furthermore, helped reduce the list of possible causes to the few that were most plausible.

The following was learnt from the first round of testing and highlighted areas in the root cause analysis process that required more work:

- The first version of the root cause analysis process was simply too long. This was especially due to the 59 process questions in Step 3. It became evident that merely by building on to Step 2 of the process, a lot of the information in Step 3

would be covered; and Step 3 would then become superfluous.

- Step 1 in the process needed to be a specific statement of the performance variation, instead of a vague problem statement, such as “negativity”. It is important to delve deeper, to uncover the expectation that lies behind the complaint.
- The information that enters the analysis must be realistic, true, and factual. Rumours and unchecked allegations are not good enough.
- The action(s) that makes up the solution must be realistic and must fit within the bounds of the true situation that exists. Ultimately, the solution must meet the test of reality, must be understood and agreed upon.

#### *6.3.1.6 Revisiting the root cause analysis process*

Based on the initial testing that had been done, the following changes were made to the root cause analysis process:

- Sharper, more specific questions were developed to move away from general problem statements, such as “negativity”, to focus on the specific behaviour that was causing concern.
- The process was changed to allow for two possible approaches – the first was based on intuition and experience and required that possible causes be listed up-front, while the second approach was more fact-based and used differences and changes as the basis for developing possible causes.
- The dimensions in the “is-is not” matrix were reduced and now included only the following dimensions: who, what, where, when, and trend; these dimensions gave the most significant information during the root cause analysis. As a result, the number of process questions in Step 2 was reduced from 12 to six.

- Step 3 in the root cause analysis process was deleted. All the performance elements that were covered in Step 3 should surface through the search for differences and changes in the who, what, where and when dimensions.

As a result of the above changes, Version 2 of the root cause analysis process consisted of the following steps:

*Step 1: Determine the performance gap*

The performance gap represents the difference between the actual, observed performance and the authenticated expected performance. The purpose of the first step is to describe this difference (or gap) in performance in specific terms and to determine if the variance is significant and requires further attention and remedial action. Step 1 of the root cause analysis process (Version 2) consisted of the following sub-steps:

- Check the performance standard.
- Describe the actual performance.
- Establish the performance gap.
- Determine the significance of the performance gap.

*Step 2: Analyse the performance variation*

This step starts with looking for possible clues and using both the clues and experience to formulate possible causes for the performance variation. The step then gathers additional information about the problem, using the “is-is not” matrix. Each possible cause is then tested against each element in the “is-is not” matrix, to screen the possible causes and identify the most plausible one(s). Step 2 in the root cause analysis process (Version 2) consisted of the following sub-steps:

- List possible causes (intuitive approach).
- Define the performance variation.
- Test the possible causes.

- Confirm the most plausible cause.

*Step 3: Plan corrective and protective action*

This step focuses on the proper and realistic corrective and protective actions that would bring about the expected and observed performance within the desired and acceptable limits. Step 3 in the root cause analysis process (Version 2) consisted of the following sub-steps:

- Establish the root cause.
- Develop an action plan.

### 6.3.2 Cycle 2

#### *6.3.2.1 Designing a feedback guide*

The researcher developed a feedback guide (see Table 6.2) to gather specific feedback from participants after they had applied the root cause analysis process to their real life situations themselves.

The purposes of obtaining feedback from participants were

- to judge the goodness of the root cause analysis process;
- to identify problem areas that required further improvement;
- to evaluate the strengths and weaknesses of the root cause analysis process; and
- to determine the value of the root cause analysis process in practice.

The overall aim of the feedback was to develop a better quality root cause analysis process that would be suitable for analysing uncontrolled variations in human performance.

**Table 6.2 The feedback guide**

| | | | |
|---|---|---|---|
| 1. | Describe the performance gap that was analysed with the process. | | |
| 2. | Describe the outcome that was reached with the process. | | |
| 3. | What value did the process add to the above situation? | | |
| 4. | Did the process follow a logical flow?<br>If not, please describe how the flow of the process can be improved. | YES | NO |
| 5. | Were all the questions in the process clear (easy to understand)?<br>If not, please list the specific question(s) and describe why it (they) was (were) difficult to understand. | YES | NO |
| 6. | Were all the questions in the process specific enough to elicit the required response/information?<br>If not, please list the specific question(s) and describe why it (they) caused confusion. | YES | NO |
| 7. | Were there areas in the situation that were important, but not identified by the process?<br>If so, please describe them in detail. | YES | NO |
| 8. | What are the current strengths of the process? | | |
| 9. | What are the current weaknesses of the process? | | |
| 10. | How can the process be improved, or what can be added to the process to make it more effective? | | |
| 11. | In which situations would the process be most useful? | | |
| 12. | In which situations would the process be least useful? | | |
| 13. | Who in your organisation would benefit most from the process? | | |
| 14. | Other comments/suggestions: | | |

#### *6.3.2.2 Testing the root cause analysis process*

The root cause analysis process was tested by 29 students who were doing their master's degrees in Counselling Psychology at the Consortium Institute of Management and Business Analysis (CIMBA) in Asolo, Italy. CIMBA was founded in 1991 and offers undergraduate, graduate and executive programmes to local and international students.

Students tested the root cause analysis process by applying the process to their own situations. The support materials provided to the students included a worksheet, the process questions and the feedback sheet (see Table 6.2).

Mr Scott B. Newton, a Managing Partner at CIMBA Business Advisement srl., led the session and coached students during their applications. Mr Newton is a highly skilled and experienced consultant and has facilitated numerous root cause analysis sessions for clients globally.

The following are examples of the type of situations that the root cause analysis process was applied to – a performer who

- is late and/or absent from meetings;
- ignores emails, calls and messages and has not met with the supervisor for three weeks;
- does not complete the test in the allocated time;
- does not consistently interact socially;
- does not attend classes; and
- breaks the law by stealing.

#### *6.3.2.3 Gathering and interpreting data*

Feedback was obtained in the following formats:

- worksheets that were completed by the participants who applied the root cause analysis process to their own situations – reviewing the original worksheets to identify information gaps, or incorrect information, was a great way of identifying potential problem areas in the root cause analysis process; and
- numerous telephonic discussions with Mr Newton from CIMBA Business Advisement srl., who championed this testing phase.

The following is a summary of the areas in the root cause analysis process that required further improvement:

- People are generally not used to thinking in the direction of "is not" information. Therefore, the "is not" questions needed to be phrased very specifically to ensure a "tight" problem description against which the possible causes could be tested.
- It is more difficult to find the root cause if the human performance variation is caused by an underlying personal problem which nobody else is aware of.
- One should be wary not to fall into the trap of focusing on a symptom of the human performance variation, instead of the real problem.
- In most cases, the participants did not know what was causing the uncontrolled variation in the human performance and, therefore, they did not benefit much from the intuitive approach. It would have been more effective to follow the rational approach in these instances – to go straight into the identification of differences and changes and then to develop possible causes, using the information on differences and changes.
- The technique of "question to the void" (asking follow-up questions until all the details are exposed) in all process questions proved to be critical. Without it, an important "piece

of the puzzle" could easily be overlooked, which would leave the problem unsolved.

#### *6.3.2.4 Revisiting the root cause analysis process*

Based on the testing conducted by the 29 students, the following changes were made to the root cause analysis process:

- Process questions were tightened up to achieve the following:
  - process questions that are short, sharp and specific; and
  - more specific "is not" responses.
- Additional questions were added to some of the process steps, to achieve the following:
  - to provide the appraiser with a choice of questions; and
  - to make the root cause analysis process applicable to as many situations as possible.
- The five why's technique was added at an early stage of the process to ensure that the analysis focuses on the real performance issue at hand, instead of a symptom of the problem.
- New questions were added to determine the significance of the human performance variation.
- The intuitive approach, which required the participant to use his/her experience and "gut feel" to list possible causes early in the process, was removed. This was replaced with the search for discrepancies in each dimension of the "is-is not" matrix.
- "Question to the void" was added to the questions in the "is-is not" matrix.
- The question about trend in the "is-is not" matrix was deleted.
- A selection matrix was added to evaluate the possible solutions.

As a result of the above changes, Version 3 of the root cause analysis process consisted of the following steps:

*Step 1: Identify the performance variation*

The purpose of the first step was to determine the variation in performance, and whether the variation was significant and required further attention and remedial action. Step 1 of the root cause analysis process (Version 3) consisted of the following sub-steps:

- Recognize that a performance requirement is not met.
- Identify the performer.
- Check the performance standard.
- Describe the actual performance.
- Describe the variation in performance.
- Stair-step the problem (sharpen the problem by separating the cause and effect) to unveil the problem that lies behind the symptom.
- Determine the significance of the performance variation.

*Step 2: Analyse the performance variation*

In this step, additional information about the problem was gathered, using the "is-is not" matrix. The "is-is not" matrix focuses on the performer, the performer's behaviour, and where and when the variation in performance takes place. A comparison between "is" and "is not" information is made to search for differences, evidence of change, and/or any unusual features. This information is used as clues for the development of possible causes for the human performance variation. Each possible cause is tested against each element in the "is-is not" matrix, to screen the possible causes and identify the most plausible one(s). Step 2 in the root cause analysis process (Version 3) consisted of the following sub-steps:

- Describe the performance variation.

- List possible causes.
- Test the possible causes.
- Confirm the most plausible cause.

*Step 3: Rectify the performance variation*

This step focuses on the corrective and remedial actions that would bring the expected and observed performance into the desired and acceptable limits. Step 3 in the root cause analysis process (Version 3) consisted of the following sub-steps:

- Describe the confirmed cause.
- Establish the root cause.
- Develop a solution.

### 6.3.3 Cycle 3

#### *6.3.3.1 Developing a case study*

Yin (in Ramolefe, 2004:32) defines a *case study* is "an empirical inquiry that investigates contemporary phenomena within their real life context when the boundaries between phenomena and context are not clearly evident and in which multiple sources of evidence are used".

According to Emory and Cooper (1991:143), "a single, well-designed case study can provide a major challenge to a theory and provide a source of new hypotheses and constructs at the same time". In addition to this, Cohen and Manson (*verbatim*, in Blaxter, Hughes & Tight, 2001:73, cited by Ramolefe, 2004:32) have also outlined the following advantages of a case study:

- Case study data are drawn from people's experiences and practices and so are seen to be strong in reality.
- Case studies allow for generalization from a specific instance to a more general issue.

- Case studies allow the researcher to show the complexity of social life.
- Case studies can provide a data source from which further analysis can be made.
- Because case studies build on actual practices and experiences, they can be linked to action and their insight contributes to changing practice.
- Because the data contained in case studies are close to people's experiences, they can be more persuasive and more accessible.

The following disadvantages of case studies have, however, been highlighted by Denscombe (in Ramolefe, 2004:35):

- The point at which a case study approach is most vulnerable to criticism is in relation to the credibility of generalizations made from its findings.
- On the technical side, the boundaries of the case study can prove difficult to define in an absolute and clear-cut fashion.
- Negotiating access to case study settings can be a difficult and demanding task.
- It is hard for case study researchers to achieve their aim of investigating situations as the situations occur naturally without any effect from their presence.
- Case studies are often perceived as producing "soft" data and are accused of lacking the degree of rigour expected of social research.

For the purposes of this research study, a case study was sourced from Thinking Dimensions International (TDI). TDI was founded in 1998 and specializes in root cause analysis, decision-making, project management and innovation.

The case study that was selected describes a human performance problem that the organisation experienced, namely a high error rate on claims transactions, due to incorrect data input by one of its employees.

The purpose of choosing this case study was

- to present a human performance situation that provided the participants with an opportunity to apply the root cause analysis process;
- to place participants in the role of managers and give them the opportunity to apply the root cause analysis process to a human performance problem that they had probably not experienced in their own workplace;
- to test the reliability of the root cause analysis process (would the process lead different participants who had the same set of information to the same cause?); and
- to apply and evaluate the root cause analysis process, so that final changes could be made to the process based on the feedback received.

*6.3.3.2 Testing the root cause analysis process*

Five of the ten consultants at Thinking Dimensions Group (South Africa) Pty Ltd (TDG) volunteered to test the root cause analysis process by applying it to the selected case study. TDG was founded in 1986 and specializes in the following fields: root cause analysis, decision-making, project management, innovation, and Six Sigma.

Because the focus of qualitative research is on depth, the emphasis is rarely on the sheer number of participants. According to Patton (in Jones, 2002:4), “sample size depends on what you want to know, the purpose of the inquiry, what’s at stake, what will be useful, what will have credibility, and what can

be done with available time and resources". Patton suggests (in Jones, 2002:4) that the researcher must establish a minimum sample size based upon the number of participants needed to provide "reasonable coverage of the phenomenon given the purpose of the study". Lincoln and Guba (in Jones, 2002:4) recommend sampling to the point of redundancy, stopping at the point at which no new information is being gained from participants.

Although five participants may seem like a relatively small sample size, the comments cited from Jones (2002), above, confirm that appropriate sample size has less to do with the actual numbers of participants and more to do with the quality and depth of information elicited through the research process. The five participants who volunteered had between five months and 25 years experience in the root cause analysis field. This represented a good range for the following purposes:

- determining whether the root cause analysis process would lead a novel as well as an experienced person to the root cause;
- obtaining an inexperienced person's feedback about the process's ease of use; and
- obtaining feedback from experienced as well as inexperienced root cause analysis practitioners.

The support materials that were provided to the participants included the case study, a worksheet, the process questions and the feedback sheet. The same feedback guide as that used in Cycle 2 was employed (see Table 6.2).

Participants completed the case study application individually and at their own pace. The completed worksheets and feedback sheets were submitted for analysis and interpretation via facsimile and email.

#### *6.3.3.3 Gathering and interpreting feedback*

Feedback was obtained in the following formats:

- a review of the worksheets that the participants who applied the root cause analysis process to the case study had completed – incorrect information or gaps in the information highlighted potential problem areas in the root cause analysis process;
- a review of the feedback sheets for themes and golden threads – this process helped make sense of the feedback and identified the areas in the root cause analysis process that needed further improvement; and
- informal discussions with the participants about their applications to obtain supplementary information about the root cause analysis process – open dialogue between the researcher and participants played an important role during this study, with all five participants contributing to the development of the best solution.

The findings of this testing phase were as follows:

- Although the five consultants applied the root cause analysis process independently, it led them all to exactly the same root cause, which provides sufficient proof of the process's reliability.
- The following is a summary of the areas in the root cause analysis process that required further improvement:
  - The process does not allow for enough stakeholder involvement. This is a crucial element in any root cause analysis process, because it is very rare that any single person possesses all the information needed to solve a problem. Collaboration, especially with the performer, is

vital to solving a human performance problem successfully.

- The first part of the process might be too long and was somewhat confusing to some participants.
- The need for testing the possible causes (hypotheses) was questioned by some participants. The reason they gave was that people often know what is causing their behaviour and will share the information during a consultative process that establishes trust and openness.
- Some participants, even though they are experienced root cause analysis consultants, found the latter part of the process somewhat difficult and required additional assistance in completing it.

#### *6.3.3.4 Revisiting the root cause analysis process*

Based on the testing conducted by the five consultants, the following changes were made to the root cause analysis process:

- The first part of the process was shortened and simplified.
- The root cause analysis process was split into two parts:
  - *Part 1 is to be completed by the manager/supervisor prior to his/her discussion with the performer*.

    The purpose of this phase is
    - ~ to gain a better understanding of the performance variation;
    - ~ to develop a specific description of the performance variation;
    - ~ to consult the required stakeholders and other sources of information about the performance situation; and
    - ~ to prepare the manager/supervisor for his/her discussion with the performer.
  - *Part 2 is to be completed jointly by the manager/ supervisor and the performer*.

The purpose of this phase is

- to give the manager/supervisor and the performer an opportunity to share information, so that they can reach a shared understanding of the performance situation;
- to create an environment of trust and openness, so that the manager/supervisor and the performer together can identify the contributing factors that might have been causing the performance variation;
- to allow collaboration and cooperation, so that the manager/supervisor and the performer can reach consensus on the root cause(s); and
- to assist the manager/supervisor and the performer in reaching agreement on the action plan that would remove the performance problem for good.

As a result of the above changes, the final version (Version 4) of the root cause analysis process consisted of the phases and steps set out in Figure 6.3.

**Phase 1: Performance variation assessment**
Step 1: Define the performance variation
Step 2: Describe the performance variation
**Phase 2: Performance variation discussion**
Step 1: Identify contributing factors
Step 2: Crystallize the most likely cause(s)
Step 3: Determine the root cause
Step 4: Rectify the performance variation

**Figure 6.3 The root cause analysis phases and steps**

Version 4 of the root cause analysis process is discussed in detail in Chapter 7.

*6.3.3.5 Developing a Human Performance Management Model*

As indicated in Chapter 2, the development of a Human Performance Management Model is not new. Many researchers have long focused on the development of an appropriate performance management model.

The root cause analysis tool developed as a result of this research is, however, different and new. It provides a systematic and analytical process to describe the gap between the desired and actual human performance, to identify factors that contribute to the human performance variation, to uncover root causes, and to select and implement interventions to fix the root causes. The ultimate aim of the root cause analysis process is to solve human performance problems at the employee level in order to achieve the desired organisational results.

The purpose of the Human Performance Management Model is to integrate the root cause analysis method and strategy into a holistic approach that will enhance employee performance and allow employees and management to participate actively in all stages of the human performance management process. The true value of the Human Performance Management Model lies in the fact that it becomes a management tool and also improves communication between the manager and employee. By using the model, managers can ensure that employees are pursuing the organisation's goals and are behaving in ways that are consistent with the organisation's vision statement.

The Human Performance Management Model was developed by means of an extensive review of books, journals, conference papers and articles. The following was achieved by means of the literature review:

- Deeper insight was gained into the fields of human performance management and human performance improvement.
- A knowledge base that was sufficient to develop a human performance management model was developed.
- Knowledge was gained about the human performance management models that already exist, to ensure that the model that is developed as a result of this study will make a distinctive contribution.

The Human Performance Management Model that was developed as a result of this study is discussed in detail, together with the final version of the root cause analysis process, in Chapter 7.

## 6.4 ENSURING ETHICAL CONDUCT

A consideration of ethics is fundamental to all research and it is the researcher's responsibility to ensure that his/her research is ethical. The following ethical standards were applied during the research:

- A sound research methodology was followed to ensure the advancement of knowledge.
- The appropriate confidentiality was maintained throughout the research, by ensuring that the participants and performers whose performance was evaluated remained anonymous.
- Objectivity was ensured by allowing participant involvement and participation at all stages of the research process.
- Participants who tested the root cause analysis process agreed voluntarily to be part of the study and understood the purposes of the research.
- Permission was obtained from CIMBA and TDG for their students/ employees to participate in the research.

- Trust and transparency was instilled between the researcher and participants, by allowing participants to do their applications independently and to complete their own worksheets.
- A project archive was kept of all feedback received to substantiate the research findings.
- Respect for individual differences was shown by giving all participants an equal opportunity to participate, give input and feedback.

## 6.5 CONCLUSION

This chapter outlined the research design, research approach, and ethical standards that were applied in this study.

The characteristics of action research are evident in this study. The study followed three iterative cycles of testing. After every cycle, there was a deeper understanding of the problem and the required solution. Based on this, the root cause analysis process was revisited before it was tested again. This process was repeated till an adequate solution was developed. All necessary consideration was given to ensure that the researcher's conduct was ethical throughout the research process.

In the next chapter, the final version of the root cause analysis process and the Human Performance Management Model are outlined and discussed in detail.