CHAPTER FIVE
Preliminary Phase: Problem identification, needs and context analysis

> The case study is the method of choice when the phenomenon under study is not readily distinguishable from the context. The inclusion of context as a major part of a study… creates distinctive technical challenges. First, the richness of the context means that the ensuing study will likely have more variables than data points. Second, the richness means that the study … will likely rely on multiple sources of evidence. Third… distinctive strategies will be needed for design and analysis. (Yin, 2003, p. 5)

This chapter takes a closer look at the research design and results of the first of five design cycles for this thesis. The first cycle is known as the Preliminary Phase and addresses sub-question 3: "What pre-existing conditions need to be established in the feedback system to facilitate the use of the learner performance feedback system?" Each design research cycle presents a small, but complete research process that allows the identification of design principles that inform the next cycle of development. The initial cycle is described as the Preliminary Phase (Plomp, 2009) of the design research process. This phase focused on conceptualising the feedback system and defining the design specifications The information derived from the literature review (Chapter 3) as well as the *Prior Development, Needs and Context Analysis* and *Exemplary Case Study-asTTle, New Zealand* were combined and are discussed in full in this chapter.

The Preliminary Phase is discussed with reference to the specific research questions and evaluative foci, the pre-existing system being evaluated, the research design, results and design principles from the phase. The focus of this chapter in terms of the overall research cycles is discussed in Section 5.1. Section 5.2 introduces the pre-existing feedback system (Sections 5.2.1-5.2.3) and the evaluation of the pre-existing system is discussed in Section 5.2.4. The design principles derived from the literature in Chapter 3 are provided in Section 5.2.5, followed by the exemplary case study of the asTTle system in

NZ (Section 5.2.6). Section 5.2.7 introduces the design principles derived from the case study.

5.1 Research Cycles

This thesis consists of five full design cycles. The *Preliminary Phase* starts with the existing feedback system and consists of one design cycle. The *Prototyping Phase* consists of three full design cycles that are discussed in Chapter 6 and 7, while the *Assessment Phase* consists of one cycle represented in Chapter 8. The design and evaluation interactions for this research are illustrated in detail in Figure 5.1. The pre-existing system and feedback prototypes are shown in blue and the evaluation activities in green. Every full design cycle consists of the prototype adaptation followed by implementation and corresponding formative evaluation of that prototype.

Each cycle represents a complete, small research and is therefore discussed separately (Chapters 5-8), beginning with a description of the prototype, followed by a closer examination of the research design used to evaluate the prototype. The evaluation activities are guided by the research questions addressed and the evaluative focus for each specific cycle. While there is a specific focus for each cycle there is always some overlap and a cycle may address some aspects of other research questions or evaluative foci. The research methods for each cycle include the sampling (Section 5.2.6.2), data collection and capturing (Section 5.2.6.3-5.2.6.4), analysis (Section 5.2.6.5) and discussion (Section 5.2.6.6).

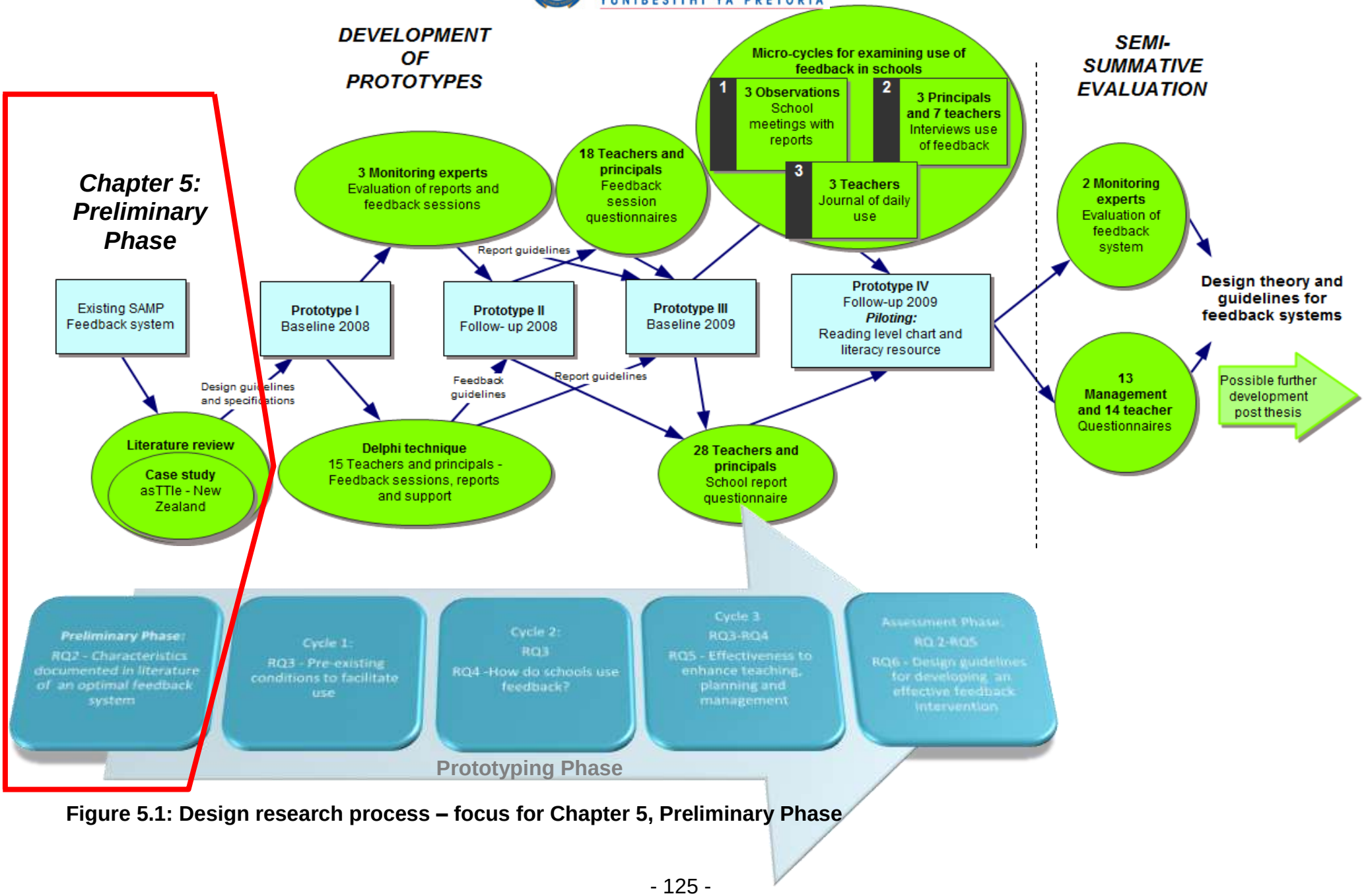


Figure 5.1: Design research process – focus for Chapter 5, Preliminary Phase

5.2 Prior Development, Needs and Context Analysis

Schools participating in the existing feedback system prior to 2006 expressed a need to receive feedback more quickly and that the data be presented in such a manner that it is easier to use for planning, decision-making and action in the school environment. It was necessary to develop design guidelines and criteria for the global design of the feedback system to facilitate use of the data. In order to accomplish this a number of approaches were employed including a literature review of selected international SPFSs (see Chapter 3).

This was supplemented with an exploration of an exemplary case in the form of the asTTle (assessment Tools for Teaching and learning) system in NZ. By studying the feedback system used with asTTle in New Zealand, thus gaining a better understanding of how context influences the effective use of a feedback system. The Preliminary Phase therefore pertained to the second[32] ***research question***:

2. *What are the characteristics documented in literature of an optimal feedback system for use in school-based monitoring?*

Design research is a parallel process with an intervention or product being designed along with design principles to further the body of knowledge. The design principles are generated out of the evaluation of the prototype or for this first cycle, the pre-existing system. However, prior to the evaluation of the cycle the researcher has a conceptualisation of the class or type of design guidelines that are sought in the cycle. The evaluation information for the first cycle was therefore aimed at generating ***design guidelines*** relating to the design specifications for the global design of the feedback system:

1. *Design specifications and global design:* Determining the components necessary for the optimised feedback system. Generating a preliminary conceptual framework for the feedback system.

[32] Research question one: "How can an existing learner performance monitoring system be appropriately adapted, contextualised and translated to the South African context?" was addressed in full in Chapter 2.

The evaluation in this cycle focused specifically on the ***evaluative foci*** (as discussed in Section 4.2.2) of relevance and consistency:

1. *Relevance (content validity):* The system and its design should be based on state-of-the-art (scientific) knowledge. The feedback system must clearly be connected, in form and purpose, to the learning performance monitoring system for which it provides feedback.
2. *Consistency (construct validity):* The system must be 'logically' well designed. The various parts are well defined and the connections between them explicitly postulated. Although some elements may emerge more clearly throughout the process, there are no internal contradictions.

In the following section, the pre-existing feedback system that formed part of PIPS (Performance Indicators in Primary Schools) is introduced briefly, along with the design principles from the informal evaluative activities of this cycle. This is followed by the guidelines derived from the literature discussed in full in Chapter 4. Then the research procedures and data for this cycle are discussed.

5.2.1 Pre-Existing Feedback System (Prior to 2006)

Prior to 2006, the data for the feedback system were generated through a computerised version of PIPS that was translated into Afrikaans and Sepedi. Learners from seven schools were assessed in English, Afrikaans or Sepedi. Fieldworkers were provided with hired laptops on which the assessment software was loaded to conduct the fieldwork. Around 47 learners were assessed per school resulting in 327 learners assessed in 2005. Each learner was assessed on a one-to-one basis by a fieldworker who used the computerised testing programme. Data were downloaded from the laptops and the code sent to the CEM in Durham.

Once the data were processed in Durham, a dataset was sent back to the CEA for further analysis and feedback. The system still contained some programming errors and bugs, which meant that for the translated languages such as Afrikaans and Sepedi as well as the South African English, not all the data from the assessment could be used. In all three languages part of the Letters and

Vocabulary subtests had to be omitted from the calculations as the programme terminated prematurely, while the reading items in Afrikaans still provided difficulty along with the more advanced Sepedi reading items (Eiselen, 2005a). This meant that only the mathematics scores were comparable across the different languages. The project leader would produce a report for each participating school based on the usable data and once the reports were completed, a feedback session would be arranged at the University of Pretoria. In a given year a school participating in the PIPS system would have its Grade 1 learners assessed at the beginning of the year and based on this a report for their school would be produced. The principals would then be invited to a feedback session at the University of Pretoria where the reports were handed out. This process was repeated again at the end of the year for the follow-up assessment. The components of the Pre-existing PIPS feedback system are shown in Table 5.1.

Table 5.1: Pre-existing PIPS feedback system components

Component	Description
Paper-based baseline report	Produced for each school individually and handed out at the feedback session
Baseline feedback session	Principals from all participating schools invited to the University of Pretoria
Paper-based baseline report	Produced for each school individually and handed out at the feedback session
Follow-up feedback session	Principals from all participating schools invited to the University of Pretoria

5.2.2 Reports – Pre-Existing Feedback System

The report outline for the pre-existing feedback system was similar for the baseline and follow-up reports:

1 Introduction
2 Introduction to the Assessment
  2.1 Early Phonics
  2.2 Early Reading
  2.3 Early Maths
3 Interpretation of Results
4 Overall Trends Observed
  4.1 Overall Achievement in Maths
  4.2 Overall Achievement of xxx School
  4.3 Achievement at Different Ages
  4.4 Achievement Boys and Girls
  4.5 Which Items Did Learners Find Difficult and Which Were Easy
    4.5.1 Phonics
    4.5.2 Reading
    4.5.3 Maths
5 Individual Learner Results
  5.1 Learners at Risk and Exemplary Learners For Each Category
    5.1.1 Phonics
    5.1.2 Reading
    5.1.3 Maths
6 Conclusion
7 References

Figure 5.2: Report outline – pre-existing system

Both the baseline and follow-up reports of the pre-existing feedback system (demonstration reports can be found on the audit trail DVD) started with a short description of the project, followed by a description of the various subtests (see Figure 5.3).

Vocabulary

Vocabulary is assessed through two picture items. The learners are shown the picture, such as the one in Figure 2, and asked by a voice on the computer, to point to common objects in the picture. For example in Figure 2 the learner is asked to point to some carrots. If the learner is able to complete this task the field worker will record this response as "right".

Figure 2: *Vocabulary* **subtest:**
The learner is asked to point to a picture on the screen

Figure 5.3: Description of the Vocabulary subtest – pre-existing system

All results were produced as category scores with 1 = 0-25%; 2=26-50%; 3=51-75%; 76-100%. First, the Mathematics results across the different schools were shown (see Figure 5.4), these being the only set of comparative results provided, as the sample was too small to compare the different scale results per language group and the assessment were not shown to be equivalent across the other scales.

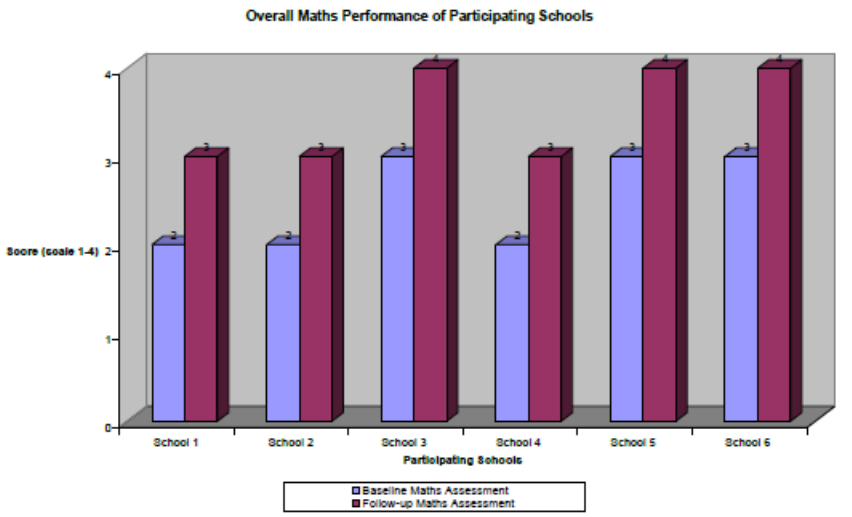


Figure 19: Overall Maths Achievement of all the schools which participated in this years study (2005)

XXX School is indicated as school 6 on the figure above. Although school XXX achieves of the highest mathematics scores, it also receives learners, at the beginning of the year, whose early mathematics skills are already partially developed.

Figure 5.4: Mathematics Scale results across schools - pre-existing system

This was followed by the school's scale scores represented in a bar graph format. The graph showed the school's comparative performance separately for Early Phonics, Early Reading and Mathematics scale with the results of both the baseline and follow-up assessment depicted (see Figure 5.5). Bar graphs depicting the comparative performances for each scale according to gender and age for the school were also provided.

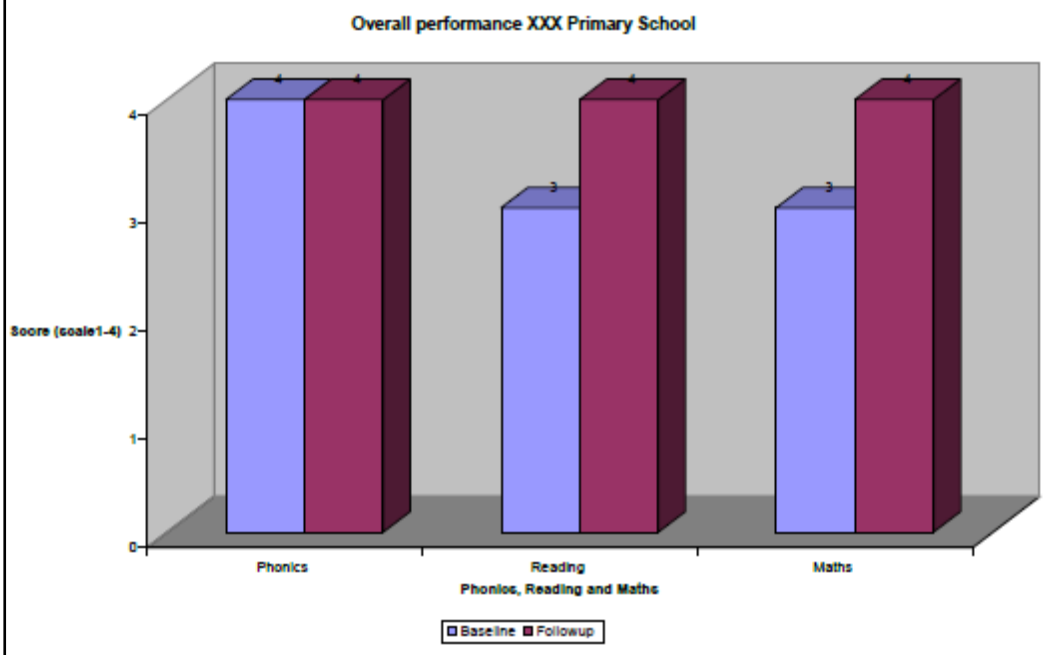


Figure 20 Overall performance XXX School

Figure 5.5: Overall performance for the school - pre-existing system

The bar graph representations were followed by a tabulation of the easiest and most difficult subtest item for each school (see Figure 5.6). In total, six such tables were produced, one for the easiest and one for the most difficult items for each of the three scales. This concluded the reporting of overall school results.

Figure 24: The easiest reading items

Subtest	The easiest item of this subtest for all the learners who participated in this years study	The easiest item of this subtest for XXX School learners
Vocabulary	"Can you point to a fork?"	"Can you point to some carrots?"
Letters	"What is this letter?" S	"What is this letter?" S O
Mix up	"Which word says rabbit?"	"Which word says rabbit?"
Quiz words	"Which word says car"	"Which word says car"

Figure 5.6: Easiest Reading easiest items – pre-existing system

Thereafter there was a section on individual learner level, which started with a tabular representation of learner results presented in categories from 1-4 for each of the three scales for the baseline and follow-up results (see Figure 5.7). The table was followed by a section in which learners were listed as having trouble or achieving exceptional results in each of the three scales.

Table 3 Performance of Mrs XXX's class

Learner name	Learner surname	Baseline Phonics	Follow-up Phonics	Baseline Reading	Follow-up Reading	Baseline Maths	Follow-up Maths
ZZZZ	YYY	3	1	1		2	3
ZZZZ	YYY	2	3	1	1	2	2
ZZZZ	YYY	2	4	1	1	3	2
ZZZZ	YYY	3	3	1	2	3	3
ZZZZ	YYY	3	2	2	1	3	3
ZZZZ	YYY	3	3	1	2	3	3
ZZZZ	YYY	3	3	1	2	3	4

Figure 5.7: Individual learner result tables – pre-existing system

Once the reports were completed, a feedback session was arranged at the University of Pretoria.

5.2.3 Feedback Sessions – Pre-Existing Feedback System

Schools were invited to attend and received the reports at the feedback session, which took about two hours and consisted of a presentation by the project leader pertaining to:

- Introducing the CEA and the project
- Describing the assessment

- Presenting the aggregated results across all the schools
- Indicating the most difficult and easy items on average for the schools
- Presenting the future plans for the project
- Providing an opportunity for questions

The session was concluded with light refreshments and open discussions between the schools and research team.

5.2.4 Informal Evaluation of - Pre-Existing Feedback System

Two schools indicated that they wished to cease participation in the PIPS project. Informal face-to-face and telephonic conversations were conducted with these schools and the other five schools. Schools raised a number of concerns about the reports and feedback sessions:

5.2.4.1 Reports

Schools indicated that they found the PIPS system useful in a number of respects:

1. Teachers indicated that the individual learner results were very useful. These results were used for comparison with their own standard of marking.
2. The identification of learners who had trouble with certain sections of the assessment or who achieved exceptionally well was also useful. Teachers employed this information to determine which learners needed individualised support or more advanced stimulation.

At the same time, the schools expressed a number of concerns:

1. The only comparative data reported on between schools were on the Mathematics Scale. Due to the errors and bugs in the computerised system and because the equivalence across languages had not been established, the Reading and Phonics scores could not be compared across the different languages. The small sample size also meant that comparative data for schools of the same language group (maximum of three per language) could not be provided as this would impinge on

confidentiality. Therefore, only the Mathematics data were presented in comparison to other schools in the assessment. This meant that schools could not determine how their schools were doing overall or on the Phonics or Early Reading scales compared to other schools. This made it difficult for schools to decide what areas they should attend to in their curriculum planning.

2. The use of the large categories (25% range) in the school scores also meant that often no growth would be seen in the overall school graphs. See for example the phonics results shown in Figure 5.5 (above).

3. Once a particular area such as Early Reading was identified as a concern no data were available to determine which subtests were of the greatest concern. Therefore, the school still did not know which particular aspects of reading should enjoy greater attention.

4. Schools also indicated that while the identification of the easiest and most difficult items in each subtest was interesting, it had little impact on their planning and classroom practice.

5. Teachers and principals with African learners in their schools expressed doubt about some of the results as the graphics used in the computer programme and illustrated in the reports were considered by them as Eurocentric and foreign to some of the learners.

6. The results of individual learners were difficult to relate to planning for the class overall.

7. The lack of a recommendation section made it difficult for schools to gain an overall view of their performance and to take action.

8. Schools also expressed concern about the long time span between the assessment and reporting. As the data went through a long process of cleaning and analysis involving both the CEM and the CEA, report writing was delayed. Reports were also manually produced per school; which meant that reports were often only received three months after the assessments were concluded.

9. Two of the schools indicated that there was a breakdown in communication between themselves and the previous project coordinator.

5.2.4.2 Feedback Sessions

The schools expressed that it was a novelty to have contact with the University and hear about the project. They however experienced the sessions as very long and repetitive as the focus was mainly on the format of the assessment and the different subtest. While the feedback sessions helped with understanding the data, they did not support them with transforming the data into action. The need was for feedback sessions that supported school improvement action based on the data.

5.2.5 Design Principles from Literature Review

Based on this initial analysis of the pre-existing feedback system, a literature review was conducted to determine tentative design principles for the optimisation of the pre-existing feedback system (Discussed in full in Chapter 3). As no such system existed in South Africa at the time of the optimisation, international SPFSs (School Performance Feedback Systems) which had been documented over an extended period of time were reviewed. The four cases included the CEM Suite (UK), the asTTle system (NZ), Zebo (Netherlands) and SAM (Louisiana).

Although these countries have varying approaches to SPFSs, there are some principles that emerge (the principals are mapped to the systems in Table 5.2).

1. The data must ***not be viewed as part of unfair high-stakes accountability practises***. Its main purpose should be as a driver for improvement and not accountability (Hattie, 2005; Tymms & Albone, 2002).

2. ***School and educator expertise should be utilised in the development*** and improvement of the feedback system to ensure contextual appropriateness and a sense of ownership (Hendriks, et al., 2001; Tymms & Coe, 2003).

3. The feedback system must ***provide tools to support school improvement-driven practices*** and support greater school autonomy (Angelle, 2004; Hendriks, et al., 2001; Teddlie, et al., 2002).

4. Data must allow for ***comparison of a school's performance to other groups*** (Angelle, 2004; Crooks, 2002; Hattie, 2005; Hendriks, et al., 2001; Tymms & Coe, 2003).

5. A ***short turn-around time*** from assessment to reporting is essential to ensure the data is still relevant.

    - ***Use of ICT is important to improve turnaround time*** and increase schools sense of autonomy (Angelle, 2004; Hattie, 2005; Hendriks, et al., 2001; Teddlie, et al., 2002).

Table 5.2: Principles emerging from the international SPFSs

Principle	UK - CEM Suite	NZ – asTTle	Netherlands - Zebo	Louisiana – SAM
Not part of high-stakes accountability	✓	✓	✓	
School expertise used in development	✓	✓	✓	✓
Provide tools for improvement practice	✓	✓	✓	✓
Comparison with other groups	✓	✓	✓	✓
Importance of short turnaround time	✓	✓	✓	✓

The literature on SPFSs discussed in Chapter 3 provided a rich source from which to develop initial design guidelines for the components necessary for the feedback intervention. However, investigating contextualised processes and logistical issues through literature alone was insufficient. It became clear that contextualised knowledge about the functioning of the SPFS in its particular context was required in order to transfer the learning to the South African context. A case study of an exemplary feedback system in its context was conducted to gain this knowledge.

5.2.6 Exemplary Case Study – asTTle, New Zealand

A specific feedback system and context had to be identified for the exemplary case study. The focus of the case study was to expand on the understanding of

the components and aspects of a good feedback system and its functioning, in context holistically within one education system to further development of the design guidelines. Limited resources meant that such a case study could only pertain to one system. It was therefore essential to identify the exemplary case to study selectively.

An examination of PIPS in England may have been appropriate for such a study. This option was rejected as regular communication already takes place with the CEM in Durham about the Value-added project. Also, much information had already been gathered by two previous researchers on the project during a three-week study tour. The communication has already had an influence on the development of the feedback system without a specific study of the UK case. Visits by academics between the CEM and CEA also take place as part of the Value-added project. Likewise, knowledge of the Dutch ZEBO system had also already been accessed through the Dutch consultants involved in the SANPAD collaboration and previous visits by colleagues to the Netherlands. While SAM functions well in Louisiana, it only covers one state and not the entire educational system. SAM also forms part of high-stakes accountability practices which were avoided in the pre-existing system. The asTTle system thus presented an opportunity to explore another monitoring and feedback system that had not yet had a direct impact on the development of the feedback system.

The reasons for selecting asTTle for the exemplary case study are set out below:

- asTTle has been successfully employed in New Zealand since 2001
- asTTle has been lauded as a success by both the New Zealand Ministry of Education and New Zealand schools
- asTTle is widely used in schools in New Zealand
- New Zealand utilises Outcomes Based Education (OBE), as South Africa does
- The New Zealand education system is relatively small, making it more feasible to access users and stakeholders at various levels in the system within a short period. This makes it possible to gain a holistic picture of a national system.

- The DoE in South Africa was also exploring the possibility of adapting asTTle in some form

  (Crooks, 2002; Hattie, et al., 2004b; New Zealand Ministry of Education, 2007a)

The asTTle system was therefore selected and a month-long visit to NZ undertaken to study the use of asTTle in context. In the next section, the literature review for the case study is discussed, followed by the research procedures with reference to sampling, data collection, data capturing, data analysis and a discussion of the data.

5.2.6.1 Literature review

The South African and New Zealand education systems both had similar outcomes-based education curricula at the time and both share policies that encourage assessment for learning as opposed to assessment of learning (Gardner, 2006). In other respects, there are vast differences between the two countries. For example, South Africa is still a developing country, with grave internal infrastructural and economic disparities, which complicate the effective implementation of education policies. Another significant difference is that academic performance in New Zealand, by international measures of mathematics and science such as TIMMS 1995, 1999 and 2003, as well as reading, PIRLS 2006, is considerably higher than that of South Africa (Harmon, et al., 1997; Martin M. O., et al, 2000, 2004; Mullis, et al., 2000, 2004). The South African Educational context is discussed in depth in Chapter 3, and the NZ educational context here.

New Zealand educational context

NZ participates in national and international assessments in education as part of its system monitoring agenda. NZ generally performs exceptionally well on international assessments, for example with performance in PIRLS 2006 (Chamberlain, 2007), PISA 2003 (New Zealand Ministry of Education, 2007b) and TIMSS 2003 (New Zealand Ministry of Education, n.d.) having been well above average, and consistently so (New Zealand Ministry of Education, n.d.). While the NZ education infrastructure is far superior to that of South Africa, there

are interesting differences in how the nation has implemented the assessment for learning policy.

The NZ education system has undergone several changes in the last two decades, the most significant being a shift from centrally controlled education through a department of education to autonomous schools. This was accomplished in 1989 through the Tomorrow's Schools reform that transferred operational control of schools to the boards of trustees of individual schools (Crooks, 2002; Fiske & Ladd, 2001). Under the Ministry of Education (MoE), government funding of schools continues, within a framework of self-governance, self-management, and self-directed improvement. The decentralisation of education increased fears for the maintenance of national standards, especially since NZ's outcomes-based education system had already been criticised for allowing too much room for interpretation in terms of levels and outcomes (see discussion in Brown, et al., 2008; Crooks, 2002). The MoE's strategic policy response was five-fold (Brown, et al., 2008; Crooks, 2002; New Zealand Ministry of Education, 1994).

1. Creation of national curriculum statements for all essential learning areas with achievement objectives aligned to eight levels of progression between beginning of primary and end of secondary education;

2. The development and provision of curriculum-aligned teaching materials and programmes to aid educator content and pedagogical content knowledge, with special emphasis on innovations in literacy and numeracy;

3. The development of a toolkit of assessment resources to support educators in school-based assessment consisting of a wide variety of curriculum-aligned assessment resources, including:

    a. an online Assessment Resource Bank (ARB) for English, Mathematics, and Science;

    b. national exemplars of progression in Levels 1 to 4 for all essential learning areas;

c. teacher participation in the administration and marking of curriculum monitoring tasks at Years 4 and 8 (i.e., National Education Monitoring Project—NEMP); and

d. an electronic Assessment Tools for Teaching and Learning (asTTle) software system

4. Funding of extensive professional development for educators with specific attention to assessment for learning (i.e., Assessment for Better Learning - ABEL and Assess to Learn - AtoL)

5. A low-stakes educational assessment policy distinguished by:

   a. No central reporting of school data

   b. No compulsory nationwide testing programme in primary school

   c. Giving choice to educators as to which assessment resources or methods to use

   d. Aligning assessment resources to curriculum objectives and levels

These actions taken together created a climate of increasing trust, confidence, and competence in which national monitoring purposes were met by school-based assessments and improvement purposes were clearly fore grounded in the daily lives of teachers and administrators.

The development of the teaching and assessment resources in NZ coincided with extensive professional development opportunities for educators. This included development specifically aimed at assessment practises (e.g. Assessment for Better Learning (ABEL) which was later replaced by Assess to Learn (AtoL) (Brown, 2008; Crooks, 2002). Educators' knowledge of assessment was also expanded by participation in the development of assessments such as those found in the Assessment Resource Bank (ARB), national exemplars, and asTTle and participation in the NEMP matrix sampling of student performance (Brown, 2008; Crooks, 2002).

Complementary to this strong emphasis on school-based formative assessment, the government obtained public accountability information through the Education

Review Office (ERO) (Brown, et al., 2008). ERO is responsible for triennial evaluation of all schools' performances in NZ through a combination of school self-review and on-site inspection visits to establish quality assurance and legal compliance (Fiske & Ladd, 2001). ERO not only evaluates schools, but also acts as a resource to support schools, educators and school governing body members by providing public accessible support documents.

Comparing New Zealand and South Africa

From this brief comparison of the South African and NZ educational landscapes, three relevant aspects are highlighted (i.e., infrastructure, educator knowledge and assessment philosophy). Infrastructure refers to the quality of school equipment, buildings, and technology, while educator knowledge refers to the content, pedagogical, and content knowledge of teachers as well as their professional role and position in society. Assessment philosophy refers to the purposes of and policies for assessment. Table 5.3 summarizes the similarities and differences between the countries. It is evident that the discrepancies between them are large in terms of infrastructure and educator knowledge; whereas, the assessment philosophies are strongly aligned. Nonetheless, there are huge discrepancies in assessment for learning resourcing and outcomes between the two societies.

Table 5.3: Comparison of the South African and New Zealand educational landscapes

	South Africa	New Zealand
Population *Estimated 2008 mid year population (World Bank, 2010)*	48,687,000	4,268,900
Schools	2,410,501 learners attending 26,099 schools in 2007 (Department of Education, 2007a)	766,379 learners attending 2,593 schools in 2007 **(Data Management and Analysis Division, New Zealand Ministry of Education, 2008)**
Infrastructure	*Variable provision* Well developed in urban, affluent areas Poorly developed and maintained in rural and low socio-economic status areas.	*Advanced provision* Equitably distributed High Technology based
Educator knowledge	*Developing* Many educators had their training under the apartheid system and have received poor training. The professional development system is still immature and experiencing developmental difficulties. There are however a small group of educators who have received good pre-service and in-service training.	*Advanced* Well established pre-service training and professional development system.
Assessment	*Aimed at promoting learning and monitor progress* Centralised and mandated assessment for the national senior certificate in Grade 12 (75% of marks). 25% of the final result is based on school based assessment.	*Aimed at promoting learning and monitor progress* Centralised and government mandated assessments for the final years of schooling from Years 11 -13.

AsTTle in New Zealand

The Assessment Tools for Teaching and Learning (asTTle) software, which is the focus of this paper, is the single most expensive (i.e., more than NZ$17,000 000 ≅ R89,000,000 between 2000 and 2008) addition to the assessment policy and resource-base or toolkit in NZ. AsTTle is an appropriate choice since the NZ government has invested substantially in the development and deployment of a national curriculum- and normative- referenced educational resource making use of advanced computer technology. Indeed, the asTTle software has been hailed as the “best new education investment this government has made” by the NZ Minister of Education, Trevor Mallard (Atlantech, 2003, p. 1). More importantly, the development and use of asTTle has been seen as a solution to

the negative effects of compulsory national testing, while meeting accountability requirements (Hattie & Brown, 2008).

The asTTle system has been described extensively elsewhere (Brown, et al., 2008; Crooks, 2002; Hattie & Brown, 2008; Hattie, Brown, & Keegan, 2003) so only a brief overview is given here. AsTTle provides the autonomous, decentralised schools of NZ an educational technology resource that provides data for school, classroom and learner improvement by assessing student performance in reading, writing, and mathematics in either English or Maori. Since 2002, schools have been provided, upon request, with the asTTle software free of charge and usage is voluntary. The asTTle software allows schools and teachers to create curriculum-aligned customised, standardised, 40-minute tests of mathematics, reading, and writing from large banks of calibrated test questions for English and Maori medium learners. Reporting is against both the objectives and strands of Curriculum Levels 2 to 6 and norms for students in Years 4 to 12.

All asTTle items and tasks were mapped by teachers, content area experts, and curriculum experts according to the NZ curriculum statements for the relevant subjects. Additionally, all items are mapped to a cognitive processing taxonomy (i.e., the Structure of Observed Learning Outcomes—SOLO) in order to categorise student performance on the various tasks according to broad levels of current functioning (Hattie & Brown, 2004). The test-users can select from a suite of graphical reports (including an online catalogue of curriculum-aligned teaching resources) that allow interpretation of the performance of individuals and cohorts relative to norms, standards, and objectives. The various reports were designed and evaluated to meet educational improvement and accountability purposes (Hattie, Brown, Ward, Irving, & Keegan, 2006).

While asTTle depends on computer technology, its development in NZ has been gradual and consistent with the infrastructure available in schools (Hattie & Brown, 2008). Currently, asTTle is in its 7th generation, which permits on-line testing, computer adaptive testing, and longitudinal tracking and goal setting (Hattie, 2009). At the time of this study, asTTle Version 4 was current (Hattie, et al., 2004a).

5.2.6.2 Sampling

The populations accessed for the NZ case study included:

- Principals, teachers and learners using asTTle
- NZ Ministry of Education officials working with asTTle
- Members of the asTTle team
- Professional development providers and school improvement organisations working with asTTle

From these populations, purposeful sampling for the case study was used to ensure that the perspectives of varying stakeholders on the use of asTTle was included. Participants knowledgeable about asTTle were selected in order to provide rich sources of information. Both the outsider perspective and the choice of rich sources of data contribute substantially to the validity of the case study. The following participants[33] were sampled for the study:

Table 5.4: Participants in exemplary case study

Population	Sample
School Users	• Two teachers (Ms Z and Mrs X) and three Year 8 learners from a school that adopted asTTle in 2006. The teachers were identified by their principal as effectively employing asTTle in teaching and learning and the learners have been exposed to asTTle during 2007. • E, principal of a school, who did an evaluation of asTTle and has experience both of using asTTle and the professional development associated with asTTle.
Ministry of Education	• Two assessment division representatives at the NZ Ministry of Education (NZ MoE) – Y and N. It should be noted that the opinions expressed by these officials does not necessarily represent the official Ministry policy.
asTTle Development Team	• Professor J, the creator of the asTTle tool. • Dr H, one of the asTTle developers, who had been a secondary school deputy principal and chief examiner for mathematics before joining the asTTle team.
Professional Developers and Researchers using asTTle	• B, a professional development provider who was involved in the development of asTTle itself and therefore has a profound content and knowledge about the tool. • Two associate directors of Research Centre G (A and D) and Q, a project researcher at the same centre. The centre focuses on research-based educational interventions specifically with Maori and Pacific Island children. Researcher Q uses the asTTle tool in working with schools on writing interventions.

[33] Attempts have been made throughout to protect the identities of the participants. In some cases, the identities of the participants may still be gleaned due to the very specific nature of their knowledge of the asTTle system. These participants have all been briefed on the limitations to confidentiality and have even agreed to have their identities published. All participants received copies of the analysis products and chapter in order to review it prior to publication and to re-evaluate their willingness to have the data published.

The data collection procedure for this sample is discussed in the next section (Section 5.2.6.3).

5.2.6.3 Data Collection

Data for the case study were generated through semi-structured interviews with NZ stakeholders in the asTTle system. The focus of the interviews was on how asTTle was used and the extent of use as well as the factors that facilitate or hinder use of the feedback system. The full interview schedules, transcripts of all the interviews and analysis products are available on the audit trail DVD. The interview data were supplemented with documents collected in NZ.

5.2.6.4 Data Capturing

Interviews were digitally recorded and transcribed and all field notes were captured electronically. Original digital recordings and notes were archived and will be kept at the University of Pretoria for a minimum of 15 years. Recordings were not published on the audit trail DVD, as the publishing would violate confidentiality.

5.2.6.5 Data Analysis

The interviews were analysed using what Saldana (2009) terms 'pragmatic eclecticism', which means that the researcher keeps herself open during the initial data collection and coding to determine the most appropriate methods of coding. A number of First Cycle coding methods (preliminary coding methods) were combined with Second Cycle coding (categorical, conceptual, and/or theoretical organisation). During the First Cycle, coding and recoding, data were analysed according to meaningful units of text, with codes generated through an inductive process and allocated to each unit individually. The First Cycle Coding methods included the following types:

1. Attribute coding: Coding of descriptive and context data captured at the beginning of each interview.
2. Holistic coding: Coding of basic themes or issues, preparatory to more detailed coding, large portions of text are coded with general codes.
3. Descriptive coding: Coding of the topic, smaller units than holistic coding are coded, in this study descriptive sub-codes were included for greater specificity.

4. Initial coding: This coding is also known as open coding, which involves the breaking down of the data into discrete parts and examining them for similarities and difference. This open-ended method allowed for deeper reflection on the data and the inclusion of nuances.
   (Saldana, 2009)

Once the First Cycle coding was completed, codes were clustered in meaningful groups to generate themes. For example, the theme 'professional development' includes codes such as *use to increase data-literacy* and *use to transform data into action*. The Second Cycle approach employed in this study was therefore pattern coding which is both inferential and explanatory, pulling large amounts of codes and data into more parsimonious units, sometimes known as meta-codes (Saldana, 2009).

This type of analysis employed in this thesis is based on inductive logic where the researcher has to immerse herself in the data in order to allow the themes to be constructed. The analysis was aimed at organising, describing and interpreting the data by trying to identify patterns or themes and constructing a framework through which this essence can be communicated meaningfully (Best & Kahn, 2006).

This analysis was framed in the pragmatist paradigm and was underpinned by the conceptual framework for this study (See Chapter 4), therefore the researcher approached the work with some pre-existing ideas. Readings on feedback of monitoring and pre-conceived ideas on the topic influenced the data analysis. The researcher moderated the inherent subjectivity through reflexive notes and memos, as well as the use of peer debriefing and examination of the audit trail by some of the expert consultants (See Chapter 4 for further discussion of the methodological norms for this study). The qualitative data analysis tool *Atlas.ti* was employed to facilitate analysis and provide an easily accessible audit trail in web-page format.

Computer Aided Qualitative Data Analysis

Many tools for Computer Aided Qualitative Data Analysis (CAQDAS) exist. *Atlas.ti* was utilised for the analysis here as it falls in the category of code-based theory building packages (Lewins & Silver, 2009). *Atlas.ti* allows for the analysis

of textual, graphical and audio data (Scientific Software Development, 2004). Willig (2001, p. 151) describes *Atlas.ti* as moving beyond mere coding and retrieval with several additional features including: "…visual displays of the hierarchical relationships between codes and the construction of conceptual diagrams or networks".

> The use of computers can certainly speed up the process of data exploration. The easy retrieval of data files and inspection of analytic memos on screen removes the need for physical cutting and pasting, photocopying of extracts, colour coding and manual sorting. In addition such programs allow the researcher to retrieve files that share certain features based on codes, keywords or descriptive labels in order to identify patterns within the data without having to search through the entire data set. (Willig, 2001, p. 152)

Atlas.ti facilitates the use of direct quotations to enrich the data representation. The use of CAQDAS is specifically indicated when dealing with large amounts of unstructured textual material, which could cause serious data management problems (Henning, Van Rensburg, & Smit, 2004, p. 129).

Separate analytical or hermeneutic[34] units were created for the analysis of the qualitative data in the different design cycles. A unit was generated for the analysis of the case study data from NZ. The separate units will allow for analysing the qualitative data from the various cycles on their own as they relate to different aspects of the design research process.

As *Atlas.ti* can be a complex tool for a novice user, and represents only one of a number of CAQDAS programmes that are available on the market, it may limit how well the reader can interact with the data and analysis using *Atlas.ti*. All data-analysis products and memos relating to the analysis process are therefore presented in the format of web pages for each hermeneutic unit and are included on the audit trail DVD along with this thesis. No knowledge of *Atlas.ti* is required to access the audit trail in html format and the data and analysis products can easily be accessed by any reader.

[34] The units that are used to analyse data in *Atlas.ti* are known as hermeneutic units.

5.2.6.6 Discussion

From the analysis, it appeared that the success of the feedback system incorporated in asTTle in part relied on the structure of the feedback system and its components. The key components contributing to the feedback system are illustrated in Figure 5.8.

I. asTTle Instruments

The first component is not necessarily part of the feedback system, but facilitated the trust in the data and instruments used to collect the data. One of the NZ MoE requirements for the development of asTTle was that teachers be involved in the development and testing of items for the item banks.

> *[Trevor Mallard] made some demands of us and he said 'you must involve teachers', he said, 'I'm not giving you all this money only to find it all going to the university and not going back to teachers'. (PD3, Prof J creator of asTTle[35])*

Teachers who contributed were compensated for their services and acknowledged in the technical documents and instrument manuals of asTTle. The participation in the development of asTTle de-mystified asTTle for many teachers and helped to build trust in the instruments. Great care was also taken in developing the items for asTTle to insure that a lot of the content of the items specifically related to NZ: "*we would be very careful to have material relating to New Zealand in asTTle" (PD1, PD provider B).* This made it more difficult for asTTle to be adapted to other contexts, as these items would have to be replaced with others specific to the new context. However, the NZ specific content engendered more trust and a greater sense of ownership of the instrument for NZ teachers and schools. The instruments for asTTle are highly dependent on ICT and schools design and print the assessments themselves based on the aspects they wish to assess. They set parameters according to the learning area they

[35] Reference to interview document from which quote originates. E.g. PD3, Prof J creator of asTTle, refers to Primary Document 3, Professor J creator of asTTle. The reference can be checked against the documents on the audit trail DVD.

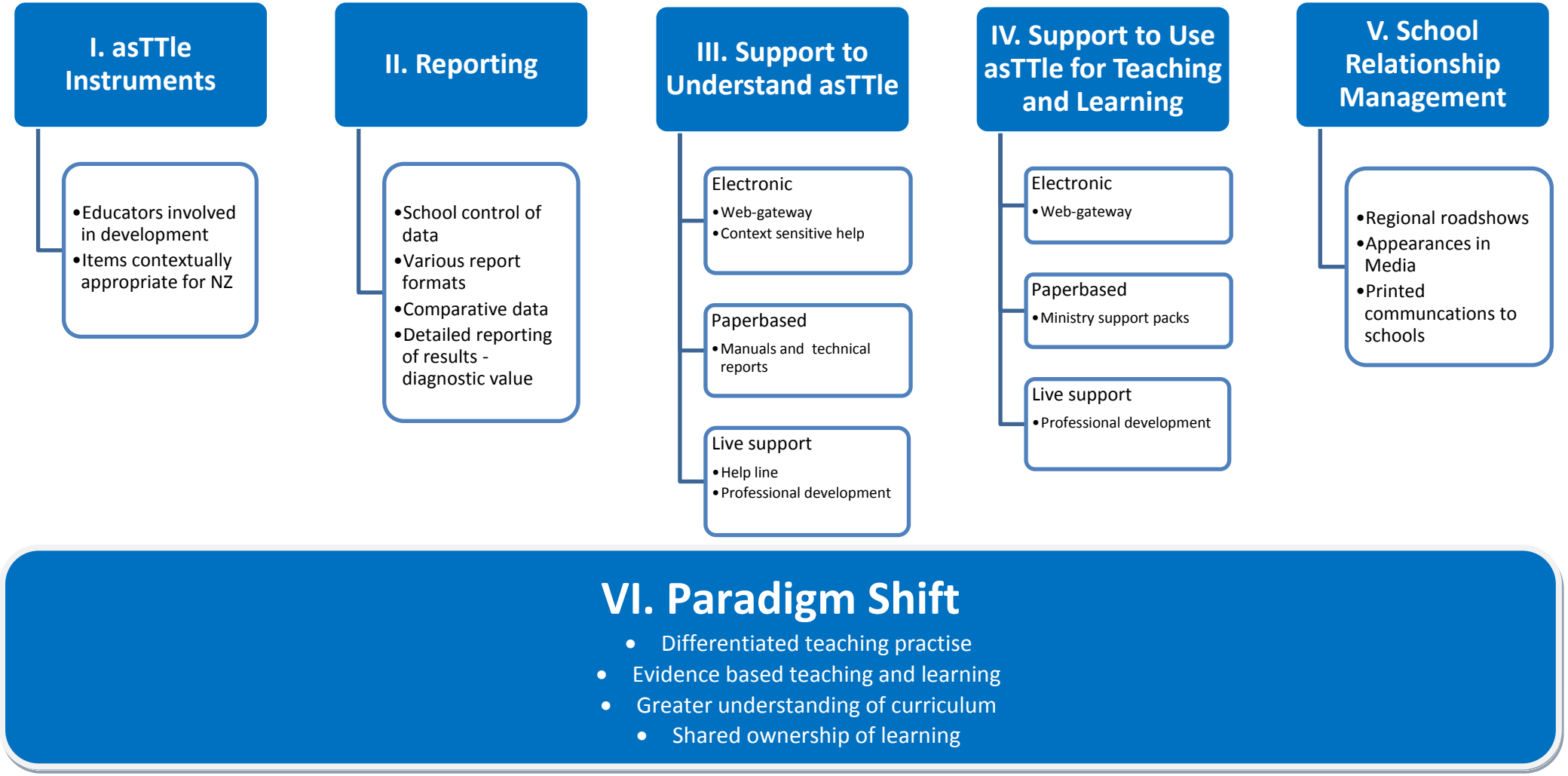


Figure 5.8: Components facilitating the success of the asTTle SPFS in New Zealand

wish to assess, at what level and also the specific topic areas. The assessment is then produced along with a memorandum. All the materials are then printed by the school and each learner receives an assessment.

The teachers then mark the assessment according to the memo and input the data into the system. As the system is so reliant on ICT, the design team was very concerned with ensuring that the technical aspects were not so complex that it detracted from the real purpose of the assessments to support assessment for teaching and learning. "*Absolutely. As I said before … it is all about teaching and learning and if they talk about the technology we have failed" (PD3, Prof J creator or asTTle).*

II. Reporting

The second component relates to the reporting of data. AsTTle can be used by schools autonomously. Schools input the data themselves and can then produce a variety of different reports based on it, which means that the turn-around time from assessment to feedback is very short and solely dependent on the schools. Schools do not have to report data to the ministry, but if they are willing to do so, it is done anonymously. This was one of the pre-requisites of the asTTle developers, that there should be no way in which the data could be used for high-stakes accountability practices by the NZ MoE.

> *I take the view that the government has a need and a right to know, but we don't want league tables, and we don't want teaching to the test, and we don't want the teachers having the test define the curriculum. (PD3, Prof J creator of asTTle)*

The reports were such an important concern for the asTTle developers, that various report formats were part of the proposal to the NZ MoE for the project and the various report formats were piloted prior even to the completion of asTTle, to ensure they were understandable and usable for school improvement.

> *… a lot of focus group time was spent with teachers presenting different versions of reports, asking them what they think it means getting in to tell us ummm…what they needed additionally to improve it, or if it had this if it would make any kind of a difference. (PD5, Dr H asTTle team)*

The report formats present the data in a variety of ways, either on an individual learner, class or school level with comparative data from the rest of the country or rest of the school *"That's the New Zealand mean. And that is where we are up to on the asTTle reading score" (PD7, Year 8 learners).* Comparative data for specific ethnic groups can also be inserted and reports are also presented in a variety of formats ranging from traditional graphs, and tables to those using graphics similar to an odometer to show progress and relative performance. The variety of formats was essential to ensure that teachers and schools could acquire information in a format detailed enough to allow its use for diagnostic and improvement purposes. The different report formats also cater for the preferred style of data presentation of teachers and schools. One of the report formats is also specifically geared to grouping children according to learning needs, to make it easier for teachers to use differentiated learning in their classrooms. These groups are also seen by teachers and learners as not being static, but as based on current learning needs in a specific learning area e.g. Geometry.

> *"[I]n some things the child may be in the purple group and they just pick it up so easy, so you just move them on. The groups are fluid… they will probably change about six times in a term, easily…" (PD10, Ms Z teacher)*

Children are placed in different groups for each learning area and the groups may change and shift as children progress through each learning area. The reports also directly relate back to the curriculum and the areas being assessed to help target action for improvement. *"[T]he reason I prefer asTTle to any of the other tools is that it is linked to the curriculum" (PD1, PD provider B).*

The third and fourth components of the asTTle feedback system relate to reporting, but there are however two distinctly different aims in the support structures. The one focuses on providing support to understand how to use the asTTle system and understand the data. This encompasses the technical skills to use the asTTle system and to understand the reports and graphs in asTTle. The other focuses on how to move from understanding the data and

system to using it for curriculum and classroom planning, teaching and learning activities.

III. Support to Understand asTTle

The support to understand asTTle is provided in a variety of forms. First, there is electronic support in the form of the www.tki.nz.org gateway that provides links to technical reports and manuals for asTTle as well as information pages. The programme itself is also equipped with a context-specific help function that facilitates the technical use and understanding of the programme. For the less technically inclined, paper-based instrument, manuals and technical reports are also available. Live support is also in place in the form of a helpline to the asTTle team at the University of Auckland. If the call centre personnel cannot assist the calls are immediately escalated up to members of the asTTle development team themselves. Schools can also contract professional development (PD) providers to provide training and support for the use of asTTle.

> *Well, at the moment our strategy is based on assessment for learning, so our professional development is helping teachers use assessment for learning better in their classrooms and schools. Part of that is purposeful use of tools. The tool part is a small part of the work we are doing. (PD 8, N NZ MoE).*

IV. Support to Use asTTle for Teaching and Learning

The fourth aspect, support to use asTTle for teaching and learning overlaps somewhat with support to understand asTTle. The focus here, however, is not technical, but school improvement, moving from understanding what the data is relaying to interpreting it and taking action accordingly in a specific school or classroom. This aspect builds on the support to understand asTTle. The TKI gateway provides electronic support to link the data to action through a 'What Next Button'. This function helps to relate the data to what the next area of learning should be and even has examples of activities that may help to achieve the learning. *"[W]hen I go on to asTTle 'What Next?' it is absolutely what I want to meet the learning needs. It is not just lots of cute activities" (PD 9, Mrs X specialist teacher)*

The NZ MoE has also produced information packs about asTTle:

> *So we produce the technical reports, and that is very important, but we are also producing information that is far more accessible for policymakers and for teachers. So for example in this one, this was a tool that we had that looked at reading, maths and writing [referring to asTTle data]. (PD8, Y NZ MoE)*

These not only discuss the project and introduce it, but also provide guidelines on how to interpret data and relate it back to action in a specific school using examples and guidelines. PD providers can also be contracted for training on transforming the asTTle data into action in schools. PD for asTTle not only addressed teacher technical requirements, but also emphasised the underlying assessment *for* learning philosophy of asTTle (Hattie, et al., 2006).

V. School Relationship Management

A final part of the feedback system is a relationship management function. Part of the trust that asTTle users have in the system is related to its creator Professor John Hattie being a well know educational researcher in NZ.

> *Having Prof J as the programme director has meant a huge amount of trust involved, because he is such a respected figure in the field of education…and having somebody as respected as that has made it a lot easier" (PD1, PD provider B).*

The project team are encouraged to engage in educational activities throughout NZ and upon occasion to appear in the media to comment on educational matters. This contributes to the visibility of the project and the trust that users place on asTTle. The MoE also regularly sends out printed information about asTTle and developments to keep users informed of developments. Annually the asTTle team also undertake a number of regional meetings to meet with schools. Such meetings provide an opportunity for direct communication with schools about their context, problems and experiences with asTTle. The meetings are invaluable in putting a human face to asTTle.

This interaction of various components of the asTTle feedback system helped overcome initial resistance to asTTle and brought about a number of paradigm

shifts. Originally, there was a theme of ***Resistance to the introduction of asTTle***. This particularly related to:

1. *Fear of high-stakes accountability.*

As asTTle was funded by the NZ MoE many teachers were afraid that it would be used to monitor teachers through high-stakes accountability practises.

> *[A] lot of people thought it would be used as a tool of torture and that it was going to be used to compare school A against school B. It was going to be part of a national monitoring system where schools would have to give the information to the ministry… (PD2, Principal E)*

Interestingly, the developers of asTTle at the University of Auckland were vociferous opponents of such use of asTTle (Hattie, 2005).

2. *Wide range of assessment tools available in NZ.*

AsTTle is only one of a range of government-sponsored or approved assessment resources available to NZ schools (Brown, et al., 2008; Crooks, 2002). Schools are free to employ any of the tools that they feel are appropriate, though unfortunately many have not lived up to expectations (e.g., they are expensive, time-consuming, or technologically cumbersome) and teachers were hesitant to accept the promises about asTTle based on previous experiences with other promising new assessments.

3. *Vulnerability through transparency.*

The asTTle reports are geared towards transparency in assessment. The results are diagnostic and individualised for each learner. *"[AsTTle] gives us the information we need, is informing the practice and is very easy to share with the students at this age." (PD9, Mrs X specialist teacher).* This means a high level of openness about learner performance, which some educators and school-leaders may find threatening. Principals and HoDs also have greater insight into the comparative performance of various classes in the school.

4. *Shock of standardised results compared to national standards.*

Given the validity procedures asTTle employed (i.e., independent curriculum mapping, national teacher item review panels, and national teacher standard setting panels) it is highly likely that asTTle curriculum level reports reflect appropriately the objectives of the national curriculum statements. Nevertheless, gaining credibility in the minds of teachers was more complex. Many educators were shocked at the first results from asTTle (Hattie et al., 2003), believing that asTTle had given lower curriculum level scores than students merited. For example, teachers may have perceived their learners to be at Level 4, while the asTTle results may have revealed their learners were only functioning on Level 3. *"[A] lot of the teachers think these kids are doing well, and then the test is saying they're not doing well." (PD5, Researcher D).* Thus, there was a tendency on the part of educators to question the validity of the asTTle tool, rather than examining the standards they were employing in the classroom. *"[R]ather than having a good look at their understanding of Level 4 and whether the students are fulfilling, grasping the concept of that level, they were criticising the tool" (PD2, Principal E).*

5. *Fear of change and the novel.*

Many educators are entrenched in their assessment practices and were hesitant to try a new approach. As one teacher put it: "*it would be a problem for teachers who were entrenched in 'this is the way I have done it for the last 104 years, it is working, why change it?'" (PD9, Mrs X specialist teacher).*

6. *Technological complexity.*

Although NZ has a very good ITC infrastructure (e.g., all schools in NZ at the time of asTTle V4 deployment in 2005 had access to broadband internet connectivity of at least 54Mbps; all teachers were entitled to participate in a national government-funded "laptops for teachers" scheme) and most educators are computer literate, some teachers found asTTle challenging. Some NZ educators were also not comfortable working with computers, which dissuaded them from employing the system; *"So teachers do get terrified from it, some of them do get terrified because it is computers" (PD3, Prof J creator*

of asTTle). Indeed more positive attitudes towards ICT predicted greater usage of asTTle, which indirectly contributed to more accurate interpretation of asTTle reports (Hattie et al., 2006).

7. *Cost.*

Printing of asTTle assessments and reports increased stationery expenditure in schools; instead of buying off-the-shelf test products schools were printing their own customised tests. *"One principal said to me the other day, it is a dollar (sic) for each paper, which is quite a lot it is $30 for a class. So, that is a barrier for some people." (PD1, PD Provider B).* Furthermore, construction of assessments, capturing of marks and printing of reports could also be time consuming, particularly if a person were unfamiliar with the programme. *"[I]t takes a lot of paper, it takes a lot of time for the teachers to do the marking and the data re-entry" (PD5, Dr H asTTle team).* Thus, some schools found these factors outweighed the benefits of asTTle. Nonetheless, it could be argued that this was a matter more of changing teachers' work rather than adding to it; the computer saved considerable time to create and analyse tests (e.g., creation of photocopy ready tests took 10 minutes in asTTle, unlike the four or more hours needed to prepare tests even when items were cut-and-pasted from previous tests).

A number of themes related to ***how asTTle overcame the resistance to implementation:***

1. *Aligned development of infrastructure, educator knowledge, and assessment philosophy.*

At the time of deployment, schools had in place the necessary infrastructure of ICT (including copying facilities) so that usage of asTTle was feasible. However, asTTle was presented not as a technology or testing resource, but rather an educational resource (Hattie & Brown, 2008*). "[W]e will never talk about testing, we will talk about teaching and learning- how is it going to make a difference to teaching and learning" (PD3, Prof J creator of asTTle).* Furthermore, asTTle was introduced in a policy environment that strives towards assessment *for* learning (New Zealand Ministry of Education, 1994)

and enhanced teacher quality. The Ministry provides teachers various forms of PD (e.g., assessment, literacy, numeracy) to reinforce this approach and their pedagogical content knowledge. Therefore the PD, electronic and paper-based support were all aligned to the underlying philosophy of assessment for learning.

2. *Support for use.*

This includes the electronic, paper-based and live support already discussed above.

3. *Tools to inform change.*

AsTTle differentiated itself from other assessment tools in that it provided highly diagnostic information compared to both curriculum expectations and national norms. Teachers can access reports for individual learners, grouping reports, reports comparing class progress against national norms, and so on (Hattie & Brown, 2008; Hattie, et al., 2003). The data are also specific in terms of the differential skills of learners in different learning areas. "*I had a child last year who on reading tests would actually do really well, but on asTTle it actually showed up that she had a gap in evaluation, she was actually quite low" (PD9, Mrs X specialist teacher*). This information enabled the teacher to identify what even better children needed to learn. Results are operationalised in terms of gaps, strengths, weaknesses and things still to be learnt. AsTTle then also provides links to what actions can be taken in the class to move learners from their current levels to the next level.

4. *Trusting intentions.*

From the beginning, the terms of development for asTTle made it clear it was for school-based use, not government or central agency use. Data from asTTle are not sent to the MoE (either by regulation or by technological means), although schools may choose to use their data to demonstrate their effectiveness to the Ministry in their triennial reviews. This explicit policy of "no control, no compulsion, no central reporting" (Hattie & Brown, 2008) helped to break any distrust schools may have had towards the introduction of a

government-funded national assessment tool. The voluntary status of the tool also mattered to teachers: *"this is not a country where teachers take kindly to being forced to do things" (PD1, PD provider B).* That the instrument was designed by a team outside the government and led by a well-known academic figure (Prof J) further engendered trust in the tool and its intentions. As part of the Ministry contract, teachers were involved in the development process of asTTle and in this way teachers could see the inside workings of the design of asTTle and contribute to it. These teachers later became resources in spreading information on asTTle, either through formal avenues such as PD, or by word-of-mouth. *"Well, people say to me, well how did they write these questions? And I say, well I know exactly the answer to that question, because I helped put it in." (PD1, PD Provider B).* Indeed, the point of assessment for learning is to encourage schools and teachers to discover weaknesses or poor results in their students' learning without fear of shame, blame, or punishment.

5. *Success in bringing about learner improvement.*

AsTTle has in many instances formed the basis for drastic improvement in learners. Once educators could identify the learning needs, these could be addressed and shifts in the learning could be accurately measured against the curriculum using asTTle. *"[T]hat is just in a term, the difference you can see from just a term, so teach it for a whole year, like it is just exciting to see …" (PD 10, Ms Z teacher).*

VI. Paradigm Shift

The most fundamental changes brought about by the asTTle feedback system were shifts in paradigm in schools, PD providers as well as academic and MoE staff. These shifts were stimulated by the high degree of congruence between the underlying philosophy of the feedback system and the educational policy context. These paradigm shifts included:

1. *Using assessment for evidence based practice.*

While NZ has no compulsory testing in primary school, there was a great deal of testing, much of which was seen as producing results for records. In contrast, the asTTle system employs a formative, validity-focused process that begins with teachers determining the focus of any asTTle assessment, followed by diagnostic interpretation of data directly linked to teacher action to help learners to progress to the next level. The tool provides a basis for evidence-based classroom practice that is sensitive to the needs of the learners.

> *[F]or years, we were sort of feeling around in the dark, this might or might not work, and now we have some clear evidence to show where our problems are. We can target our teaching skills" (PD1, PD provider B).*

In some cases, the introduction of asTTle led to greater transparency around assessment with learners and parents being briefed on results and their meaning for further teaching and learning. *"I use [the reports] with parents and I say here is the data, this is where the child is at and what we are working towards" (PD10, Ms Z teacher). "[AsTTle] gives us the information we need, is informing the practice, and is very easy to share with the students at this age" (PD9, Mrs X specialist teacher).*

2. *Shared ownership of learning.*

By shifting the assessment practices from a purely summative or teacher-centric process to a more assessment *for* learning approach, learners were provided the opportunity to take responsibility for their own learning. *"It is a little like doing a dance with them, we are in it together… I think the engagement, self-monitoring, the talking with them [learners] makes a difference" (PD9, Mrs X specialist teacher). "[I]f you don't work for it, you are not going to get it, so you are in control of your learning" (PD7, Year 8 learners).* Openness and sharing of reports from assessments allowed learners to gain insight into their current status and what their needs were and thus motivating them to focus their efforts.

3. *Facilitation of differential teaching practises.*

AsTTle provides various reports, including grouping reports, where learners with similar needs are grouped together. Teaching material and activities can thus be differentiated for the group's particular learning needs. Grouping in such a manner means that learners do not associate groups with specific levels, but differing learning needs. No negative connotations of a 'clever' or 'stupid' group are thus created. "*[I]t's never like it is in junior school… like when you get the best readers in the top group. It's like what you got wrong, it is what you don't understand." (PD7, Year 8 learners)*

4. *Increased understanding of curriculum levels and description.*

The autonomy of NZ schools and the breadth of curriculum outcomes have jointly facilitated a divergence of understanding between teachers as to expected standards. Teachers tend to be exposed to learners from a certain region and socio-economic background and naturally revert to a form of norm referencing and personal interpretation of the curriculum standards and outcomes. AsTTle, through its writing of items to curriculum objectives and curriculum-levels based standard setting processes, permits the development of a national understanding of progression. *" …[A]ll our learning intentions are given to us in asTTle so we can see what a child at that level, at level 2 should be learning, what their learning intentions should be." (PD10, Ms Z teacher).* This effect was more obvious in the context of written language.

5.2.7 Design Principles from the Exemplary Case Study

The analysis of the exemplary case study proved to be a successful tool to identify design principles for the optimising of the SAMP feedback system in South Africa. The system must include: a trusted assessment system, clear reporting, support to understand the data, support to use the data and school relationship management. The design guidelines for these components are now discussed.

I. Instruments

a. Teacher involvement in development of the monitoring and feedback system is essential to engender trust and ensure contextual appropriateness.

b. The design and building of trust in the assessment is a key component in ensuring the success of the feedback system.

II. Reporting

a. Data must be provided in a variety of formats graphically, textually, tabulated, to accommodate the needs and preferences of different users.

b. Data should already be presented in a way that is clear and easy to understand, the presentation should not demand to high a level of data-literacy from users.

c. Turnaround time from assessment to reporting must be as short as possible.

d. Data must be detailed and have diagnostic value.

e. Comparative data support interpretation and action.

f. Data must be presented in such a way that it allows for additional analysis.

III. Support to understand the feedback

a. Some support must be aimed at facilitating the understanding of the feedback. Making sense of the data as represented.

b. Support should be provided in a variety of formats to suit user needs and preference, possibly including live support, professional development, ICT resources and printed media.

c. Some support should be available around the clock through either printed media or ICT resources.

IV. Support to use the feedback

a. Some support must be aimed at facilitating the use of the feedback must be provided with the data.

b. Support should be provided in a variety of formats to suit user needs and preference including live support, professional development, also ICT resources and printed media.

c. Some support must be available around the clock through either printed media or ICT resources.

d. There must be congruence between the infrastructure and feedback and support delivery modes to ensure sustainability and accessibility.

V. School relationship management

a. Relationship management with users and stakeholders is an essential and ongoing process.

b. Open face-to-face communication with users engenders trust.

c. Some support should be available around the clock, even if only in printed form.

d. The feedback team must be responsive to user input.

e. Feedback facilitator reputation and persona affect the trust in the system.

VI. Supporting paradigm shifts

a. The monitoring and feedback system should exemplify and operationalise assessment for learning to facilitate action in schools.

b. The feedback system should encourage triangulation of results to support evidence-based practise.

c. The feedback system must not be so technical or demanding of data-literacy that the main focus is on trying to understand the system rather than using it.

These design guidelines along with the guidelines from the literature review (Section 5.2.5) and school inputs provided the guidelines for the components and underlying philosophy for the optimising of the SAMP feedback system. Guidelines about reporting and instruments were incorporated immediately as the initial prototyping cycles focused on creating conditions for the use of the data. Guidelines about support and aspects of school relationship management were only fully implemented and explored later in the optimisation of the feedback system as the focus shifted to facilitating the use of the feedback provided.

5.3 Conclusion

In this chapter the pre-existing feedback system was introduced. The context and needs analysis as well as the first cycle of the exemplary case study of asTTle the NZ SPFSs were explored. The combined design guidelines from the Preliminary Phase are summarised in Table 5.5.

Table 5.5: Combined design guidelines from the Preliminary Phase

Component	Case Study	Literature review
Instruments	Use of school and educator expertise in development, to ensure contextualisation and engender trust.	Use of school and educator expertise in development, to ensure contextualisation and engender trust.
Reporting	• Use multiple forms of data presentation to accommodate the needs and preferences of users. • Data presented in clear and easy manner, not require high level of data-literacy • Short turnaround time from assessment to reporting. • Detailed diagnostic data. • Comparative elements. • Allow for further independent analysis	• Provide comparative data for evidence-based decision-making. • Short turn around time between assessment and reporting. • Use of ICT to decrease turn around time and increase autonomy.
Support to understand the feedback	• Multiple forms to support understanding to suit user needs and preference may include live support, professional development and also ICT resources and printed media. • Some support must be available 24 hours, e.g. ICT resources or printed media.	
Support to use the feedback	• Multiple forms to support use of the feedback to suit user needs and preference • Some support must be available 24 hours. • Congruence between the infrastructure, feedback and support delivery modes to ensure sustainability and accessibility.	• Resources to support school improvement based on the feedback must be provided.
School relationship management	• Essential and continuous process. • Open face-to-face communication with users engenders trust. • Some support should be available around the clock, even if only in printed form. • Must be responsive to user input. • Feedback facilitator reputation and persona affect the trust in the system.	• The quality of interaction between facilitator and users impact on sense of trust, ownership and credibility. • Communication must be honest, open, clear and respectful.
Supporting paradigm shifts	• System should operationalise assessment for learning to facilitate action in schools. • Encourage triangulation of data. • The feedback system must not be so technical or data-literacy demanding	• Not be viewed as part of high-stakes accountability

The data from this chapter were used to provide the overall design guidelines for the Prototyping Phase which is discussed in the next chapters.

CHAPTER SIX
Prototyping Phase: Establishing conditions for use (Cycle 1-2)

> Over the past decade there has been exponential attention paid to accountability, assessment for and of learning, and the glut of information that accompanies such phenomenon (sic), aided and abetted by the fantastic increase in technology. Having reams of data, however, does not by itself make us smarter – only overloaded and confused. (Fullan in Earl & Katz, 2006, p. vii)

Plomp (2009) describes this phase that builds on the problem identification, needs and context analysis as the Prototyping Phase of the design research process. This chapter takes a closer look at the research design and results for the first two of the three design cycles employed during the Prototyping Phase. The design focus of the Prototyping Phase initially was to establish the conditions for use of the feedback system, then progressed to facilitating the transformation of these conditions into use. The first two cycles that focused on establishing conditions for use of the feedback system are discussed in this chapter. The next chapter (Chapter 7) focuses on the third cycle in the Prototyping Phase that examines how to facilitate the use of the feedback in schools.

The two complete research cycles of this chapter consisted of the development of two successive prototypes of the feedback system both of which were formatively evaluated to inform the development of the next prototype. The focus of this chapter is illustrated graphically in Figure 6.1.The pre-existing system and feedback prototypes are illustrated in blue and the evaluation activities are illustrated in green. Every full design cycle consists of the prototype adaptation followed by implementation and corresponding formative evaluation of that prototype.

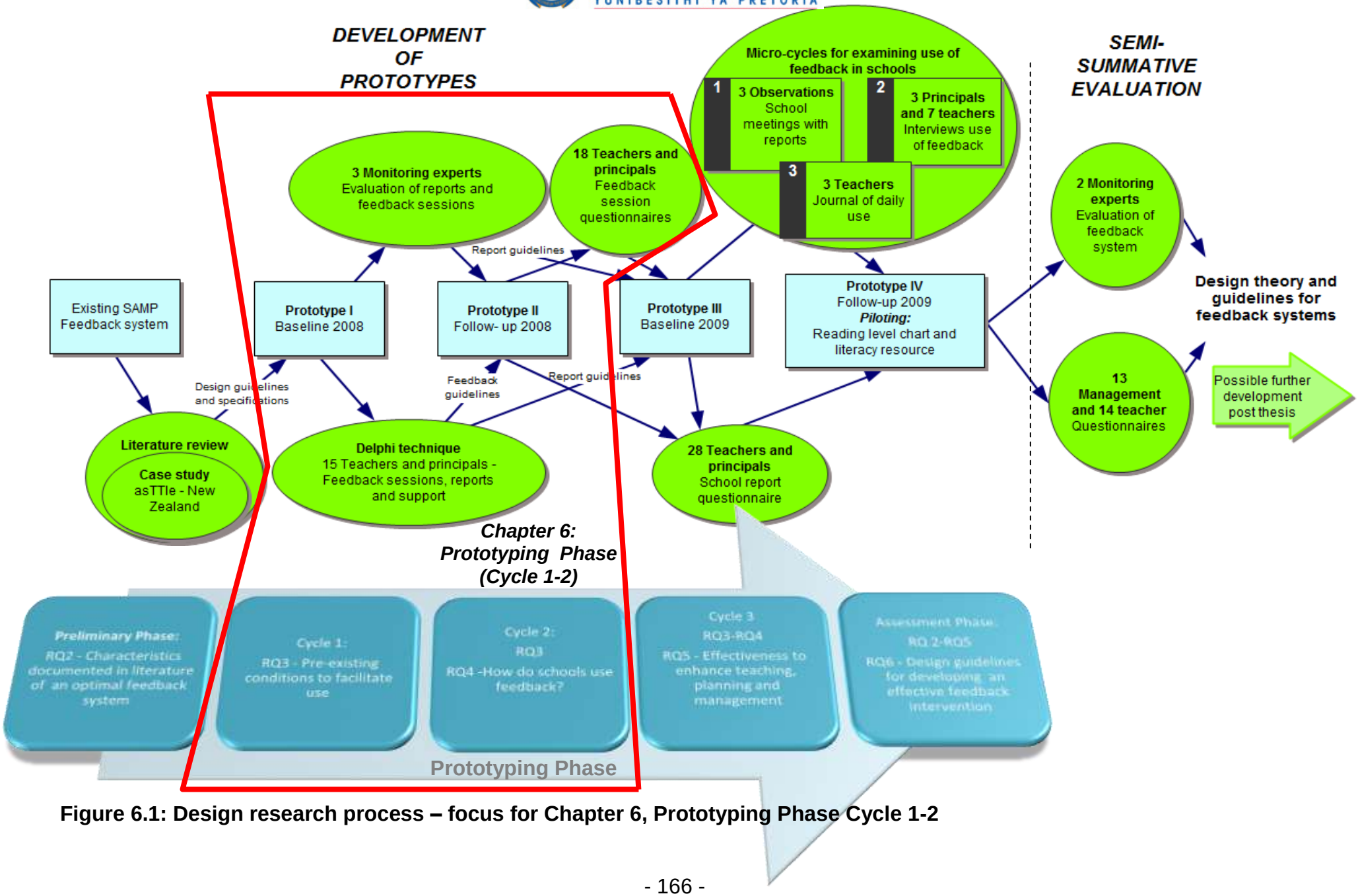


Figure 6.1: Design research process – focus for Chapter 6, Prototyping Phase Cycle 1-2

In the following section each of the three cycles of the Prototyping Phase are discussed separately, beginning with a description of the prototype, followed, by a discussion of the research design used to evaluate the prototype. The evaluation activities are guided by the research questions being addressed and the evaluative focus for the specific cycle. While there is a specific focus for each cycle there is always some deliberate overlap and a cycle may address some aspects of other research questions or evaluative foci. The research procedures for each cycle examine the sampling, data collection and instruments, analysis and discussion.

6.1 Cycle 1 (Prototype I - Baseline 2008)

Feedback Prototype I incorporated the learning from the Preliminary Phase to establish the conditions for use of the feedback. The design and evaluation focus for this cycle was on the reports and feedback session elements of the feedback system.

The formative evaluation for this cycle employed the judgements of both monitoring experts and school users. The monitoring experts were asked to evaluate the reports and feedback sessions. Teachers, HoDs and principals were asked to comment on reports, feedback sessions and support materials. In this case, the monitoring experts and the school users acted as revisors (See Section 4.2.2 for a full discussion of the various roles of participants in design research evaluations), as they were asked to make suggestions for improvement and change. Open, general evaluation questions were employed to allow evaluators to make suggestions about the global design elements of the feedback system, focussing on the feedback session and reports as well as commenting on the monitoring system, logistical factors and basic support and communication with the research team.

Cycle 1 addressed the third ***research question***:

3. *What pre-existing conditions need to be established in the feedback system to facilitate the use of the learner performance feedback system?*

The cycle served to provide ***design guidelines*** relating to the design specifications to establish use of the feedback system:

2. *Establishing conditions for use:* This development stage was aimed at improving the components of the feedback system. For this cycle the focus was examining in detail the design of the reports, feedback sessions, logistical arrangements and basic support in detail.

The evaluation in this cycle focused specifically on the ***evaluative foci*** of relevance, consistency and expected practicality (Plomp, 2009), with specific reference to the feedback session and reports:

1. *Relevance (content validity):* The system and its design should be based on state-of-the-art (scientific) knowledge. The feedback system must be clearly connected, in form and purpose, to the learning performance monitoring system for which it provides feedback.

2. *Consistency (construct validity):* The system must be 'logically' well designed. The various parts are well defined and the connections between the parts explicitly postulated. Although some elements may emerge more clearly throughout the process, there are no internal contradictions.

3. *Expected practicality:* The system is expected to be usable in the settings for which it has been designed and developed. Here in particular the focus is on whether the support, feedback sessions and reports are perceived as understandable and helpful for the schools in informing action.

In the following section Prototype I of the feedback system, developed and implemented in Cycle 1, is introduced briefly.

6.1.1 Prototype I – Baseline 2008

After 2006, the mode of assessment for SAMP changed to paper-based in Afrikaans, English and Sepedi, which proved more feasible for adaptation and sustainability (see Chapter 2). This shift meant that the sample size of schools

participating in the SAMP monitoring system was increased to twenty-two (English, Afrikaans and Sepedi) which translated into 1,535 learners being assessed in the baseline for 2008. All the schools in the sample also participated in the feedback system. Data from the assessments were captured by the fieldworkers, using optical mark forms, assessing learners on a one-to-one basis. Data were captured electronically, cleaned and analysed at the CEA, without being sent to the CEM, thus decreasing transposition errors and turnaround time for data cleaning, analysis and reporting.

All the schools in the sample received paper-based reports that included an instrument manual section. The teachers, principals and HoDs involved in the project were invited to attend the feedback session at the University of Pretoria. Schools were also invited to contact the CEA if they required further support interpreting and using the feedback. The components of Prototype I are shown in Table 6.1.

Table 6.1: Prototype I – Baseline 2008 components

Component	Description
Paper-based baseline report	Produced for each school individually and handed out at the feedback session
Baseline feedback session	Principals and teachers from all participating schools invited to the University of Pretoria
Telephonic, written and face-to-face communication	On an ad hoc basis as required

The inclusion of a component of more open communication with schools was based on the guidelines from the previous cycles. Schools were invited to approach the research team directly with any queries or if they required support in any improvement actions. These communications took place on an ad hoc basis as requested by schools. The changes to the paper-based reports and feedback sessions are discussed below.

6.1.1.1 Reports

The overall structure of reports was revised, with the adapted structure of the reports as follows:

1. Introduction to the SAMP project
2. Introduction the assessment subtests and scales (revised and expanded)
3. Results per school (expanded and revised)
4. Individual results (notes on interpretation and histograms added)
    a. Notes on interpretation
    b. Learner results table
    c. Learners at risk
    d. Exceptional learners
5. Conclusion and recommendations (expanded, recommendations added)

The introduction to the project remained similar to that used in the pre-existing system, as did the description of the subtest and scales. An additional section was however added with a figure to represent how the subtests and scales relate to each other (see Figure 6.2).

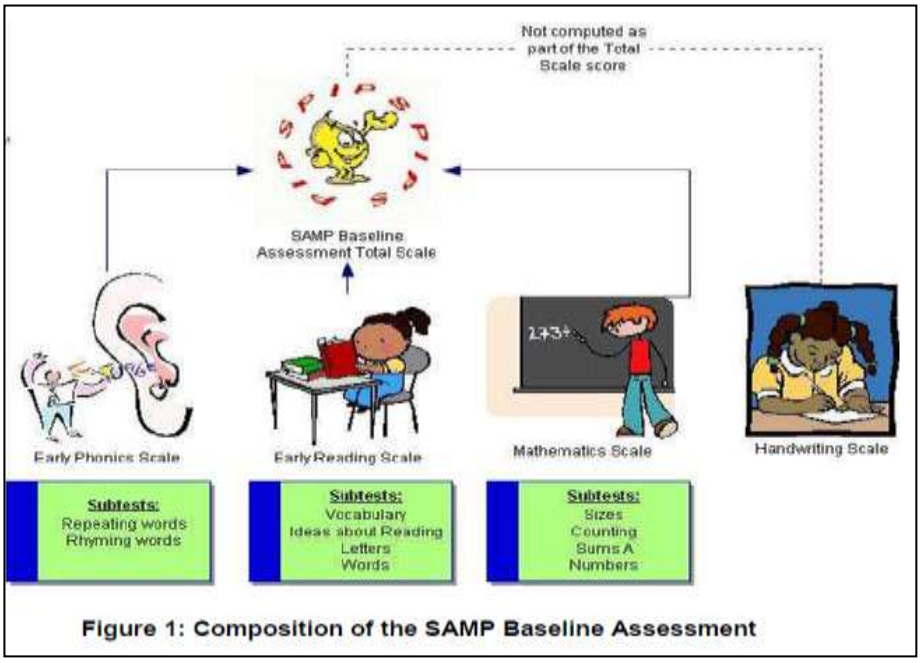


Figure 6.2: Composition of the Baseline Assessment – Prototype I

The graphics from the computer-based assessments reproduced in the reports were replaced by the graphics from the paper-based assessment (see Figure 6.3). All the paper-based graphics had been adapted to the South African context

as discussed in Chapter 2. In the pre-existing system the graphics represented in the report were usually from the easiest items of the assessment. This raised concern that teaching to the test may take place in the classrooms, based on the descriptions and example items. Therefore, Prototype I rather incorporated graphics from equivalent items, or the most advanced items, to maintain the integrity of the assessment.

VOCABULARY SUBTEST

Vocabulary is assessed through three different picture items. picture, such as the one in Figure 2, and prompted to point to

Figure 2: Vocabulary subtest:

Figure 6.3: Description of the Vocabulary subtest – Prototype I

Section 3 dealt with the overall school results. Unlike the pre-existing reports, all school-aggregated data were represented as percentages and not as aggregated categories to provide more detailed data. As the sample size was increased and the paper-based assessment did not have the technical problems experienced with the computer system, comparative scores were generated for each scale and subtest, whereas previously, they had been limited to the Early Mathematics Scale. Schools were allocated numbers to maintain the comparative component without impinging on trust, anonymity or confidentiality. Results were only compared across schools assessed in the same language, as although the assessments were similar, equivalence had not been established. The section on overall results for the school started with a tabulated summary of results and a discussion to provide schools with a quick overall guide of performance (see Figure 6.4).

4.1 AVERAGE PERFORMANCE OVERALL AND PER SCALE

In this section of the report, learner performance is discussed in terms of the five scales as well as the overall average performance for all learners. The results are presented with Table 1 as well as in Figure 10 through Figure 24.

Table 1 illustrates the achievement profile of the Grade 1 learners in February/March 2008. Compared to the other English schools assessed, your school's learners (**School 4**) had the fourth highest overall total start for their education (59%), 6% above the average (53%) for all English Schools in the sample. The strongest scale score for your school was on the Early Mathematics Scale (80%). The lowest scale for your school was the Early Reading Scale at 40%. The lowest subtest score for your school was achieved in the Words subtest with a score 28%, while the Counting subtest was the strongest subtest with 97% (See Table 2).

Table 1: Average percentage per scale and total for English learners

Scales	School 3	School 4	School 16	School 17	School 18	School 20	School 21	School 23	Overall Score - English
Handwriting	72	75	84	66	90	82	79	71	78
Early Phonics	38	56	50	35	63	56	41	38	48
Early Reading	20	40	43	26	51	43	39	25	36
Early Mathematics	57	80	85	64	89	80	78	66	76
SAMP Total	38	59	60	42	68	60	53	43	53

Table 2: Average percentage per subtest and total for English learners

Subtests	School 3	School 4	School 16	School 17	School 18	School 20	School 21	School 23	Overall Score - English
Vocabulary	30	49	59	35	68	52	53	31	48
Ideas about Reading	23	39	38	25	41	38	36	25	33
Repeating Words	60	76	71	60	81	75	59	56	67
Rhyming Words	16	36	29	11	45	37	22	20	28
Letters	22	44	51	33	58	51	47	32	43
Words	6	28	25	11	37	33	20	12	22
Ideas about Maths	65	91	91	75	95	88	86	80	84
Counting	78	97	97	85	97	94	96	86	91
Sums A	43	67	79	44	88	69	69	47	64
Numbers	43	66	76	54	76	70	63	51	63

Figure 6.4: Comparative tables per language group for scale and subtest scores – Prototype I

The tabulated results were followed by bar graphs of results comparing the school's performance with that of other schools in the same language group. The comparative performances of individual schools on each scale (Overall, Early Phonics, Early Reading, Early Mathematics and Handwriting) were represented graphically, together with a discussion. After the representation of each scale, the graphs for the subtests (that constitute the particular scale) were also produced (see Figure 6.5). For example, the Phonics Scale comparative graph would be followed by comparative graphs of the Repeating Words and Rhyming Words subtests that constitute the Phonics Scale.

4.1.3 PHONICS SCALE

The Phonics Scale consists of the Rhyming Words and Repeating Words subtests represented in Figures 13 and 14. The learners from your school achieved the joint second highest Phonics scale score (along with school 20) of all the English schools who participated in the Baseline assessment with 56%. This is 8% above the average of all the English schools in the sample. Your school performed better on the Repeating Words than the Rhyming Words subtest which comprises this scale (76% and 36% respectively).

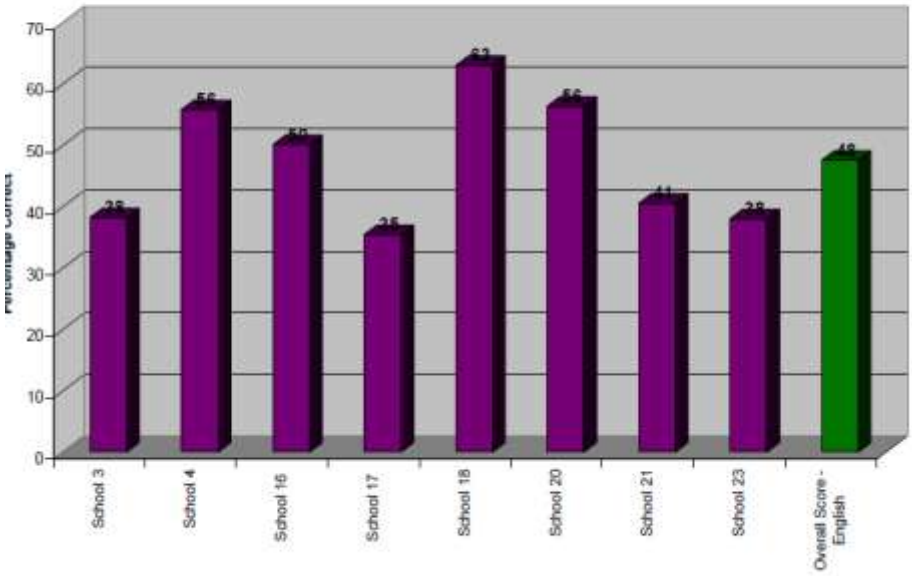


Figure 12: Performance on the Early Phonics Scale per school and overall – English medium of instruction

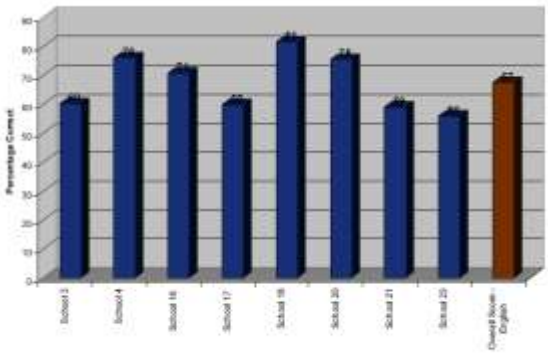


Figure 13: Performance on the Repeating Words Subtest per school and overall – English medium of instruction

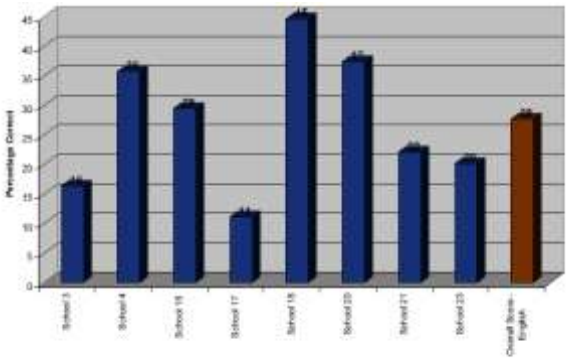


Figure 14: Performance on the Rhyming Words Subtest per school and overall –English medium of instruction

Figure 6.5: Early Phonics scale and constituent subtest results across schools – Prototype I

The overall school result section concluded with a graph summarising the school's performance across the scales (see Figure 6.6), then across the subtest. The tables containing the easiest and most difficult subtest items for each school was also removed from Prototype I as schools indicated that it did not contribute any value and that the descriptions of the subtests and scales were more meaningful.

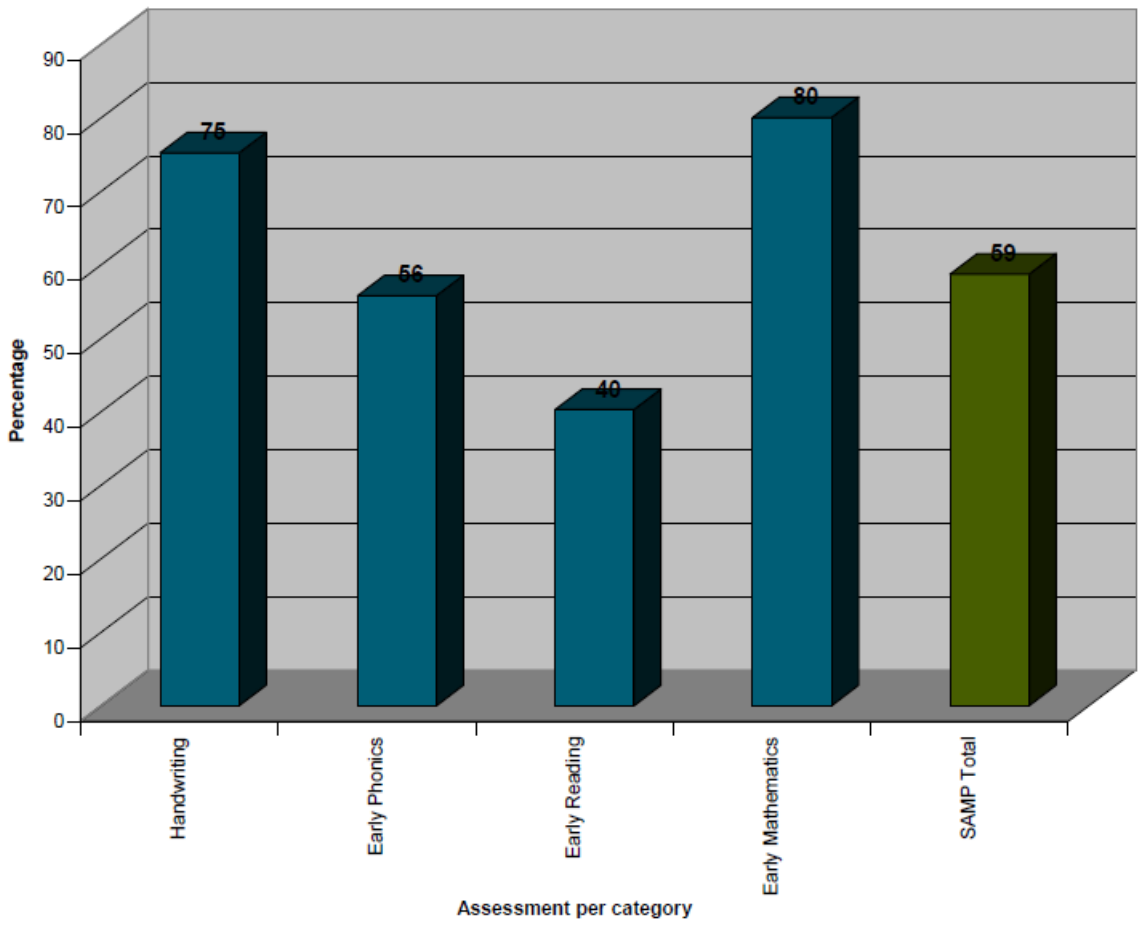


Figure 25: Performance per scale for School X Primary School per scale and overall

Figure 6.6: School's performance across the scale – Prototype I

The Individual learner's results in Section 4 maintained the representation of the data as categories from 1-4. A section with notes on interpretation[36] was added to warn users against over-interpretation of results for a learner from a single assessment. The tabular representation of learner results presented in categories for each of the scales for the baseline was also kept (see Figure 6.7).

[36] It is important to remain cognisant of the fact that all testing situations are dynamic. Children's performances are influenced by multiple factors on any specific test day. A learner's performance may be influenced by such factors as his or her health, the time of day at which the test is administered, whether or not the child is hungry, emotional difficulties or even the rapport with the specific fieldworker.

Table 3: Individual learner results for SAMP Baseline Assessment School X Primary School 2008 expressed in categories

Name	Surname	Total	Phonics	Reading	Maths	Handwriting
ZZZ	YYY	2	1	2	4	4
ZZZ	YYY	3	3	2	4	3
ZZZ	YYY	3	2	3	4	0
ZZZ	YYY	3	3	2	4	4
ZZZ	YYY	2	2	1	2	4

Figure 6.7: Individual learner result tables – Prototype I

The section on exemplary learners and those in need of extra support was also maintained. A histogram of the learners' performance for each scale was however included to provide greater insight into the distribution of the learners' performance for the scale per school (see Figure 6.8).

5.4.3 EARLY READING SCALE

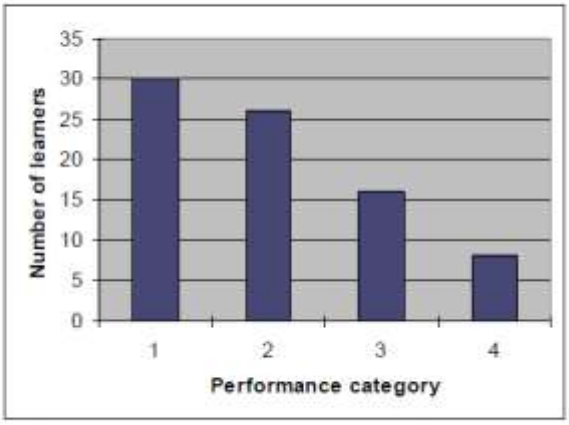


Figure 30: Distribution of learner performance according to performance category on the Follow-up Early Reading Scale

The majority of learners in your school had achieved a 1 (0-25%) or 2 (26-50%) on the Reading section of the assessment. The 30 learners who achieved a 1 have been identified as in need of additional support in this area.

Learners in need of support in the area of Early Reading:

Name	Surname
ZZZ	YYY
ZZZ	YYY
ZZZ	YYY
ZZZ	YYY
ZZZ	YYY

Figure 6.8: Histograms and identification of learners in need of additional support - Prototype I

A conclusion section was added to the report summarising the main strengths and weaknesses of the group tested for the school. An appendix was added with learner results presented as percentages for teachers who preferred working with percentages. The changes to the feedback session for Prototype I are now discussed.

6.1.1.2 Feedback Sessions

Representatives from schools were invited to attend and received the reports at the feedback session. With all the changes that had been implemented, the turnaround time for reporting had decreased by two weeks. The feedback session was shortened to 90 minutes and consisted of a presentation by the project leader, comprising:

- A shortened introduction to the CEA and the project (adapted)
- Description of the assessment (adapted)
- Presentation of the new report format (new)
- An example of how to make sense of the data in the new format (new)
- The future plans for the project
- An opportunity for discussion and questions

The focus shifted from introduction of the assessment to discussing how to understand the reports and make sense of the data. Schools were also provided with more opportunity for questions and discussion of application of results and problems in their schools. Schools were presented with a handout with the slides and an agenda to facilitate the process. The invitation to contact the research team for any further analysis or support was repeated officially. Refreshments were served and informal conversations took place between the research team and the schools' representatives about the project and individual school reports during the break.

6.1.2 Formative Evaluation of Prototype I

The formative evaluation of Prototype I took place through two processes. Firstly, school users were approached to evaluate the prototype and provide suggestions and priorities for improvement through the Delphi technique. Secondly, expert evaluators were asked to evaluate the prototype and provide verbal and written feedback. The research procedures for this formative evaluation are discussed below.

6.1.2.1 Selection of Participants

All schools in the SAMP sample participated in the ***feedback prototypes,*** i.e. all 22 schools in the sample that received reports were invited to the feedback session and received support material and telephonic support if required. The evaluation of Prototype I consisted of the Delphi technique, employed with the schools and an expert evaluator's examination of the reports and feedback session documentation. All schools were invited to participate in the Delphi technique and participation took place on a voluntary basis.

Sampling for Delphi technique

All schools were sent electronic facsimiles (faxes) of the forms to participate in the Delphi technique. Both expert and user evaluator were employed to evaluate Prototype I. All schools received all three rounds of documentation whether or not they had participated in the previous round. In some cases different schools responded to each of the three rounds of the Delphi technique. A non-response analysis was conducted (see Table 6.2). All English and Afrikaans schools participated in some round of the analysis and three of the seven Sepedi schools participated. In total, 17 of the 22 schools participated in the Delphi analysis. The low response rate for the Sepedi schools was attributed in part to problems with communication infrastructure at the schools and strike action at the time.

Table 6.2: Response analysis for Delphi technique –Prototype II

School Number	Language	Round 1	Round 2	Round 3
3	English			1
4	English	1	1	
6	Afrikaans			1
7	Sepedi	1		
8	Afrikaans	1		
10	Afrikaans			1
11	Sepedi		1	1
12	Afrikaans	1	1	1
16	English	1		1
17	English/Afrikaans	1	1	
18	English	1		
19	Afrikaans	1	1	1
20	English	1		1
21	English		1	
23	English	1	1	
24	Sepedi			1
25	Afrikaans	1	1	1
		11	**8**	**10**

Sampling of Expert Evaluators

Three expert evaluators and consultants were employed in this evaluation cycle. The three experts were linked to the CEA as consultants on a SANPAD collaboration project. The Dutch experts were therefore already involved in the value-added project and available to serve as expert evaluators. Each consultant's areas of expertise is summarised below:

- ***Expert 1:*** An expert in the field of education change, extensively involved in school-based research in South Africa. A qualitative research methodologist with specific expertise in computer-aided qualitative data analysis and a wide knowledge of the South African educational context.
- ***Expert 2:*** A Dutch academic involved in the development of the ZEBO school evaluation system in the Netherlands. A quantitative methodologist with expertise in Item Response Theory and multi-level modelling, and extensive knowledge of monitoring in the Netherlands education system.
- ***Expert 3:*** A Dutch academic with extensive national and international experience in educational evaluation and international schooling systems. Considerable expertise in the fields of design research and curriculum design.

The diversity of experience and expertise ensured that contextual knowledge of South Africa, monitoring knowledge, knowledge of design research methodology, qualitative and quantitative expertise were all presented by the expert evaluators.

6.1.2.2 Data Collection

This first method of choice for the evaluating of Prototype 1 was the Nominal group technique. Educators, HoDs and Principals from one school per language group were invited to participate. The Nominal group technique was originally chosen as the technique is often employed to generate a diversity of ideas with a level of anonymity, whilst still providing the opportunity of checking communication (Syque, 2007). The technique perfectly suited the role of the evaluators as revisors (Nieveen, 2009) in this phase. Unfortunately, during the first attempt at the Nominal groups, attendance was poor with only the selected English school participating and the participants tended to communicate naturally with each other, producing the 'group think' phenomena. This was contradictory

to the purpose of the approach to generate a multitude of ideas. Therefore, the approach was changed to the Delphi technique to address this issue.

The Delphi technique is similar to the Nominal group technique in that it is a group problem-solving and decision-making approach, but does not require face-to-face interaction (Michigan State University Extension, 1994). The technique starts by the posing of a specific problem to which participants anonymously contribute. This initial question statement and input is followed by a series of carefully designed questionnaires that incorporate summaries and comments from the previous rounds to generate and clarify ideas. The process concludes with a voting round in which the participants can indicate the priorities for the specific project (Dunham, 1995; Illinois institute of technology, nd; Williams & Webb, 1994). In this study, the questions were aimed at determining how the use of the feedback system for SAMP could be improved, with specific reference to three areas:

1. The feedback sessions at the University
2. The reports provided for each school
3. The support for understanding the information included in the reports

School representatives were also invited to comment on any other aspects of the programme.

Usually, e-mail communication is used in the Delphi technique, but many of the schools in the sample did not have access to the Internet so a slight adjustment was made to the technique with faxes being sent to and from schools. The technique proved more efficient and encouraged greater participation than the Nominal group technique with at least a third of schools in the sample contributing to each round of questioning. Diverse and rich ideas were also generated and discussed in relation to the feedback system.

The input from the three expert evaluators was less formal. The expert evaluators were provided with the reports and the support materials, as well as materials relating to the feedback session (including invites, agendas and slide presentations). The evaluators provided written and verbal comments and made recommendations including for improvements to the reports.

6.1.2.3 Data Capturing and Analysis

Data from the Delphi technique were captured electronically, both in textual forms for qualitative analysis and in *Excel* for descriptive analysis of frequencies. Feedback from the expert evaluators was captured through field notes from meetings, while notes on the reports were kept and captured electronically and electronic feedback received through e-mails was saved.

Data collection and analysis for the Delphi technique was iterative. The first rounds of data from the faxes were captured textually and analysed using *Atlas.ti* to generate themes of suggestions. The themes were constructed from the responses and presented in the second round of faxes. Further feedback and comments were requested in the second round and the themes revised, based on the feedback from round two, again employing *Atlas.ti*. The third round faxes summarised the comment and recommendation themes and allowed the schools to vote on the priority order for further development of the feedback system. These data were captured in *Excel* and descriptive statistics were generated to determine the priorities for further development of the feedback systems.

The data from the expert evaluators were thematically analysed to determine the focus for further development. These themes were compared to input from the users to determine which aspects should receive priority for further development. This process allowed for a grounding of the expert evaluations in the contextual needs of the users.

6.1.2.4 Results and Design Guidelines-Expert Evaluators

The evaluators commented on reports verbally and through written notes on the materials. The overall evaluation of the reports and feedback session was positive, the evaluators stating that the data were presented clearly and in an easily understandable format. A number of recommendations for improvement of the reports were provided:

1. ***Continued involvement of users*** in evaluating and improving the reports and feedback sessions

2. Ensuring of ***alignment of format and structure*** between the development of the secondary and primary school feedback systems

3. Dividing reports into a ***separate manual and data report***

4. ***Expanding the descriptions*** in the instrument manual with particular reference to the underlying skills involved in each subtest and the links to the curriculum

5. ***New instrument manual***

    - Including the ***reliability and validity*** data of the instrument development in the manual

    - Including a ***section on interpreting and using the data*** in the manual

    - ***Automating*** certain parts of the report generation to decrease turnaround time from assessment to reporting

6. ***Reports***

    - Changing the reporting to reflect learner scores in ***five instead of four categories,*** so that categories are less broad and allow for easier differentiation between learners

    - ***Comparing results to scores from previous years***. This would mean that reports could be generated, before all the schools were assessed, further decreasing turnaround time.

    - Placing ***standard error bars*** in the graphs to convey the message that there is uncertainty in the scores and a small difference in score should not be over-interpreted.

    - Ensuring that that the scales in the graphs on the ***Y-axis run from 0-100***.

The majority of these recommendations were only employed in Prototype III, to maintain consistency of reporting from the baseline to the follow-up assessment.

6.1.2.5 Results and Design Guidelines-Delphi Technique

Several themes emerged based on the Delphi technique, clustered according to material relating to the feedback presentations, reports and support at the University. The voting in the Delphi technique also resulted in priority values being assigned to the different suggestions for improvement.

I. FEEDBACK PRESENTATIONS

The input on the feedback presentations related mainly to the content, logistics and process of the feedback presentations.

I (a)Content

The schools generally expressed the view that the content of the feedback session was very informative and positive. Schools who have been involved in the project for longer indicated that the sessions seemed to be aimed at the newer schools and some of the information was repetitive. "*Session benefit only new schools who cannot interpret the results. If I know how to interpret the results, I do not need to attend session" (Q1-English-School 4).* Many of the schools indicated that they would appreciate more information on the questions used in the assessment and the link to the curriculum. "*Belangrik, sodat korrekte leeruitkomste aangespreek word aan die begin van die jaar"*[37] *(Q2-Afrikaans-School 12).* Some schools warned that while this would be good the information should be presented in such a way that it would not encourage teaching to the test *"…On other hand the test would not be successful as learners will be prepared" (Q2-English - School 23).*

I (b)Logistics

Some schools indicated that signage to the venue should be improved as the campus can be quite confusing. There was also a general request that the time of the feedback sessions should be brought forward slightly. The time of 14:00 was decided as most appropriate for the feedback sessions to allow for travel time. Both these suggestions were taken up without any further voting as they could easily be addressed. There were also suggestions to move the sessions to a

[37] English translation: *"Important so that the correct learning outcomes are addressed at the beginning of the year."*

more central location or conduct presentations at the schools individually. Some schools indicated a willingness to host the feedback sessions, but most schools stated that the University was a good central venue. Little support was shown for having individual feedback sessions at each school.

I (c) Process

Schools indicated that they were generally happy with the overall feedback process. One suggestion was that it might be beneficial to increase the participation by schools and allowing HoDs to make presentations. This suggestion was met with resistance from most schools who indicated that they were happy with the discussions and question-and-answer sessions already incorporated in the feedback: *"Nee, soos dit huidiglik is, is goed genoeg. Skole gee mos 'n inset gedurende die sessie, en kan vrae vra"*[38] *(Q2-School 19 - Afrikaans).* Some schools also indicated that asking HoDs to participate in such sessions would be unreasonable, given their current workload *"No time - too many obligations" (Q2-School 21 - English).* It was also suggested that the invitation to attend the feedback session be extended beyond just the principals, HoDs and Grade 1 educators to the whole Foundation Phase department. This idea was strongly supported by schools and it was further suggested that the Grade R educators attached to the schools could also benefit from attendance.

Priorities for improving feedback sessions

In order of importance, the following priorities for improvement were identified, based on the two rounds of questionnaires and voting of round 3:

[38] English translation: *"No, as it is currently is good enough. Schools give input during the session and may ask questions."*

Table 6.3: Delphi - Priorities for improving feedback sessions –Prototype I

Improvement Task	Mean Priority Level 1= Highest 4 = Lowest	Implemented
More information on the questions	1	Yes, included in manual Prototype III
Adjust the feedback sessions for old schools	1	Yes, format changed in Prototype II, feedback shortened and more of a focus on interpretation and new developments.
Include more people in the feedback sessions	2	Yes, all educators were always allowed to attend, invite reworded to indicate that all educators, Gr0-3 were welcome along with HoDs and Principals (Prototype III).
More central venue	3	No, not enough support
School presentations	4	No, not enough support
Improve the directions and signs to the venue.	No voting	Yes
Start feedback session earlier.	14:00 indicated as most appropriate	Yes, from Prototype II.

II. REPORTS

The feedback on the reports related mainly to their content, presentation and timing of the reports.

II (a) Content

Overall schools were happy with the content of the reports: *"Reports to schools were clear and covered all aspects of test" (Q1-School 16 - English)*. Many schools however suggested inclusion of additional variables in the report to expand the analysis and interpretation, e.g., age and demographics of learners, learners repeating Grade 1, home language and pre-school attendance: *"Yes, it makes a great difference in the results and performance" (Q2-School 23 - English).* It was also suggested that the reports include a breakdown of the learning outcomes. One school expressed that the reports seemed slightly large.

II (b) Presentation

The schools expressed the view that the reports were clearly written and understandable. *"The graphs give a clear indication of the results and we appreciate the information on who needs assistance and stimulation" (Q1-English School - 21). "All the information given was really simply done, understandable and user-friendly" (Q1-English-School 16).* Some schools indicated that sometimes the data were not a true reflection of certain learners'

capabilities. There was a request that schools should be grouped according to district for results: "*Areas will help to compare results and many areas work together" (Q2-School 23 - English)*. Some schools indicated that reporting should be done in all languages of assessment, though this was however not a high priority and schools noted that it might not be feasible. Some schools indicated that they were uncomfortable with comparison of results, even anonymously, with most indicating that the comparison was essential to compare school standards externally. *"Skole moet vergelyk word - Kan sodoende bepaal of skool hoë standaarde handhaaf"*[39] *(Q2-School12 - Afrikaans).* Schools indicated that it might be beneficial to have more than one copy of the reports provided to them; while others indicated that it was unnecessary. *"Think it is up to the school to photocopy the results to other teachers. This is a school management issue." (Q2-School 4 - English)*

II (c) Timing

Most of the schools indicated that they were happy with the current turnaround time. Some schools however noted that a shorter turnaround time would allow more time to work on identified problems.

Priorities for improving reports

The following priorities for improvement, in order of importance were identified, based on the two rounds of questionnaires and voting of round 3:

[39] English translation: *"Schools must be compared – Can then determine if school is maintaining high standards."*

Table 6.4: Delphi - Priorities for improving reports–Prototype I

Improvement Task	Mean Priority Level 1= Highest 5 = Lowest	Implemented
Report on additional variables	1	No, attempted to include, but schools failed to provide additional data
Report on overall trends across schools	2	Yes, reported in feedback sessions
Group schools - district or area	3	No, only reported per language
Provide reports earlier	4	Yes, report automation from baseline 2009.
Minimise comparison with other schools	4	Yes, from 2009 main comparison to average and own school's previous performance.
Produce reports in Afrikaans and English	4	No. Would require that all testing languages be used for reporting, not feasible.
Clearly state the learning outcomes	4	Expanded and stated in manuals after separation, baseline 2009.
Provide 2 copies of reports	5	No, additional cost not justified, responsibility of school.

III. SUPPORT

Feedback on the support provided related mainly to the administrative aspects, professional development, materials for intervention and opportunities to network with other schools.

III (a) Administrative

It was suggested that informed consent letters be provided to parents at enrolment the year before the assessments. This enjoyed support from the schools, who indicated that it would also help schools to plan their academic calendars with the dates formalised. *"This can be a proactive move from your side and school's side. When planning is made at school level, your evaluation dates will be properly planned for" (Q2-School 4 - English).*

III (b) Professional development

Schools were in favour of expanding the professional development activities and support beyond only Grade 1 educators, specifically to include Grade R/0 educators (Q1-School7 - Sepedi). *"Belangrik. Sal Gr R leerders meer toerus vir Graad 1 – Dat hulle skoolgereed is"*[40] *(Q2-School12 - Afrikaans)*. Some schools indicated that support for development and improvement of Grade R/0 would be appreciated as they identify areas for improvement here and evaluate progress

[40] English translation: *"Important. Will better prepare Grade R learners for Grade 1 – So that they are school-ready."*

for these teachers too (Q2-School 4 - English). Educators also indicated that it would be meaningful for them to attend the assessments, to have a better idea of content, the procedures and how the children react to the fieldworkers in the testing situation (Q2-School 23 - English).

III (c) Intervention materials

Schools asked for the provision of intervention materials to help support the addressing of areas of difficulty that had been identified. *"Teachers need support materials that you are using" (Q1-School 7 - Sepedi).*

III (d) Opportunities for networking with other schools

Schools indicated that they enjoyed being able to interact with other schools to address issues. They found these opportunities at the feedback session beneficial and asked for more such opportunities (N-School 23 - English).

III (e) Priorities for improving support

The following priorities for improvement, in order of importance, were identified based on the two rounds of questionnaires and voting of round 3:

Table 6.5: Delphi - Priorities for improving support–Prototype I

Improvement Task	Mean Priority Level 1= Highest 4 = Lowest	Implemented
Provide support to Grade R/0 Educators	1	Yes, included in feedback sessions, electronic resource Prototype III
Consent letters available during enrolment	2	Yes, baseline 2009 letters provided to schools in latter half of 2008 Prototype III
Allow educators to observe assessments	3	Yes, always been allowed, made schools aware at feedback that they may observe Prototype II
Workshops for teachers - project and application	4	No, only individual sessions and meetings with schools as requested. Schools made aware of this option again in Prototype II

IV. MONITORING SYSTEM ITSELF

Although schools were asked only to provide ideas around the reports, feedback sessions and support for interpretation and implementation, they also provided some additional information on the project for improvement. These ideas were noted and implemented where possible, but not circulated for voting or further discussion, as it was not the current focus of development. The main input around

the assessments was a request for an expansion of the sample within the participating schools:

- to include all grade 1 learners: *"Is it possible to test all the Grade One's +/- 200?" (Q 1-School 8 - Afrikaans)*
- to include other grades: *"How about evaluating grade 4s.(sic)"(Q1-School 7 - Sepedi)*
- by increasing the number of schools in the sample
- by increasing the frequency of the monitoring to more than twice a year

This input is encouraging as it indicates that the monitoring and feedback was valued and that expansion of the project would be welcomed. Schools also provided some input on further fieldworker training.

The evaluation data on the feedback sessions and support were incorporated into the feedback session and support for Prototype II. The reports however maintained their structure from the baseline to ensure report consistency for users from the baseline to the follow-up assessment. Only minor changes were performed on the report formats for Prototype II. Guidelines that had a large impact on the reporting format were only incorporated in Prototype III – Baseline 2009.

6.1.3 Cycle 2 (Prototype II, Follow-up 2008)

Feedback prototype II was developed based on the previous evaluations, with adjustments made to the feedback sessions, communications and logistics. Only minor changes were made to the reports, with major structural changes to them only implemented in Prototype III. This staggering of changes was essential to ensure that the baseline and follow-up reports for 2008 remained similar in structure and format so that changes would not interfere with interpretation and comparison of the baseline and follow-up results for 2008. The formative evaluation of Prototype II was more directly focused on the feedback session and employed school-users as evaluators. The guiding research and evaluation question for this cycle was therefore still question 3, but with a focus on the feedback sessions:

Research question:

3. *What pre-existing conditions need to be established in the feedback system to facilitate the use of the learner performance feedback system?*

The ***design guidelines*** generated related specifications to establish use of the feedback system, specifically the feedback sessions:

2. *Establishing conditions for use:* This development stage was aimed at improving the feedback session component of the feedback system. For this cycle the focus was on examining the design of the feedback sessions in detail.

The evaluation in this cycle focused specifically on the ***evaluative foci*** of relevance, consistency and expected practicality, with specific reference to the feedback sessions and reports. In the following section, Prototype II of the feedback system, developed and implemented based on the guidelines of Cycle 1 is introduced.

6.1.4 Prototype II – Follow-up 2008

The same sample of 22 schools from the baseline 2008 assessment participated in the follow-up assessment. Therefore, 1,390 learners from the baseline assessment were assessed in the follow-up for 2008. There was a drop out rate of 9.4%, due largely to learner absenteeism and migration. All the schools also participated in the feedback system.

All the schools in the sample received paper-based reports that included an instrument manual section describing the different subtests and scales. Teachers, principals and HoDs were invited to attend the feedback session, while schools were also invited to contact the CEA if there were any questions or if there was any help or support needed with interpretation or the results and planning. Additionally brochures for parents on providing literacy support and printed reading support materials were provided to schools for their own use at the feedback session, as indicated by the requests for additional support in Cycle 1. The components of Prototype II are shown in Table 6.6.

Table 6.6: Prototype II – Follow-up 2008 components

Component	Description
Paper-based follow-up report	Produced for each school individually and handed out at the feedback session
Follow-up feedback session	Principals and teachers from all participating schools invited to the University of Pretoria
Literacy support materials	Some resources printed and handed out to schools at the feedback session
Telephonic, written and face-to-face communication	On an ad hoc basis as required

The changes to the paper-based reports and feedback sessions are discussed below.

6.1.4.1 Reports

The overall structure of reports remained consistent from the baseline to the follow-up report. The reporting of follow-up scores however presented the gains data differently than the pre-existing system, in that the difference between the baseline and follow-up score was shown as a gain or loss on the same bar (see Figure 6.9)

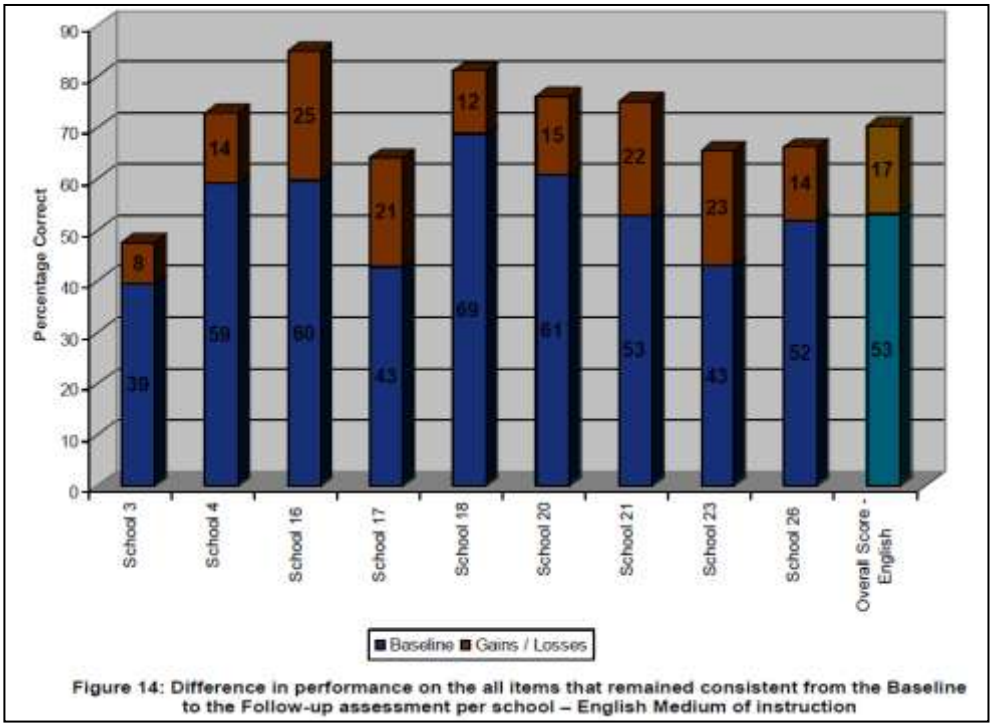


Figure 6.9: Overall school performance in terms of gains and losses in percentage correct – Prototype II

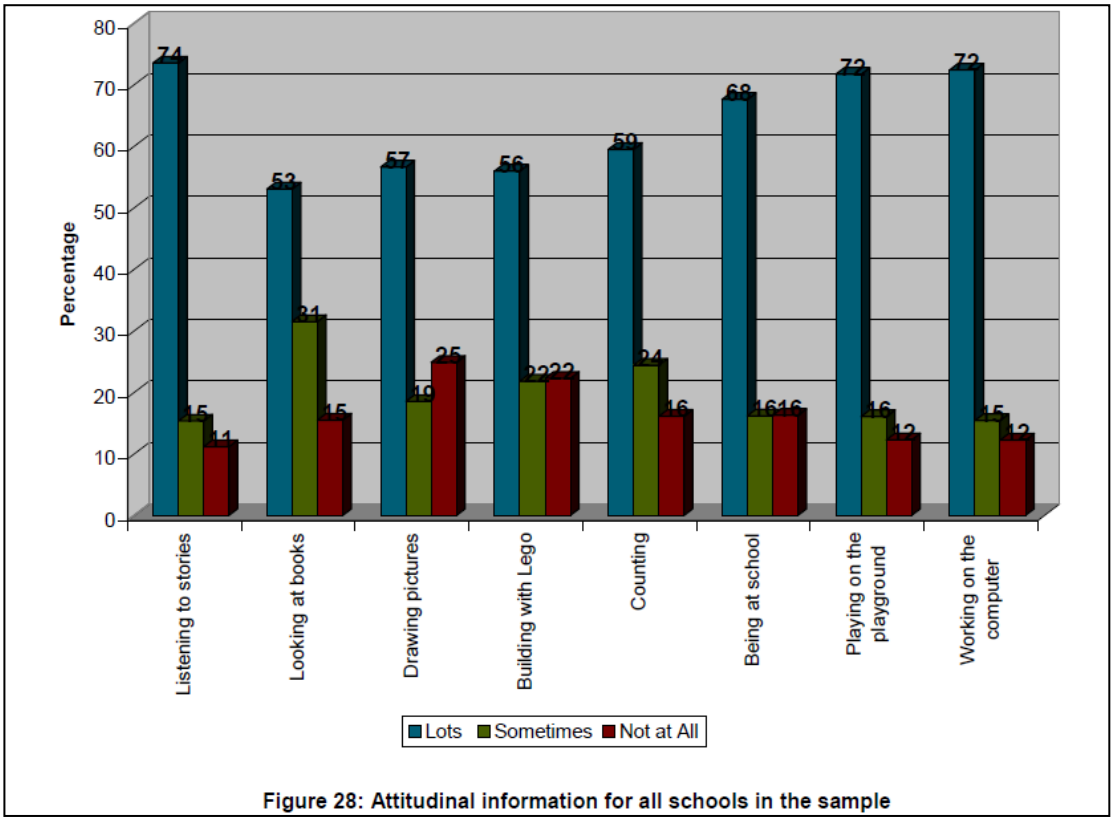


Figure 6.10: Attitudinal information for learners on school-level – Prototype II

Additional information was also included in the form of attitudinal data for the learners in the school (see Figure 6.10, above). The attitudinal data were first presented as an average for all the schools across the sample and then for the specific school.

The changes for this prototype focused on the feedback session. The feedback sessions for Prototype II is discussed below.

6.1.4.2 Feedback Sessions

School representatives were invited to attend the feedback session, where they received the report. As per the evaluation of Cycle 1, care was taken to ensure that schools knew they could bring a group of people, including Principals, HoDs and teachers from Grade 1 and other related years. The time of the feedback session was moved to 14:00, the time agreed on as most convenient for all parties in the Delphi technique and the placement and number of directions to the venue was increased. It was also made clear in the feedback session that teachers were welcome to observe assessments and speak to fieldworkers. The

feedback sessions was kept to 90 minutes and consisted of a presentation by the project leader pertaining to:

- Introducing the CEA and the project
- A shortened description of the assessment
- An example of how to interpret the data (new)
- An example and discussion of possible actions based on the interpreted data (new)
- The future plans for the project
- An opportunity for discussion and questions

The focus shifted from introduction of the assessment to discussion of how to understand the data and use it for planning and action in the school. Schools were also given an opportunity to work through an example and provide their own interpretation. Schools were presented with a handout with the slides and an agenda to accompany the presentation. The invitation to contact the research team for any further analysis or support was extended. Refreshments were also served and informal conversations took place between the research team and schools about the project and individual school reports during the break.

6.1.5 Formative Evaluation of Prototype II

The formative evaluation of Prototype II focused on the feedback session. Schools were asked to evaluate the feedback sessions by completing an extensive questionnaire. The research procedures for the formative evaluation of Prototype II are discussed below.

6.1.5.1 Sampling

All schools were invited to the feedback session for the follow-up assessment 2008. As the questionnaires focused on evaluating the feedback session, only schools who attended the follow-up SAMP 2008 feedback session were provided with them. Eighteen responses from 15 different schools were received from teachers, HoDs and principals who attended the session (see Table 6.7)

Table 6.7: Number of respondents for feedback questionnaire –Prototype II

School name	Grades Represented	Language of instructions	Number or questionnaires
School 4	1	English	3
School 5	1	Sepedi	1
School 6	1	Afrikaans	1
School 7	2	Sepedi	1
School 8	2	Afrikaans	1
School 11	1	Sepedi	1
School 16	1	English	1
School 18	1	English	1
School 20	1	English	1
School 21	1	English	1
School 23	1	English	1
School 24	1	Sepedi	1
School 25	1	Afrikaans/English	1
School 26	1	English	1
School 26	1,3	English	2
Total			**18**

6.1.5.2 Data Collection

Data collection to inform the development of Prototype III consisted of questionnaires specifically designed to evaluate the feedback sessions of Prototype II. The questionnaires were administered to teachers, HoDs and principals from schools in the feedback system sample. The questionnaire (see the audit trail DVD) focused on the feedback sessions and was administered to persons who attended the follow-up 2008 SAMP feedback session. The questionnaire was aimed at gaining a deeper understanding of the schools perception of the feedback sessions and to elicit suggestions for further improvement. It was important to establish if the sessions created the appropriate conditions for use of the SAMP monitoring system and data.

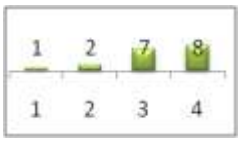
6.1.5.3 Data Capturing

The questionnaire data were captured in *Excel* spreadsheets. Open comments by the respondents were also captured electronically, to be analysed thematically, but the quantitative component was the focus of the evaluation for this cycle.

6.1.5.4 Data Analysis

Descriptive statistics were employed to analyse the questionnaire data using *Excel* and *SPSS*. The comments made on the questionnaire were also analysed thematically to provide a richer context for the quantitative data.

6.1.5.5 Results and Design Guidelines

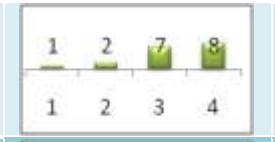
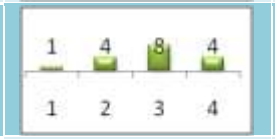
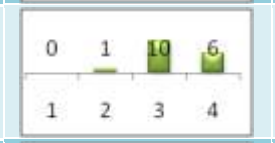
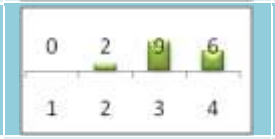
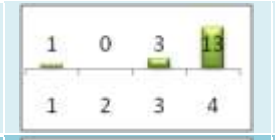
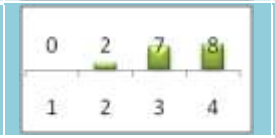


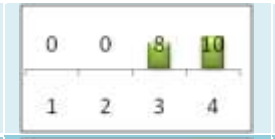
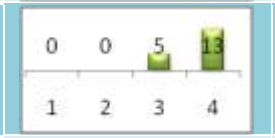
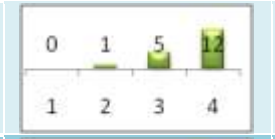
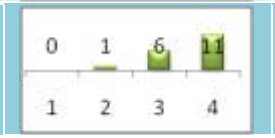
As such a large amount of data were collected through the questionnaires, graphs representing the frequency of responses for each question were employed to summarise and condense the results The numbers below the X-axis: 1,2,3,4 represents the different categories on the scale, 1=poor to 4=Excellent. The numbers above the X-axis represent the frequency of responses for each category. In this example, eight respondents rated this aspect as 4, or Excellent. This type of frequency distribution representation is used throughout the thesis. Please also note that while N=18 for this questionnaire, not all respondents answered all questions resulting in a lower response rate for some questions.

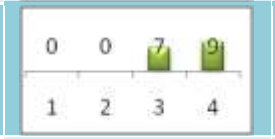
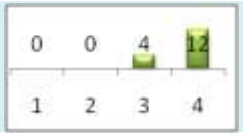
The results of the feedback questionnaire are summarised in Table 6.8 Overall, the level of satisfaction with the feedback session was very high, with an average rating of 3.5 out of a possible 4. The lowest ratings were still around logistical matters, schools indicating that the time of the sessions was still difficult, but most commenting that there could be no better time as it had to be in the afternoons.

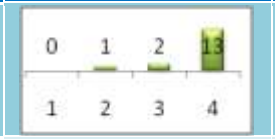
Schools noted that the feedback sessions were a priority for them and they would “make time”. Some noted that they were still having trouble with the directions to the venue. The feedback sessions were rated very highly (mean score of 3.8) in terms of being understandable, addressing school and teacher concerns and helping to make sense of the data.

Table 6.8: Cycle 3 - Summary of feedback questionnaire results

Question	Average rating 1=Poor - 4=*Excel*lent	Frequency distribution for response	Selected comments
1. Directions to the venue	3.2		Got lost on the last turn just after the second staircase.
2. The agenda of the session	3.4		I like the short and sweet version.
3. The length of the feedback session	3.4		-
4. Scheduling of the feedback session	2.9		There can't be a good time ... This is important to be done and time made for the info. Thank you.
5. Timeliness of the information	3.3		Good, we can now judge whether our retentions and progressions are on track. Information very good but timing inconvenient as we are really busy with reports and end of year work.
6. Relevance to my concerns	3.2		All learners should be assessed.
7. Opportunities to ask questions	3.7		-
8. Interaction between participants and the presenter	3.4		Your team are also very friendly when at our school. They are also accommodating. Thank You.

Question	Average rating 1=Poor - 4=*Excel*lent	Frequency distribution for response	Selected comments
9. Knowledge of the presenter	3.6		Liz is always friendly, efficient and very professional.
10. Handouts and resource package provided	3.7		*Excel*lent, we are glad to track our learners' progress.
11. Quality of the presentation	3.6		Very professional and well done.
12. The environment in which the feedback is given	3.6		Become too small (Maybe everyone didn't reply & your room wasn't large enough?)

Question	Extent : 1=Not at all - 4=Completely	Frequency distribution for response	Comments
13. Discussion of further developments	3.4		Money is one difficult concept for our learners. Mathematics is becoming easier… the problem we encounter is phonic awareness and word recognition
14. Did the feedback session meet your expectations?	3.6		-
15. Did the information provided assist with the understanding of the report content?	3.8		-

Question	Extent : 1=Not at all - 4=Completely	Frequency distribution for response	Comments
16. Was the presenter helpful in addressing concerns raised?	3.8		Very ☺
17. Was the presentation clear and understandable?	3.8		-
18. Did the feedback session provide the opportunity to learn something useful?	3.6		-

Question	Selected Themes
19. What were the strengths of the feedback session?	**Overall:** Provided insight on the performance of learners at school compared to other schools. | Will assist in changing focus on aspects that needs attention next year. | Keep up the *Excel*lent work!
	Presentation style: *Baie deeglik, Baie uitnodigend aangebied.*[41] |…Presenter is dynamic and well prepared.
	Anonymity: Reading results for each school without naming schools.
	Interpretation and analysis support Analysation (sic) of problematic topics in different learning area. | A lot of work that I did not understand is now clear… | Interpretation of feedback was simple to understand...
	Manual and report: *Excel*lent study guide. The feedback book is *Excel*lent, well put together…
20. What are perceived weaknesses of the feedback session?	**Timing of the session:** 1 December! Maybe earlier
21. Do you have any other comments regarding the feedback session, which has not been addressed?	**Overall:** I enjoyed the feedback. It was fruitful and I hope to implement it in my class.
	Support: Assisting learners with critical thinking skills in mathematics.
	Fieldworkers: Ladies are recommended to do this assessment as lower grade learners are taught by ladies. They might be frightened to be tested by men.

[41] English translation: *"Very thorough. Presented in a very inviting manner."*

In the general comment section, the schools noted the following ***strengths***:

- ***Overall:*** The feedback provides insight into comparative school performance and what the focus should be for the following year.
- ***Presentation style:*** The presentations were thorough and inviting. The presenter was clearly well prepared, inviting and professional.
- ***Anonymity:*** Comparative results were provided without naming schools
- ***Interpretation and analysis support:*** The presentation helped to make sense of problematic topic areas, and helped in understanding what was unclear. The interpretation and feedback were perceived as clear and simple.
- ***Manual and report:*** Well presented and structured.

The one ***weakness*** that was noted related to the timing of the feedback sessions and it was suggested that they take place earlier. A request was made for support in addressing areas of concern, such as critical thinking in Mathematics.

The evaluation indicated a high level of satisfaction with the feedback sessions and even the addition of the small amount of support material was appreciated. It seemed that the feedback session structure and process were effective and the focus could now shift to examining the reports and how to facilitate the use of the feedback system in the various contexts.

Design guidelines from Feedback Evaluation Questionnaire

1. ***Improved turnaround time is important*** in increasing the relevance, usefulness and efficacy of the feedback. This is not only important so far as the reports are concerned, but also for the scheduling of the feedback sessions.
2. ***Feedback must be linked with resources and suggestions for action:*** the presence of links to support material facilitates the use of

feedback. Not having access to resources or being aware of resources to address issues raised in feedback often hinders use of feedback. Providing such links facilitates the use of the feedback

3. ***Opportunity for two-way communication*** is important. Such opportunity can be created through formal discussions during feedback. An opportunity for informal one-to-one discussions with school representatives during for instance refreshments is important to address school specific concerns in a confidential manner. The atmosphere created during feedback should be ***non-judgemental, constructive and invite participation***. Feedback must also be ***clear, concise and simple,*** so conversation can focus on interpretation and application, not only understanding of the data.

6.2 Conclusion

In this chapter the first two cycles of the Prototyping Phase were documented with emphasis on establishing the conditions for use of the feedback system. This was achieved by examining and improving the different components of the feedback session. The design guidelines from these cycles informed the development of the third prototype. Prototype III, as part of Cycle 3 is discussed in Chapter 7. The next chapter focuses on transforming conditions of use into action and planning in schools.