Chapter 5 Research design and method

Scientific method includes, in short, all the processes by which the observing and amassing of data are regulated with a view to facilitating the formation of explanatory conceptions and theories

John Dewey, 1933 (From: "How we think")

Aim of the chapter

The aim of Chapter 5 is to provide the research design and methodology used in the research. The structure of the chapter and the topics covered are depicted in Figure 5-1.

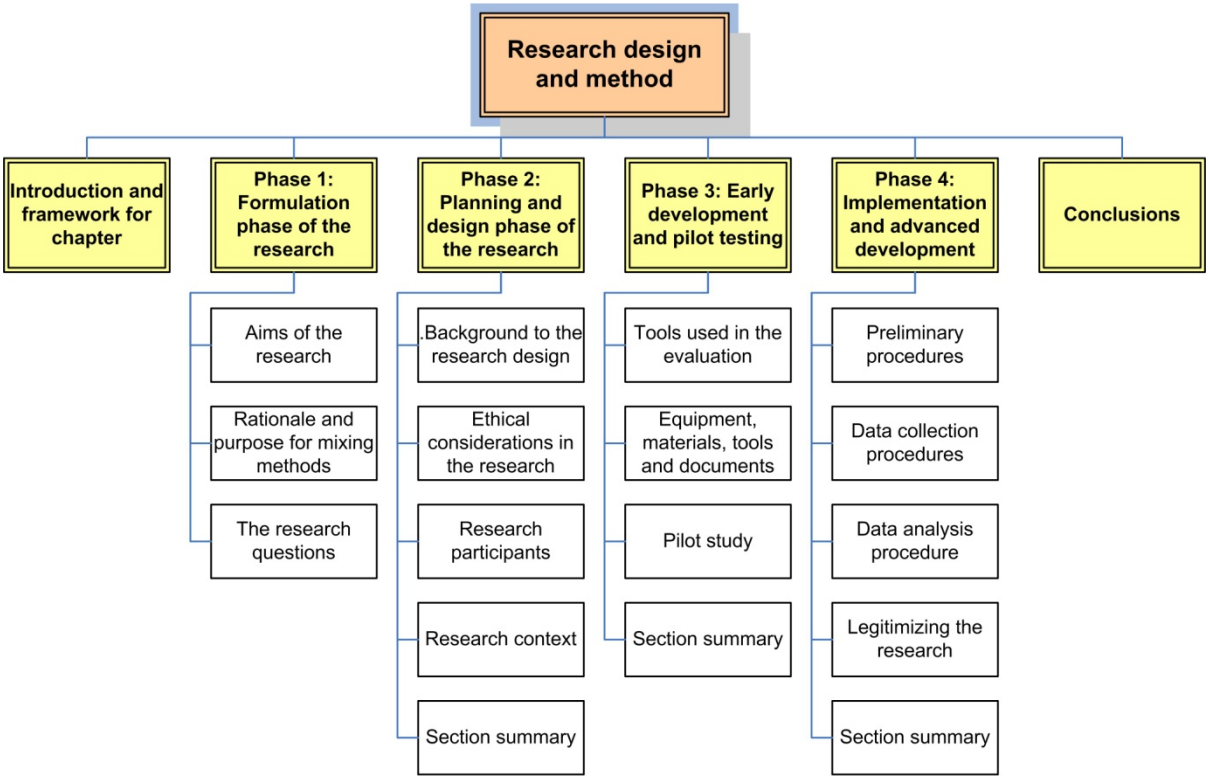

Figure 5-1: Outline of Chapter 5

5.1 Introduction and framework for chapter

Teachers cannot afford to invest their time in CPD programmes that are of little value or poor quality. The quality of a support programme is determined by judgement and appraisal of its value (Rae, 2002:3), and whether it can be used in future teacher development initiatives (Stufflebeam, 2003:31). This study developed a continuous professional development programme for foundation phase teachers built on the model for programme development previously discussed in Chapter 1 (Thomas & Rothman, 1994:28). However, the evaluation phase of the programme (refer to Figure 1.2) required both quantitative and qualitative data to answer the many research questions, for which the model for mixed methods (Leech & Onwuegbuzie, 2005:476; Onwuegbuzie & Dickinson, 2007) was selected (refer to Figure 5-2).

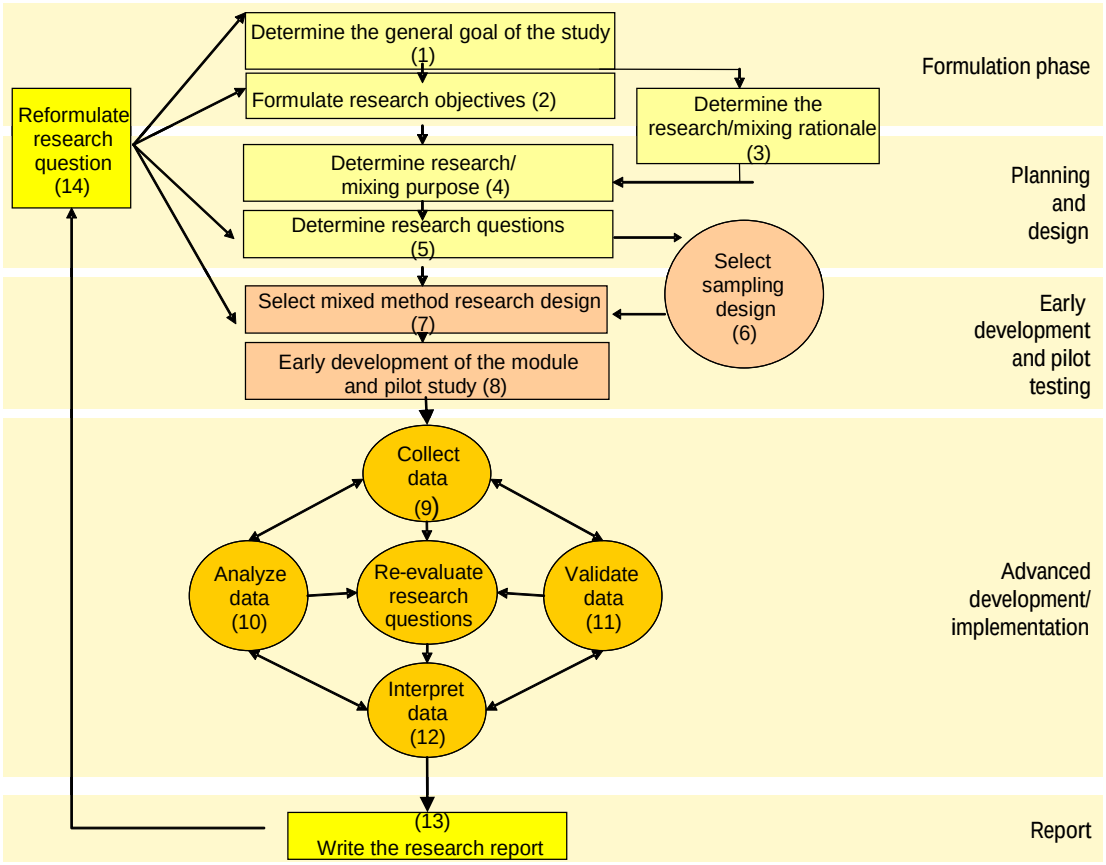

Figure 5-2: Framework for conducting mixed methods research

The mixed methods methodology for research is "…the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language in a single or set of related studies" (Johnson & Onwuegbuzie et al., 2005 in Collins, Onwuegbuzie & Sutton, 2006:69). When quantitative and qualitative methods are used together they both contribute to a common understanding (Patton, 2002:585) and increase reliability and trustworthiness of the data, as well as expand the breadth and depth of the findings (Greene & Caracelli, 1997a:23; Greene, Caracelli & Graham, 1989:255). The model for doing mixed methods research (Figure 5-2) (Leech & Onwuegbuzie, 2005:476; Onwuegbuzie & Dickinson, 2007) specifically delineates phases and steps for the evaluation of the CPD programme and therefore provides a framework that guides the discussion of this chapter. A discussion of the formulation phase therefore is the first to be discussed.

5.2 Phase 1: Formulation phase of the research

The formulation phase (Phase 1 as depicted in Figure 5-2) refers to the conceptualization of the design and method of the research. The first step is the formulation of the aim and sub-aims of the research.

5.2.1 Aim and sub-aims of the research

The main aim of the study was to develop a specific CPD programme for foundation phase teachers to facilitate listening and language for learning (with specific emphasis on the language for numeracy) (refer to Step 1 in Figure 5-2). The proposed support programme was then presented in two previously disadvantaged areas in the Tshwane region.

The focus of the research was on the 'Early development of the programme and pilot testing' (Phase 3) and the 'Advanced development and evaluation' (Phase 4) described earlier in the model for the development of the support programme (Thomas & Rothman, 1994:28) (refer to Figure 1-5). Aims and sub-aims were formulated for each of these phases (refer to Step 2 in Figure 1-5).

(a) Aims of early development and pilot testing of the programme

The aim of early development and pilot testing was to design and develop a prototype of the specific CPD programme. The following sub-aims were formulated to achieve this aim:

- To develop the workshop material and training support materials
- To design the training procedure
- To develop and pilot test the evaluation procedures.

(b) Aim of evaluation and advanced development

The ultimate aim of the research was to determine the value and worth of the specific CPD programme. In this study the framework provided by the Logic Model (W. K. Kellogg Foundation, 2004) allowed for various research questions to be answered in an ordered manner (Scriven, 2003:24) (refer to Table 5-1).

Table 5-1: Sub-aims of the research and aspects assessed

Sub-aim	Aspects addressed
To describe the 'Input component' of the CPD programme to clarify the specific training needs and demographics of the participants, and the context in which the support programme was implemented.	- Training needs of the participants - The demographic profile of the participants - Input strengths in support of the CPD programme - Input challenges that might impact upon the CPD programme
To assess the 'Process component' of the CPD programme in order to determine the effectiveness. The evaluation of the 'Process component' emphasized factors	- The workshop material in terms of relevance and use of workshop material and whether information was omitted or unnecessarily included)

Sub-aim	Aspects addressed
that had an effect on the outcomes. These factors had to be considered in the interpretation of results.	- The method of training - The trainer's skills - The overall duration and pace of training - Identification of factors that impacted on the process
To assess the 'Output component' of the CPD programme to determine whether the participants gained from the programme.	- Knowledge - Skills - Attitudes
To evaluate the 'Outcomes' of the CPD programme in order to determine the value and worth.	- The implementation of the strategies in the classroom - The value of the training to the teachers - The value of the strategies for the learners as perceived by the participants - The cost-effectiveness of the programme

By describing and assessing each of the four components (refer to Table 5-1), a comprehensive view of the value of the programme was obtained. Steps 3 and 4 in the mixed methods model (refer to Figure 5-2) (Collins *et al.*, 2006:90) consist of the rationale and purpose for mixing methods, which are discussed next.

5.2.2 Rationale and purpose for mixing methods

The rationale of mixing methods was to bring together the different strengths and non-overlapping weaknesses of quantitative and qualitative methods in order to determine the integrity of the research. The purpose for mixing methods was to "obtain different but complementary data on the same topic" (Morse, 1991: 122 in Creswell & Plano Clark, 2007:62) for triangulation. The relationship between the rationale and purpose of mixing methods is shown in Figure 5-3.

The purpose of mixing methods is linked with the research questions (Collins *et al.*, 2006:67; Newman *et al.*, 2003:167), which in this case required both quantitative and qualitative data to determine the value of a specific CPD programme. The quantitative data were statistically analyzed to assess whether the participants had gained from the programme.

The qualitative data were also used to understand the circumstances within the context in order to explain the results obtained from the quantitative data. Such mixing of methods provided a more holistic view of the CPD programme. The research questions to be discussed next therefore guided the research as they determined the research design in terms of the stages and sequence of collecting the data.

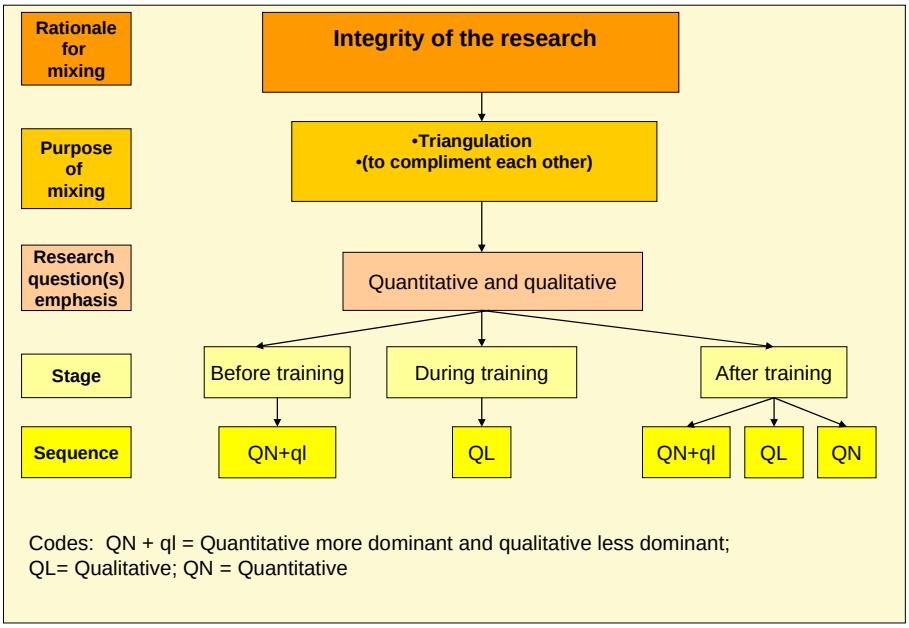

Figure 5-3: Purpose and rational for mixingg methods in this study

5.2.3 The research questions

The research question in this research was formulated as follows: *'What was the value and worth of the CPD programme?'* Several sub-questions were then formulated and placed within the components of the Logic Model framework to provide a holistic view of the value of the programme (refer to Table 5-2). The dualistic (quantitative-qualitative) nature of the research questions (refer to Table 5-1) gave rise to the selection of the research design (Reichardt & Cook, 1997 in Collins *et al.*, 2006:74) in the following phase.

Table 5-2: The research questions within the Logic Model framework and relevant data sources

Component	No	Research Question	Quantitative data sources	Qualitative data sources
Input	1	What were the participants' training needs?	Questionnaires	Research diary
	2	What support was provided previously to the participants by the school and GDE?		
	3	What were the input strengths of the programme?		
	4	What were the input challenges of the programme?		
Process	1	a. Was the information useful and relevant for classroom use?	Questionnaires (evaluation of the workshops)	Research diary Focus groups Testimonials Questionnaires with open-ended questions
		b. Was the information new or did it confirm previous knowledge?		
		c. Was any information unnecessarily included or was any necessary information omitted?		
	2	a. How relevant was the training approach?	Post-training questionnaires consisting of closed-ended questions	Research diary Focus groups
		b. Were the training methods used appropriate to accommodate various learning styles?		
		c. Did the trainer have the necessary attitude and skills to present the material in an encouraging way?	Post-training questionnaires	Research diary Focus groups
	3	a: How appropriate were the assessment methods used?	Questionnaires with closed-ended questions Portfolio assessments Financial statements Attendance registers	Focus groups Research diary Testimonials Correspondence
		b: Did the assessment methods provide sufficient information to draw conclusions?		

Component	No	Research Question	Quantitative data sources	Qualitative data sources
	4	a. Were the workshops of appropriate length and pace?	Post-training questionnaires Portfolios	Observation Research diary
		b. What was the effect of time?	Questionnaires	Focus group
	5	Did the trainer have the necessary attitude and skills to present the material in a way that encouraged learning?	Questionnaires (workshop evaluation)	Research diary Testimonials Focus groups
	6	How did logistics affect the programme?		Research diary Focus groups
Output	1	How did the participants benefit in terms of the following? a. Knowledge b. Skills c. Attitude	Questionnaires Portfolio assessments	Focus groups Research diary Testimonials
Outcomes	1	How did the participants implement the strategies in the classroom?	Portfolio assessments	Research diary Focus groups
	2	How did the programme help the participants to facilitate listening and language for numeracy?		
	3	How did the participants experience the effect of the strategies on their learners?		
	4	How cost-effective was the proposed support programme?	Attendance registers and cost analysis	Financial statements Attendance registers
	5	Were all the objectives met?	All of the above	All of the above

5.3 Planning and design phase of the research

5.3.1 Background to the research design

The model for the development and support of this support programme was based on three models, which each was included for a different purpose. Firstly, the model for programme development and evaluation (Thomas & Rothman, 1994) (refer to Figure 1.5 and Model A in Figure 5-4) provided several phases as framework, of which the fifth phase aimed at the evaluation and advanced development thereof. The evaluation and advanced development phase typically involves the steps of formulating the research questions and aims, the research design, early development and pilot testing, and finally the data collection, analysis, and evaluation of the support programme.

The research questions were placed within a Logic Model[7] framework (refer to Model B in Figure 5-4). The research questions required both quantitative and qualitative data and the study therefore used a combination of quantitative and qualitative strands (consisting of numerical, descriptive, and judgmental information), also referred to as a mixed methods[8] approach (refer to Model C in Figure 5-4).

The model for doing mixed methods research (Leech & Onwuegbuzie, 2005:476; Onwuegbuzie & Dickinson, 2007) consists of five phases, i.e. the formulation phase, the planning and design phase, the early development and pilot testing, advanced development/implementation phase, and final reporting. The original model for mixed methods (Leech & Onwuegbuzie, 2005:476; Onwuegbuzie & Collins, 2006) was adjusted in this study to allow for a pilot study in the early development of the programme (refer to Figure 5-2).

[7] The Logic Model was used for evaluation in Phase 5 of the model for programme development.

[8] The mixed method model combines qualitative and quantitative inferences.

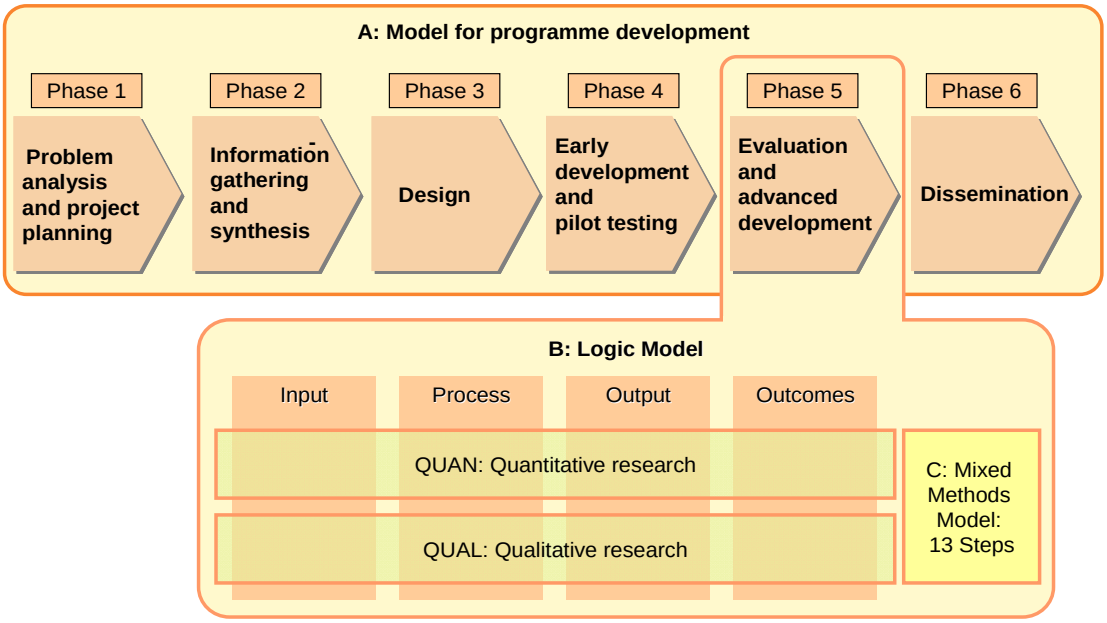

Figure 5-4: Integration of models in the development and evaluation of this CPD programme

Superimposing the model for doing mixed methods research (Onwuegbuzie & Collins, 2006) on the model for the development of this programme (refer to Figure 1-5) (Thomas & Rothman, 1994:28) shows that the different phases of the two models correspond closely (refer to Figure 5-5). Although the model for programme development consists of 6 phases and the model for mixed methods of five, the latter provides a more detailed expansion on Phases P3, P4, and P5 of the programme development model[9] through its 13 steps.

Figure 5-5 shows that the formulation phase in the model for mixed methods (Phase 1) correlates with the 'Problem analysis and project planning' (Phase 1) and 'Information gathering and synthesis' (Phase 2) of the programme development model. Phases M2 and M3 of the model for mixed methods correspond with Phases P3 and P4 of the model for programme development as they addressed the design and early development of the programme. These two phases in each model focus

[9] Note that for the sake of clarity, the phases in the programme development model are designated with a "P" (i.e. P1 through P6), and those in the mixed method model with "M" (i.e. M1 through M5).

on designing and developing the workshop and training support material, as well as the assessment procedures, the needs assessment and pilot testing, the assessment, and training procedures.

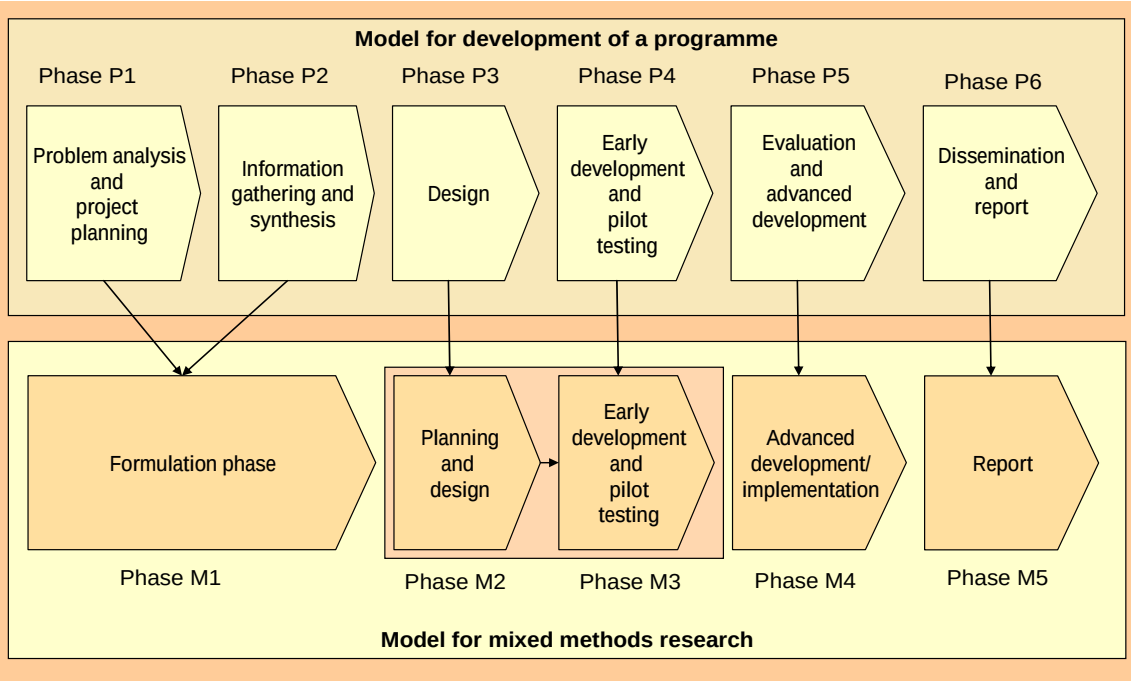

Figure 5-5: The model for mixed methods research as superimposed on the model for the development of the programme

Phase M4 corresponds with Phase P5. Figure 5-5 shows that Phase M3 ('Early development and pilot testing') and Phase M4 ('Advanced development and evaluation') have a different focus and therefore different aims.

The design and early development of the programme (Phase 3) (refer to Figure 5-5) was dependent on a literature review to inform the development of the training material, the training design, and the assessment material, as well as the tools, materials, equipment, and apparatus used. These procedures were then pilot tested prior to implementation in the actual research where the programme was presented and evaluated.

The fourth phase (refer to Figure 5-5) was concerned with the implementation, and advanced development of the programme and the evaluation thereof. This chapter

therefore focuses on the research design and method of how the support programme was evaluated, specifically with regard to how the data were collected and analyzed, and final inferences were drawn. A description of the research design is provided below.

(a) Mixed method research design

The research design selected for this study is shown in Figure 5-6 as a single phase triangulation design, in particular the data transformation model where QUAL data were transformed in QUAN[10] to compare and contrast quantitative statistical results with qualitative findings (Tashakkori & Teddlie, 2003a:717). The purpose of this single-phase triangulation design was "...to obtain different, but complementary data on the same topic" (Morse in Creswell & Plano Clark, 2007:62; Greene & Caracelli, 1997a:23; Greene *et al.*, 1989:255).

The design is also referred to as the 'concurrent triangulation design' (Creswell *et al.*, 2003:209). It was concurrent because the quantitative and qualitative methods were implemented within the same period and with equal weight. Both types of data were collected within a single phase of the research, and similar research questions were addressed by both strands. Triangulation required separate data analyses of both strands, but the results were integrated after the initial analysis of the qualitative data were quantified (Creswell *et al.*, 2003:209) to facilitate the comparison of the two data sets.

The two strands (refer to Figure 5-6) of the research were awarded equal status. The pilot study showed that the use of quantitative methods by itself was not suitable for this particular context, and therefore qualitative methods were required to create

[10] Note that in literature on Mixed Methods, the abbreviation "QUAN" is used to designate the quantitative strand of the research, while "QUAL" refers to the qualitative strand.

a better understanding of the prevailing conditions, as well as to serve as an additional assessment technique. In addition, the quantitative strand had an adequate sample size, but lacked a control group and used a non-random sampling design (imposed by circumstances beyond the control of the researcher).

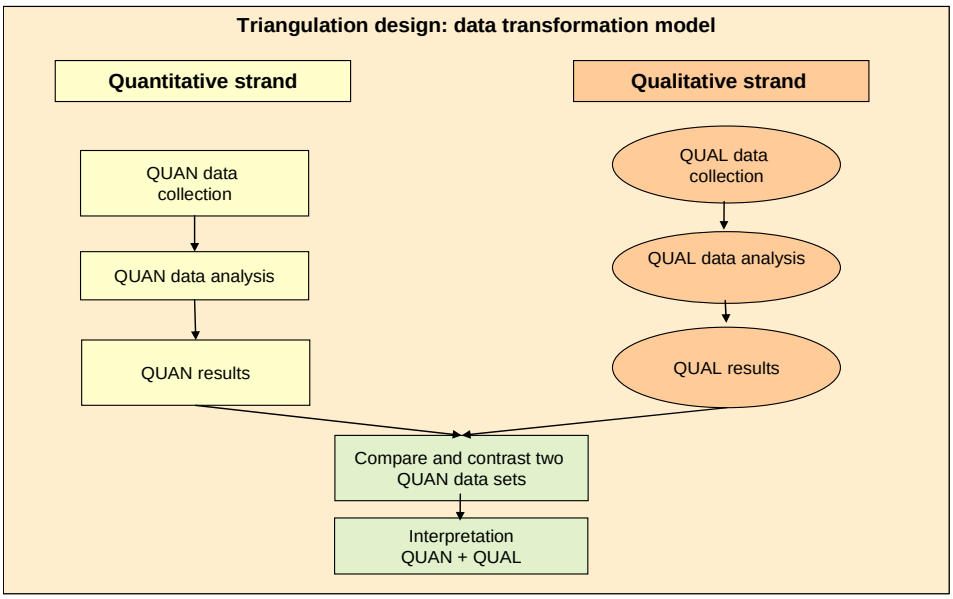

Figure 5-6: Triangulation design (data transformation model)

The qualitative strand had a relatively small sample size, but this was compensated for by a variety of ways. An adequate number of focus group discussions (8) were conducted, thick descriptions within the context were created, and rich data from several data sources (diary entries, focus groups, testimonials, and open-ended questions) were obtained. The two strands of the research could therefore be awarded equal status. The next step to be discussed is the research methods used in the research.

(b) Research methods

The evaluation of the programme consisted of both quantitative and qualitative methods:

(i) Quantitative research methods

Quantitative research is generally used to explain, predict, and control phenomena that can be generalized to other persons and places (Leedy & Ormrod, 2005:100). It does not attempt to detect cause-and-effect relationships in an effort to change or manipulate phenomena. In this case, descriptive statistics was used to describe the gains made in knowledge and skill by collecting data with questionnaires and portfolio assignments. The data from questionnaires described the participants and their needs and determined the knowledge gained. Factor analysis and regression computations were used to assess the correlation between different input parameters.

The following data were collected:

- Demographic information and needs assessment at the onset of each annual programme
- Knowledge levels prior to and after each workshop
- Attendance registers at each workshop
- Portfolio assignments 4-6 weeks after each workshop

Data collection cycles overlapped. The quantitative data collection methods and type of data required are summarized in Table 5-3.

Table 5-3: Quantitative data collection methods and type of data required

Quantitative data collection method	Type of data required
Questionnaires	Demographic information to describe the population Participants' training needs Knowledge gains
Attendance registers	Attendance (attitude/motivation)
Portfolio assignments	Applied knowledge of listening, language, and language for numeracy Skills in implementation of strategies Attitude (participation and motivation)

(ii) Qualitative research methods

The qualitative data collection methods and type of data required are summarized in Table 5-4. The descriptive approach to qualitative research describes the nature of relationships, situations, processes, systems, and people (Leedy & Ormrod, 2005). The researcher also wanted to understand the context and the participants' experiences with the strategies, and their impression of the support programme. This required various forms of qualitative data (e.g. open-ended questions and narrative data obtained from focus groups, as well as reflections in a research diary and other documents).

Table 5-4: Qualitative data collection methods and the type of data required

Qualitative data collection method	Type of data required
Open-ended questions in questionnaires	Evaluation of the programme Opinions and recommendations re future programmes
Research diary and field notes	Evaluation of programme (process and outcomes)
Photographs	Documentation of process Evaluation of portfolio assessment
Focus groups	Evaluation of the programme
Testimonials	Feedback on the value of the workshops and programme

During the data interpretation phase, the qualitative data aided in drawing inferences regarding the quality of the quantitative data, and in clarifying, describing, and validating those results (Caracelli & Greene, 1993:195; Collins *et al.*, 2006:90). Based on those findings, the research programme was modified to cater for some discrepancies and deficiencies (Sieber, 1973 in Onwuegbuzie, 2002:525).

(c) The research approach

The research focused on the value of the CPD programme developed by this study within a real-world context. It was therefore necessary throughout the research to

make practical decisions to provide the required information, which necessitated purposeful actions to arrive at the desired outcomes (Creswell, 2003:12). The practical nature of the research aligned it with the pragmatist stance, allowing the researcher to study that which was of interest and of value to her, to do so in an appropriate manner, and to use the results to effect positive changes in her value system (Tashakkori & Teddlie, 1998:30). The researcher was guided by what was believed should be achieved, and aimed to describe, compare, and to predict the value of the programme (Cherryholmes, 1992:13-14; Tashakkori & Teddlie, 1998:26).

The focus of the evaluation was on the description of links among programme activities, comparisons of programme goals and other standards, as well as hypothesized causal links between attributes and outcomes (Rallis & Rossman, 2003:494). The researcher's interest was partly of a technical nature, but it also had a practical perspective, i.e. the quest to understand. The technical view is essentially positivist/post-positivist and employs a deductive approach in describing causal laws (Neuman, 2000:64). In this study, quantitative data were used to obtain frequencies and percentages (prevalence rates) for descriptive research, where the role of the researcher was that of 'objective observer' (McMillan & Schumacher, 2006:13).

The study also implemented qualitative methods and is therefore associated with the interprevist tradition, which emphasizes multiple realities within a specific context. The researcher's role was one of disciplined subjectivity and reflexivity (critical self-examination). The study included both objective and subjective views, which required inductive (qualitative) and deductive (quantitative) rules of reasoning to be integrated in an effort to make the research more effective (McMillan & Schumacher, 2006:13).

5.3.2 Ethical considerations in conducting the research

As part of the planning and design of the research, the researcher placed strong emphasis on conducting the research in an ethical, responsible, and accountable manner (Strydom, 2002:65). These ethical considerations (view Figure 5-7) were based on two major responsibilities, i.e. a responsibility firstly towards the participants and support staff included in the research, and secondly towards the research community. Since the research involved people, it was based on the underlying principles of beneficence and non-malfeasance (Christians, 2005:146; Denzin & Lincoln, 2005b:35; Smith, 2005:112). The research was also guided by the principle of respect for others (Babbie & Mouton, 2002:528; Strydom, 2002:70), which required that cultural and individual differences be approached in a sensitive manner. The second obligation was towards the discipline of science in upholding honesty and accuracy in the research, as well as in the honest and transparent reporting of the research findings (Strydom, 2006a:56).

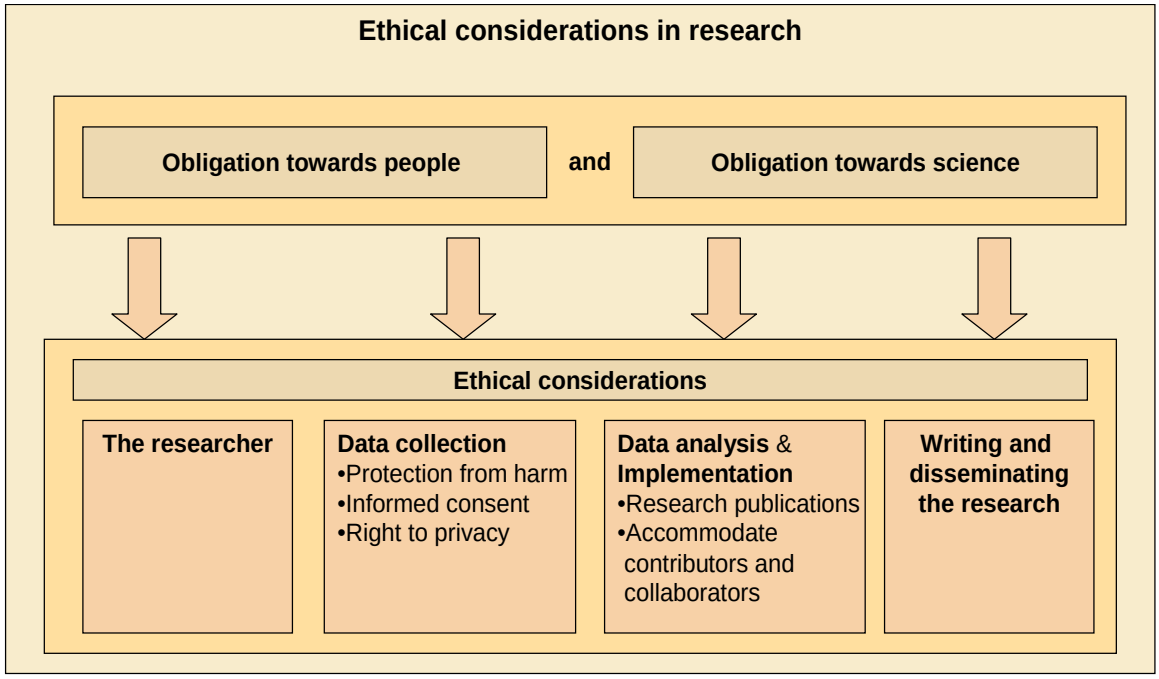

Figure 5-7: Ethical considerations in the research

The researcher accepted the responsibility that she was fully accountable for the ethical quality of the research (Henning, 2004:74), and therefore strived towards the required competency skills for undertaking the investigation (Strydom, 2002:70). Whenever in doubt, the researcher asked for advice from specialists or more experienced colleagues.

At the onset of this study, the researcher made the decision to be fair, honest, and not to deceive either the participants, the stakeholders, or the research community (Neuman, 2000:243; Struwig & Stead, 2001:67). Ethical conduct in the procedures for data collection was based on protecting the participants from harm, obtaining informed consent, and protecting their right to privacy, as discussed below. These issues are briefly reviewed below.

(a) Focus on participants

(i) Protection from harm

Considering that the principle of non-malfeasance is prioritized in ethical research (Newman & Brown, 1996:41), the researcher ensured that none of the participants in this study suffered any physical or psychological harm that the researcher was aware of (Babbie & Mouton, 2002:42, 71; Strydom, 2002:64). All attempts were made to minimize physical discomfort throughout the duration of the programme, and to create a pleasant and safe atmosphere in the classroom (Leedy & Ormrod, 2005:101).

(ii) Informed consent

The principles of voluntary participation and beneficence were realized by requesting participants' informed consent at the onset of each annual programme (Struwig & Stead, 2001:67). The participants were given the opportunity to reflect on their voluntary participation in the training on two occasions prior to training - firstly, when

the written invitation arrived at the school and secondly, in the briefing session at the onset of the programme. At the briefing meeting the participants were informed of the aim of the investigation and the intended use of obtained data, the procedures to be followed during the investigation, and the possible advantages and disadvantages to which respondents might be exposed (Creswell, 2003:64; Strydom, 2002:65). All participants who wished to continue with the programme were required to sign a form of informed consent (refer to Appendix 5C). The cover letter accompanying this request explained that they were free to withdraw at any time, without suffering any consequences (Babbie & Mouton, 2002:522). Confirmation of this commitment was repeated verbally at the onset of all contact sessions, and they were also assured that they could leave the workshops should they feel uncomfortable for any reason whatsoever (Neuman, 2000:243). School principals were specifically requested not to coerce their staff regarding participation, and to emphasize the aspect of choice (McBurney, 1994:378). Where implementation of specific strategies were videotaped in the classrooms for use as training support material, each of the student therapists who participated also granted their permission by signing forms of informed consent (refer to Appendix 5C). In addition, written consent for videotaping was granted by the specific principals on behalf of the learners (Appendix 5C).

(iii) Right to privacy

The participants' right to privacy was respected at all costs (Singleton *et al.* (1988:454) in Strydom, 2002:67). The researcher explained to participants (verbally and in writing) that anonymity was not possible, but that their personal identity would not be revealed, thus ensuring confidentiality (Babbie & Mouton, 2002:521; Creswell, 2003:46). Participants were assured that any reference to them in reports would be in terms of a group, and not in terms of identifiable individuals. Verbal consent was obtained throughout before any photographs were taken to document the training

procedures (Harper, 2005:759). Data were analyzed in terms of numbers, not names (Creswell, 2003:66) to protect the participants' identities.

(b) Transparency in research

By effectively managing the entry/contracting stage (Morris, 2003:319) any questions about possible conflict of interest with regard to the research and/or intellectual property rights were cleared (Strydom, 2002). The donor of the programme did not specify any expectations or requirements of conducting the research, which enabled the researcher to conduct the research without threat of bias.[11] It was only once ethical issues were considered to protect human beings from possible harm that the research participants could be selected.

5.3.3 Research participants

The sampling designs for both the quantitative and qualitative strands of the research were similar for some steps of the data collection, but differed slightly for others, and are therefore discussed separately.

(a) Quantitative research

The participants were selected by means of a convenience sampling strategy (McMillan & Schumacher, 2006:125), which is a non-probability sampling technique (Johnson & Christensen, 2004:215). Traditionally, the use of a non-random sampling procedure does not allow the findings to be generalized (Johnson & Christensen, 2004:255). However, with the use of mixed methods research, *rough generalizations* may be made to other people, settings, times, and treatments, provided that these delineators are similar in nature to those specified in the original

[11] The donor was informed of the researcher's intention of collecting and using data for a doctoral study (Appendix E), and that the financial support would be acknowledged in the final report.

study (Onwuegbuzie & Johnson, 2006:57; Stake & Thrumbull, 1982:1). The sample selection for the quantitative research is discussed in terms of selection criteria, selection procedure, description of participants, and sample size.

(i) Selection criteria

Table 5-5 provides a summary of the various considerations in the selection of the participants, from a provincial level to an individual participant level.

Table 5-5: Considerations in the selection of the sample

Level of selection	Aspects considered in the selection of participants
1. Provincial level (Gauteng)	Gauteng Province was the provincial base of the inquiry because it was within reasonable driving distance from the University of Pretoria. The selection of province was convenient. The GDE preferred that a cross section of the population in schools should be included in the study as they were in the process of redressing.
2. District level	The districts selected a semi-rural area and an urban/densely populated area for the programme. The selection of the specific schools was based on need.
3. School level	Children from underprivileged and low socio-economic schools (SES) are particularly at risk for developing barriers to communication and learning (Winkler, 1998:55) because they are often not exposed to the necessary experiences and stimulation during their pre-school years that should equip them with school readiness and language skills necessary for learning and academic success (Scheifelbein, 2008). The districts purposely selected these schools on grounds of priority.
4. Participant level (in the school)	At the individual level, participants were selected on grounds of availability, priority, or willingness to participate in the programme (Leedy & Ormrod, 2005:206). It was believed that participants who volunteered to participate would be motivated to learn. For practical reasons, it was necessary to limit the number of participants to four per school. The schools were given the prerogative to select the four specific teachers to be included on condition that all four grade levels were represented (Gr. R, 1, 2, and 3). Not all the schools in these areas had Gr. R classes and therefore Grade R teachers from registered nursery schools in the feeding areas were included, where possible. Only pre-schools were included to exclude caregivers from informal playgroups. The number of schools selected per annum was determined from a practical perspective; the trainer/researcher felt comfortable with training no more than fifty participants (48 and two facilitators) at a time in a single workshop, and took into account the size of available training venues.

All participants included in this study were required to meet the following criteria:

- Be appointed in teaching positions in the foundation phase at schools in the targeted contexts. The Gauteng Department of Education (GDE) specified two

particular districts for this CPD programme and therefore only teachers from the selected schools could be included. The programme was aimed at foundation phase teachers (Gr. R, 1, 2 and 3).

- Be proficient in English as the training and measuring instruments/procedures were developed in English. It was anticipated that all teachers in existing positions were able to participate in English as all GDE support is provided in English (personal communication with K. Makgada, June 23, 2005). The professional training of teachers is also in English (Dawber & Jordaan, 1999:3).
- Be motivated to improve their knowledge and skills (Ebersohn, 2000:2). For this reason, the matter of volunteerism was emphasized (Peterson, 1988:49). Teachers had to participate through their own free will and not through coercion by their superiors.

(ii) Description of the participants

There were 96 participants selected for the research across contexts. All the participants in the semi-rural context were female, whereas two of the participants in urban context were male. By using questionnaires, demographic information regarding the participants was obtained from quantitative data. It included age distribution, qualifications, experience, and previous training/support. The statistics is presented for the semi-rural and the urban/densely populated contexts, as well as for all the participants (weighted average between the mentioned groups).

It is particularly important to recognize that for various reasons the full group of participants who signed informed consent at the onset of the programme did not attend all the training sessions, and were replaced with substitutes over time. Only the group of participants who signed informed consent at the onset of the programme, attended all the sessions, and completed at least one portfolio were included in the research. This group was referred to as the 'core group' to

distinguish them from the entire group attending each workshop. The tables in this discussion include the profiles of the original group of 96, as well as the core group.

- *General age of the participants*

Table 5-6 depicts the age distribution of the participants in the two contexts. It should be noted that not all of the participants opted to complete this section in the questionnaires, possibly because it was considered as sensitive information.

Table 5-6: A comparison of the age distribution of the participants in both the contexts

Categories	Semi-rural	Urban	All	Core	Semi-rural	Urban	All	Core
20 - 25 years	0	1	1	1	0%	2%	1%	2%
26 - 30 years	1	1	2	2	2%	2%	2%	4%
31 - 35 years	7	10	17	10	16%	20%	18%	18%
36 - 40 years	13	9	22	14	29%	18%	23%	25%
41 - 50 years	17	19	36	21	38%	39%	38%	38%
51 and older	7	9	16	8	16%	18%	17%	14%
Total	45	49	94	56				

In both contexts (semi-rural and urban), the majority of the participants (77%) were older than 36 yrs, of which 38% and 39% were within the age group of 41-50 years, and therefore were experienced teachers who had most likely been trained during the previous dispensation. The sample was similar in both contexts, which suggests a possible trend.

- *Number of years teaching experience*

In agreement with the age distribution of teachers, Table 5-7 shows the majority (88%) of the participants were experienced teachers of whom those with 5-10 years' experience (33%), and 17-24 years' experience (33%) were the most prevalent groups. Only 12% had less than 4 years' experience in teaching.

Table 5-7: Years of teaching experience across the two groups

Categories	Semi-rural	Urban	All	Core	Semi-rural	Urban	All	Core
1- 4 years	6	6	12	10	13%	12%	13%	18%
5 -10 years	11	16	27	17	24%	33%	29%	30%
11 - 16 years	7	8	15	8	16%	16%	16%	14%
17 - 24 years	14	12	26	14	31%	24%	28%	25%
> 25 years	7	7	14	7	16%	14%	15%	13%
Total	45	49	94	56				

Table 5-8 shows the qualifications of the participants across contexts. Not all the participants chose to reveal their educational backgrounds. In the group from the urban/densely populated context, only 66.6% of the teachers (34 out of 49) chose to answer the question regarding qualifications. It seems possible that those who did not complete this section most probably were poorly qualified and did not want to reveal such information. From the responses obtained for the group 71% were adequately qualified (either a diploma or a degree), which implies that 29% were not suitably qualified, or received training that was not accredited by the GDE.

Table 5-8: Highest qualifications of the participants

Categories	Semi-rural	Urban	All	Core	Semi-rural	Urban	All	Core
One-year certificate	1	3	4	4	2%	6%	4%	7%
Diploma	29	24	53	30	64%	49%	56%	54%
Degree	9	5	14	11	20%	10%	15%	20%
In-service training	2	1	3	2	4%	2%	3%	4%
Others	4	0	4	2	9%	0%	4%	4%
Unknown	0	16	16	7	0%	33%	17%	13%
Total	45	49	94	56				

The majority of participants received their training at Further Education and Training (FET) colleges (refer to Table 5-9). FET colleges were known to be poorly resourced under the previous dispensation, and at the time offered inferior training compared to institutions for white students (Department of Education, 2006:2). The

majority of participants (who obtained their qualifications from former FET colleges) were therefore not as well prepared for teaching as their counterparts who obtained qualifications from accredited institutions.

Table 5-9: List of institutions where participants received training

List of training institutions where qualifications were obtained	
University of South Africa (UNISA)	Mamokgalake Chuene Training College
Tshwane University of Technology (TUT)	Thlabane Training College
Tshwane University of Technology Shoshanguve	Kopanong Training Centre
Vista University	CAN Training Centre
College of Education of South Africa	Makopane Training Centre
Hebron College of Education	South African College of Teacher Education
Ndebele College	Siseko Motheo College
Transvaal College of Education	Westminster College of Education
Saints Attridgeville College of Education	
Sekhukhune College of Education	

- *Grades taught*

In terms of the grade levels (refer to Table 5-10) the sample was well distributed according to the research design. There were four extra Grade 1 participants in the urban/densely populated area (2006), and because not all schools had Gr. R classes, there were fewer Gr. R teachers in both contexts.

Table 5-10 : Distribution of grade levels taught

Categories	Semi-rural	Urban	All	Core	Semi-rural	Urban	All	Core
Grade R	9	10	19	15	20%	20%	20%	27%
Grade 1	12	16	28	17	27%	33%	30%	30%
Grade 2	13	13	26	15	29%	27%	28%	27%
Grade 3	11	9	20	9	24%	18%	21%	16%
Others	0	2	2	0	0%	4%	2%	0%
Total	45	50	95	56				

(iii) Sample size

There were 12 schools from a semi-rural area, and 12 schools from an urban/densely populated area (including township schools and schools from informal

settlements) as illustrated in Figure 5-8. A total number of 24 low socio-economic schools (SES) in the Tshwane region were targeted for this project over a period of two consecutive years.

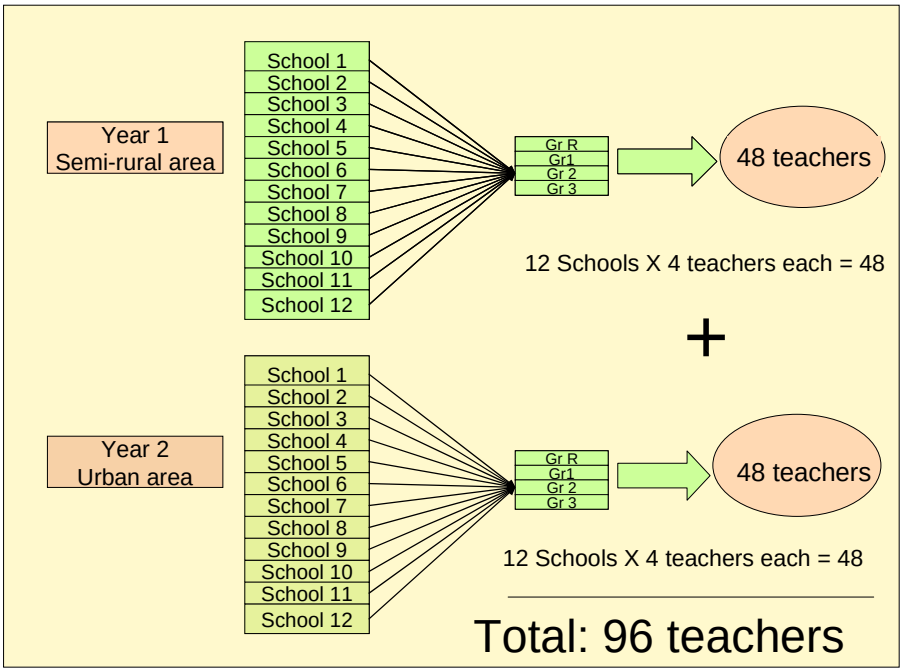

Figure 5-8: The sample size for the quantitative research

Each school that accepted the invitation to participate in the programme identified one educator in each grade level of the foundation phase (e.g. Grades R, 1, 2, and 3), so that four teachers from each school enrolled for the programme. There were 12 teachers representing each grade level included in the programme, totalling 48 teachers per annum. It was estimated that there are about three to four classes in each grade level of each school, and therefore the selection of one participant from each grade level in each school represented approximately 25% of the total number of foundation phase teachers in these selected schools.

Figure 5-8 shows that the entire sample consisted of 96 teachers, which was considered sufficient to serve the purpose of this specific study (Leedy & Ormrod, 2005:206; Struwig & Stead, 2001:111). The sample was fairly homogeneous in

terms of contexts, grade levels represented, and the teachers' experience in teaching, but not in terms of qualification and therefore is considered as a cross section of the population (Leedy & Ormrod, 2005:207). As only one primary trainer was available to conduct the workshops, groups of 48 participants were regarded as manageable. This number was also sufficient to allow for possible attrition later in the programme (Strydom, 2006b:195).

(b) Qualitative research

The qualitative strand of the research made use of the entire sample that was described in the quantitative strand (convenience sampling), but also used a nested sample design (Leech & Onwuegbuzie, 2005) for the selection of the participants in the focus group. The participants in the focus groups were drawn from the comprehensive sample (Onwuegbuzie & Collins, 2006) and therefore were similar to those in the rest of the study. The sample design for the focus group is discussed according to the criteria for selection, selection procedure, and sample size.

(i) Criteria for selection

Each participant in the focus group was required to be one of the four participants from each of the 12 schools included in the annual programme who attended the workshops. This implied that they have already met the selection criteria for the original sample.

(ii) Selection procedure

The schools were informed at the briefing meeting that one of the four participants trained in each school was required to attend the focus groups following each workshop. The participants in the focus group were either assigned by their school-based group (which consisted of four participants from a specific school), or volunteered. The participants for the focus groups were already included in the

original sample and were therefore selected by convenience (Johnson & Christensen, 2004:215).

(iii) Sample size

The focus groups consisted of 12 teachers, as it is considered to be an adequate size for a focus group (Steward & Shamdasani, 1990:10; Struwig & Stead, 2001:167). It was also a representative sample (25%) of the entire group that was trained, and allowed for the few who failed to turn up (Morgan, 1986:99; 1998:30; Steward & Shamdasani, 1990:10).

(c) Participants not included in the sample

There were participants in the study who were not included in the sample, but who took an active part in the research, namely:

- The trainer/researcher was a qualified and professionally registered speech-language therapist with considerable experience in educator support and training. She was a middle-class Caucasian female, whose first language was Afrikaans, and was registered as a D.Phil candidate at the time. There is a dearth of speech-language therapists from diverse cultures in South Africa (Naudé, 2005:135), and therefore the trainer/researcher had little choice but to conduct the training herself, which enabled her to become a practitioner researcher (Burton & Bartlett, 2005:34).
- Three district facilitators were assigned by the GDE to collaborate with the researcher. One facilitator was appointed to assist the researcher in the semi-rural context, and two in the urban context. These facilitators were of similar cultures as some of the participants, and were competent in at least one of the indigenous languages represented in the two contexts. They acted as translators and interpreters during all contact sessions, and assisted in the data collection

procedures and the workshops. In each of the districts, at least one of the facilitators had research experience, as they were enrolled for their Master's Degrees in Education at that time.

- During the second year (urban context), a group of eight Learning Support teachers attended the training as observers on invitation by the two district facilitators. Although they received handouts and participated in all workshop activities, they did not participate in the research. They provided testimonials as to the value of the CPD programme.
- An external rater validated the coding of primary documents in the qualitative database, and the scoring of the portfolio assignments. The external rater had a Master's Degree in Communication Pathology. She was experienced in portfolio evaluation, had research experience, and was proficient in English. The external rater approved the scoring procedure used in evaluating the assignments. She also attended the workshops and provided feedback on the training.

5.3.4 Research context

The contexts of the research need to be described to create a better understanding of the circumstances under which the research was conducted and which could have affected the outcomes. The schools and districts included in this study are typical of previously disadvantaged areas in South Africa but are not identified or shown to protect the identity of particular individuals. Both these contexts were under the auspices of two districts within the Gauteng Department of Education.

All schools in these two contexts were permanent structures but not all were equipped with electricity. The participants hailed from 2 areas: in the first group, they were predominantly from a semi-rural part of the Tshwane Metropolitan Municipality, while the second group was from the townships of the Tshwane Metropolitan

Municipality that included schools from two informal settlements and three township schools.

The typical education and income levels for these areas were assessed using results from the 2001 Population Census, conducted by Statistics South Africa (Statistics SA, 2001). The highest education levels of the two communities are compared in Figure 5-9. These findings were then compared with similar data for the remainder of Tshwane Metropolitan Municipality and with that of the national average.

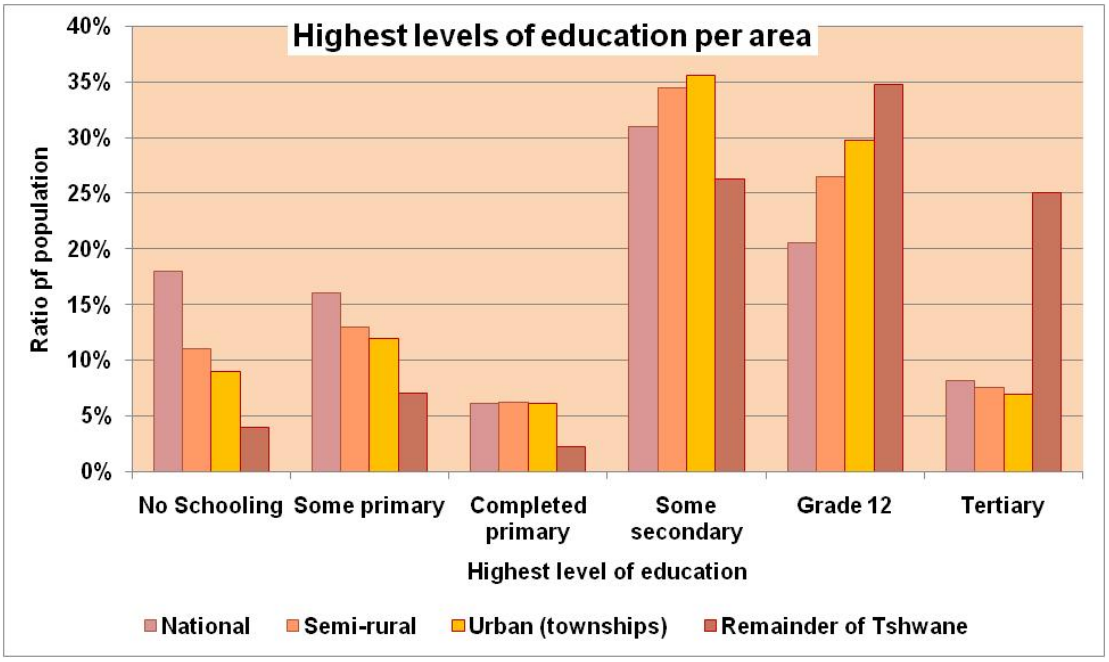

Figure 5-9: Highest levels of education

This shows that on average approximately 10% of the target communities have had no schooling. A total of 18%, 20% and 22% of the urban, semi-rural, and national sample had had some primary education, or had completed primary school. This compares to 10% for the remainder of Tshwane. It also shows that the level of tertiary education was very similar, except for the rest of Tshwane. It is therefore clear that the target communities have lower levels of qualifications than the remainder of Tshwane, but have similar levels of qualification as the rest of South

Africa. The average household income (refer to Figure 5-10), shows that income levels in these communities were lower than the rest of Tshwane, but similar to the rest of South Africa.

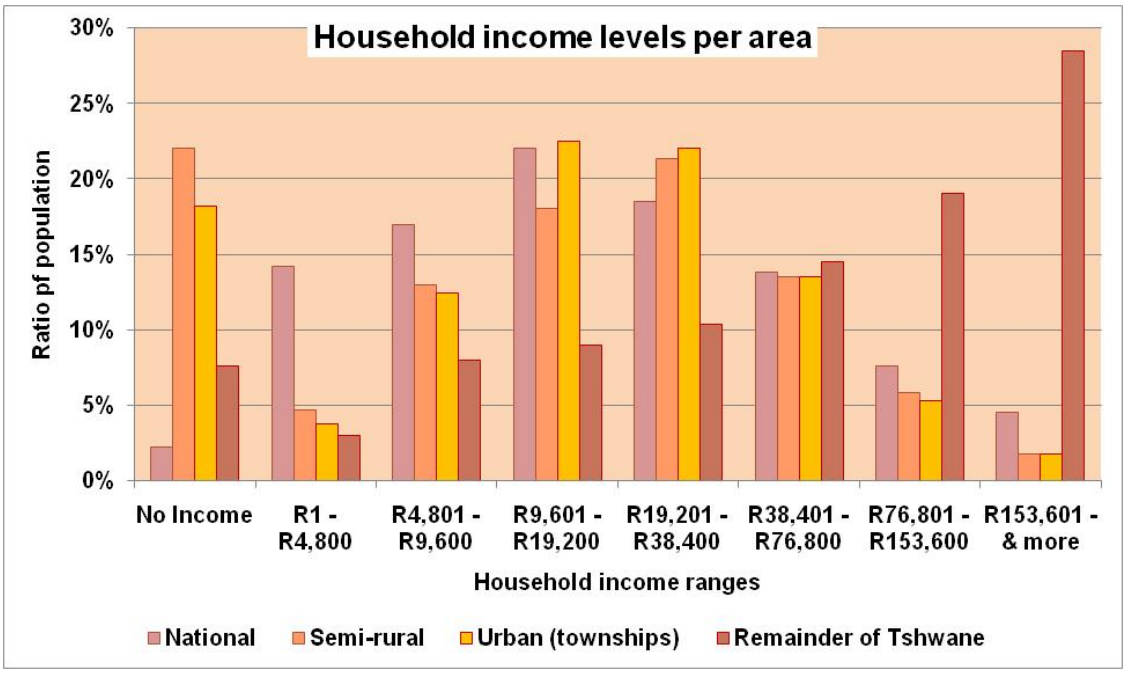

Figure 5-10: Household income levels (2001)

The informal settlements accommodate people from a variety of ethnic and cultural groups inside and outside of South Africa, and experienced ethnic and racially related violence during the past few years. Statistics on the informal settlements are unavailable at this time because these settlements were only recently established. Residents living in these settlements lived under poor conditions with limited infra-structure (e.g. no running water or electricity in their homes, and unpaved roads which were difficult to access during the rainy season).

5.3.5 Section summary

The planning and design phase included a description and justification of the mixed methods design, as well as the QUAN and QUAL research methods used. Ethical

considerations were provided and a pragmatic approach was considered suitable for the research. The sample selection for both QUAN and QUAL strands were described and the research context was explained. The following section focuses on the early development and pilot testing of the assessment materials.

5.4 Early development and pilot testing

The early development of the CPD programme aimed at compiling the workshop material (refer to Appendix 3B, Appendix 3C, Appendix 3D) and the training support material (manual and CD), based on a literature survey (refer to Appendix 5H).

5.4.1 Tools used in the evaluation of the CPD programme

The tools used to evaluate this CPD programme in the QUAN strand of the research are summarized in Table 5-11, while the tools used to collect qualitative data in the evaluation of the CPD programme are discussed in Table 5-12.

Table 5-11 Tools used to collect quantitative data in the evaluation of the CPD programme:

Tools to obtain quantitative data	Discussion of tools used to collect quantitative data in the evaluation of the programme
Self-administered questionnaires	*1. Aims of the questionnaires* The questionnaires were designed to answer the research questions and therefore stated the aims as follows: *Questionnaire no 1* -To collect demographic information for the description of the participants -To determine the participants' previous training in the specific focus areas, as it could render an indication of their content knowledge prior to the time of training -To determine the training and information needs of the participants in order to develop the workshop material -To obtain information regarding the participants' values, attitudes, and their expectations of the programme, as these are underlying factors affecting the learning process *Questionnaires no 2, 4, and 6* -To obtain baseline data of the participants' untrained knowledge prior to training -To determine the participants' expectations of the specific workshops, because positive expectations tend to yield positive learning experiences, and *vice versa* -To determine the participants' perceptions of their confidence in facilitating the specific workshop topic (e.g. listening, language, and the language for numeracy), as such information could be indicative of their pre-training competence in facilitating the specific workshop topic, and could also indicate whether there has been any change in their confidence levels as a result of the training *Questionnaires no 3, 5 and 7* -To measure change in knowledge, seeing that the post-training performance could be compared to the pre-training performance -To evaluate the participants' experience of the workshops -To determine whether the participants' expectations regarding the training of a specific topic have been met -To determine the participants' perception of gains from the training in terms of knowledge, skills, and confidence -To determine the participants' future needs of support regarding the specific workshop topic.
	2. Design and development of the questionnaires The following considerations obtained from relevant literature were taken into account in compiling the questionnaires (Leedy & Ormrod, 2005:191; McMillan & Schumacher, 2006:194; Struwig & Stead, 2001:94; Welman, Kruger & Mitchell., 2006:175): -Instructions were clear and kept to a minimum to avoid loss of interest. The questions were user-friendly and were presented in a polite manner. The questionnaires were neatly presented, and had a professional appearance, which improved the face validity (even though subjective). The questionnaires were organized in logical sections by topic and subject, and the administrative format was easy to use

Table 5-11: *(Continued)*

Tools to obtain quantitative data	Discussion of tools used to collect quantitative data in the evaluation of the programme
Questionnaires (cont.)	-Conventional language was used to obtain accurate information. Care was taken to use complete sentences, and the use of abbreviations, slang, colloquial expressions, and technical jargon was avoided. Considering that English was an additional language for all participants, care was taken to avoid negative phrasing which could cause confusion. Furthermore, leading or loaded questions were avoided. Care was taken to avoid giving offence and using biased words and phrases with reference to race or gender. -Questions were related to the aims of the questionnaires. Complex or abstract concepts were simplified by breaking them down into several simple, consecutive questions. The format of questions was judiciously chosen to include mostly closed-ended questions, but also included a limited number of open-ended questions that allowed the respondents to express themselves freely. As open-ended questions require more competence in expression and usually a higher level of education, these were limited. When multiple-choice questions were asked and there were too many responses to list, the option 'Other' allowed for items not listed. Most of the questions required the respondents to choose one or more options from a list, which minimized bias and simplified administration. The questionnaires started with questions that were easy to answer, and proceeded from general to specific questions. The demographic information was obtained before the knowledge questions were presented. Questions included only one idea at a time to enhance completion time. -A language editor reviewed and edited the questions, and two experts in the professional field, as well as a statistical advisor, scrutinized the various questionnaires to ascertain its validity as a measuring instrument, and to identify any potentially imprecise or ambiguous terms. Pre-testing determined the clarity of instructions as well as questions, and the time for completion. Three foundation phase teachers at a local school that was not included in the programme were requested to each complete the entire set of questionnaires over a period of two days. After two days, these volunteers were met during a break and asked to complete a semi-structured questionnaire in order to obtain their opinions with regard to the clarity of instructions and the questions, the appearance of the questionnaires, the ease of use, and length of time for completion. In all three cases, the time for completion was less than 15 minutes, the instructions were found to be clear, and questions were judged as easy to understand. These three respondents ensured the researcher that the questions were meaningful, and were understood by all in the same way. Although responses were not scored, minor changes were made to the layout for easy administration. *3. Compilation of questionnaires* *Types of questions included in the questionnaires:* The questionnaires used in this study consisted of both closed-ended and open-ended questions. The use of closed-ended questions had the benefit of producing data than could be statistically analyzed (Bornman, 2001:4-49). The closed-ended questions were presented as multiple choice questions, checklists, Likert-type scales, and dichotomous questions ('No'/'Yes'/'Unsure') (Leaf, 1997:128; Popich, 2003:259; Struwig & Stead, 2001).

Table 5-11: *(Continued)*

Tools to obtain quantitative data	Discussion of tools used to collect quantitative data in the evaluation of the programme
Questionnaires (cont.)	*Response types used in the questionnaires:* A literature search provided useful guidelines in designing the response types (Babbie & Mouton, 2002:76; Bornman, 2001:4049; Leaf, 1997:128; Moodley, 1999:124). The questionnaires were self-explanatory and included the following response types: 'No'/'Yes'/'Don't know', as well as 'True'/'False/'Don't know' responses. These were categorical or nominal measures, which divided the data into discrete categories that could be compared. Scaled items that obtain nominal data are preferred to all other forms of questions (Struwig & Stead, 2001:94). In this study they provided fairly accurate assessments of beliefs and opinions (McMillan & Schumacher, 2006:198). The two ends represented the opposites of each other, with a more neutral response category in the middle. Checklists provided a number of options from which to choose. The respondents had to select one from the list, or check all appropriate options. Checklists are also categorical measures. The category 'Specify other' was included where more options were available, in order to increase the flexibility of answer categories. Open questions at the end of each questionnaire allowed respondents to express themselves freely and to make suggestions (Babbie & Mouton, 2002:233). Although open-ended questions were useful to obtain additional information that could add to the understanding of phenomena, they were kept to a minimum as they take longer to complete and therefore could be the cause of non-response.
	4. Components of the questionnaires Each of the questionnaires is described according to its various components, and the individual questions that each contains (see Appendix 5A. All but one of the questionnaires contained some sections with generic questions. In addition, each questionnaire had three sections with questions pertaining to the specific content trained in a particular workshop, thereby increasing the content validity of the questionnaire (Leedy & Ormrod, 2005:92). Questionnaires no 2 – 7 (Appendix 5B) were all related to Workshops 1, 2, and 3. In all of these questionnaires, Sections A and B were generic, and are therefore explained only once (see Appendix 5A). Q2 and Q3 were administered for pre- and post-training in Workshop 1, Q4 and Q5 were used similarly in Workshop 2, and Q6 and Q7 were used for Workshop 3. Each pre- and post-training pair shared similar questions for Sections A-E. However, for each workshop, Section F in the pre-training questionnaire differed from Section F in the post-training questionnaire. The post-training Sections F and G are presented at the end of the discussion on Q2 and Q4 (which were used in Workshop 1), but because they are similar in all three post-training questionnaires, they are described only once. The specific content-related questions are discussed according to topics in each workshop (see Appendix 5A)).

Table 5-11: *(Continued)*

Tools to obtain quantitative data	Discussion of tools used to collect quantitative data in the evaluation of the programme
Portfolio assessments	*1. Aims* The portfolio assessments were used to evaluate the participants' applied knowledge and to monitor the implementation of strategies (Van Niekerk, 1998:82). The assumption was that the implementation of the strategies learnt would increase the participants' competence in planning their lessons and facilitate listening and language for learning. *2. Compilation of the portfolio assignments* The four participants in each school were required to meet once a week as a school-based support group to plan their lessons for the following week around a central theme. They were required to implement the strategies in the classrooms for a period of at least 3 weeks following the workshops (see Appendix 5E). During the implementation period, they were required to monitor the participation of three learners (a poor performer, an average performer, and a strong performer) on a monitoring sheet provided for each week. They were also required to conduct a peer evaluation by observing a colleague (one of the group of four trained) implement the strategies in the classroom, and complete a peer evaluation form that was provided. At the end of the implementation period, they were required to do a self-evaluation on a provided form. To enrich the data, the participants were encouraged to submit practical examples of learners' work, activities, and/or teaching resources used when facilitating listening and language skills. *3. Use and assessment of the portfolio assignments* Each individual portfolio was scored with the use of a rubric (see Appendix 5F), which specified a set of values for each item and provided a means to evaluate all assignments in a similar manner, thereby increasing the likelihood of validity of the portfolio as measuring instrument (Leedy & Ormrod, 2005:93). The assignments were scored for comprehensiveness and quality. The assessment scoring sheet (which was designed as a spreadsheet in Microsoft Office 2003 Excel) was programmed to automatically calculate an individual score (by using a weighting procedure for the various components) and was presented as a percentage on the summary sheet (Researcher's copy, Appendix 5F). These numerical results were used for descriptive statistics and could be compared to those obtained from the closed-ended questionnaires. The trainer then provided written feedback to each participant on a report form. The programme designed for providing the summary sheet (Microsoft Office 2003 Excel) was also programmed to simultaneously present the feedback report (Appendix 5F). The feedback report provided a descriptive evaluation of the assignments in three categories: 'Very good', 'Satisfactory', 'Require assistance'. Those who obtained results <50% required additional assistance, whereas those who obtained >50% were regarded as satisfactory, and those who obtained >70% were acknowledged for doing more than was requested. This descriptive measure was to acknowledge those participants who excelled in their effort. Although these feedback reports (Appendix 5F) did not include the individual percentages, the trainer/researcher did provide detailed written feedback to each participant with emphasis on the positive elements in the portfolio, and provided guidelines for elements that required change or future attention.

Table 5-11: *(Continued)*

Tools to obtain quantitative data	Discussion of tools used to collect quantitative data in the evaluation of the programme
Portfolio assignments *(cont.)*	*3. Use and assessment of the portfolio assignments (continued)* The feedback was intended to motivate the participants to continue with the implementation of the strategies in future, and not to discourage them, or break down their confidence in trying to complete the portfolio. These individual feedback reports were considered confidential and were sealed in individual envelopes and distributed by the district facilitators during school visits.
Attendance registers	*1. Aim* Attendance registers were used to address the following: -to keep record of participation in the programme -to draw relationships between the number of workshops attended and performance in terms of gained knowledge -to calculate the cost-benefit of the investment -to compare the two contexts (semi-rural and urban/densely populated area).
	2. Use Attendance registers were completed at all contact sessions (briefing meetings, workshops, and focus groups) and were used to indicate the relationship between participation and performance.
Budget estimates	*1. Aim* The budget estimates provided an estimation of the cost-effectiveness.
	2. Use Costs were carefully documented to monitor the programme. A financial report was provided at the completion of each research unit (formative report) and also at the end-of-term evaluation.

Table 5-12: Tools used to collect qualitative data in the evaluation of the CPD

Tools to create qualitative data	Discussion
Focus groups	*Aim:* Focus groups were used to evaluate the workshops and mentoring component of the programme in terms of the participants' impressions/feelings about the workshop, their experiences in implementing the strategies, the value of the support (e.g. contribution to knowledge and skills base, and increase in confidence levels), procedures, content, and use of strategies. Problems in implementation were addressed; future needs were identified; and the researcher could obtain a better understanding of attitudes, values, and confidence levels. The focus groups provided information regarding the strengths and weaknesses of the programme, and changes required. They also provided a better understanding of the context, and the school-based support groups' ability to support each other in compiling the portfolio and implementing the strategies. In addition, information was obtained on how the participants regarded their own individual levels of skill in implementing the strategies at the end of the three-week implementation period.
	Rationale for use of focus groups: The semi-structured focus group meeting was selected as a data source because it allowed the researcher "…to gather a substantial amount of carefully targeted data within a relatively short period" (Morgan, 1998:32). The focus group provided breadth (if not depth) of the range of experiences and opinions of the group regarding the phenomena under study. It provided the collective views of the participants, and yielded data on the uncertainties, ambiguities, and group processes, which afforded insight into the normative understandings that these groups' collective judgments were built upon (Bloor *et al.*, 2001:1). The focus groups provided access to covert group meanings, processes, and norms that were not obvious from the questionnaire data. They were also used to generate data on the meanings that were hidden behind the group assessments, to explore the group processes and normative understandings that groups drew upon. In this study, focus groups were used for triangulation purposes where focus group data were compared to other data (yielded by other methods) on the same topic. When findings from the focus groups were confirmed by findings from other methods, the possibility of measurement biases was minimized. However, the focus group data were not necessarily directly comparable with those obtained from the structured questionnaires, and neither could they (focus groups) serve as validation measures (Bloor *et al.*, 2001:13). The use of focus groups extended the range of methods, and therefore deepened and enriched the understanding of the topic to aid interpretation. *Use:* Focus group discussions used focus group schedules to provide structure to the discussions (Appendix 5G). These schedules used open-ended questions to evaluate the workshops and mentorship programme. In this study, the focus groups were used as an adjunct to other methods. The observation schedule was compiled according to specific criteria obtained from the literature (Krueger, 1998b:19-55; Morgan, 1986:33; Steward & Shamdasani, 1990). Categories of questions included opening questions, introductory questions, and transition questions, key questions, ending questions, and putting the parts together. The focus group plan was reviewed with experts and then pilot tested prior to use (Krueger, 1998b:57).

Table 5-12: *(Continued)*

Tools to create qualitative data	Discussion
Focus groups *(cont.)*	Two experts in this professional field judged whether the schedules would obtain the required responses by scrutinizing it prior to use, which increased the likelihood of both content and constructs validity of the meeting schedule.
Photos	*Aim:* The aim of using photographs as data collection tool was to produce evidence of the context and the procedures.
	Rationale for use: Photographs were taken throughout the process and used as evidence of 'something to be seen', and were therefore considered as data because they were both empirical and constructed (Harper, 2005:748). They depicted the 'truth' (e.g. the procedures, participants, and context of the training), but were also constructed by the various selections that are required in image making (e.g. technical, formalistic), and therefore were not different from any other quantitative and qualitative data. The visual documentation of the procedures supported and confirmed theories obtained from other forms of data used within the multi-method approach in triangulation. The photographs adequately described the studied phenomena. The images were important to the text as they put a face to the statistical data, and could subjectively connect the audience to the argument.
	Use: The trainer/researcher obtained verbal permission from the participants to take photographs of the procedures. A digital camera was always at hand and activities and procedures were photographed when convenient and without disrupting the flow of events.
Research diary	*Aim:* The aim was to document the process of developing the in-service training/CPD programme.
	Rationale for use: The research diary explained the process, and traced the researcher's ideas and reactions throughout the process. Apart from documenting the events as a field log, it also kept record of the decisions made during the emergent design, and had a reflexive purpose (McMillan & Schumacher, 2006:329).
	Use: Throughout the entire research process, the researcher kept a diary to document her impressions and feelings, as well as the procedures. The researcher reflected on events after every contact session, or when significant events occurred, and noted her impressions. These diary entries were subjected to text analysis, and were used for triangulation.
Testimonials and correspondence	*Aim:* The aim of these additional documents was to use them in triangulation to shed more light on the studied phenomena.
	Rationale for use: The motivation for using these additional data sources was to support or refute findings obtained by other data sources.
	Use: Correspondence and testimonials were collected throughout the process, and were qualitatively analyzed. The themes obtained from them were verified in the interpretation of the results.

Table 5-12: *(Continued)*

Tools to create qualitative data	Discussion of tools used to collect qualitative data in the evaluation of the CPD
Field notes	*Aim:* The aim of the field notes was to document all additional information (e.g. facial expressions, impressions, non-verbal interactions) that could shed more light on the discussions in the focus groups (Bloor *et al.*, 2001:1).
	Rationale for use: The assistant moderator made field notes during the focus group meetings and therefore provided an insider's view of the discussions. Verbal and non-verbal incidents were reported and the focus groups were summarized from the assistant moderator's perspective.
	Use: Field notes were documented during the focus group discussions and were qualitatively analyzed. Summaries of focus group discussions were read to the group and verified. Field notes also documented additional information, e.g. non-verbal interactions between participants which were not necessarily visible to the moderator/researcher..

In addition to the various tools/assessment procedures used to obtain information, the study also used specific equipment in the process.

5.4.2 Equipment, materials, tools and documents used in the research

The equipment, materials, tools, and documents used for the workshops, mentoring programme, and focus groups are listed below.

(a) Equipment

The following equipment was used:

- Dell Celeron laptop computer, with a Dell digital projector.
- Images were projected on a white wall, but when a white wall was not available, several sheets of white paper from the flip chart were fixed with 'Prestik' to a wall.
- The discussions were recorded by two TCM-400DV cassette recorders, of which one was used as a backup for the other; a total of 16 x 90 minute Sony audio cassettes were used.

The following equipment was used in preparing the CDs with presentation material:

- Sony DVCAM camera
- 2 x Sony Mini DV 60 minute tapes
- Microsoft Imagemaker for editing
- IBM workstation Pentium III
- 24 compact discs with labels.
- A Canon Ixus V digital camera was used to take photographs.
- The equipment used for the data analysis procedures included the following:
- A dual Pentium 5 computer with 1Gb Ram
- Microsoft Office Excel (2007), which allowed the data to be manipulated on a spreadsheet
- ATLAS-ti software (Thomas Muir Scientific Software Development, 2003-2004) for coding and to search and retrieve texts associated by codes
- A TCM-400DV cassette recorder with earphones and audio cassettes.

(b) Materials and tools

The following materials and tools were used:

- A flip chart and felt-tip pens were used for explaining concepts.
- Coloured felt-tip pens and index cards.
- The training material was presented as Microsoft PowerPoint slides and these were printed as handouts with six slides per A4 sheet (see Appendix 3B, Appendix 3C, and Appendix 3D).
- The trainer/researcher used commonly available objects for demonstration purposes. Counters (e.g. bottle caps); shakers, drums, children's books, and construction material, e.g. scissors, crayons, coloured paper, plastic geometrical shapes, beads and thread, etc. to demonstrate strategies .

(c) Documents and manuals

The following documents and manuals were used:

- Manuals were developed for use in the classrooms. Each participating school received a manual consisting of examples of lessons based on six themes commonly used in the foundation phase. Each theme consisted of four or five examples of integrated lessons to facilitate listening and language for learning (Appendix 5H). The manuals required 24 lever arch files with compact discs containing video material (discussed next) attached in a plastic compartment in the file.
- Each manual was supported by custom-made compact discs (CDs) containing video material to demonstrate specific strategies (see Appendix 5H). These video clips were also used in the workshops. The compact discs were compiled by videotaping the implementation of strategies by third-year B. Communication Pathology students as part of their practical training in foundation phase classrooms.
- A focus group summary sheet (in Appendix 5G) was developed for the documentation of observations, interpretations, and comments from the trainer/researcher and district facilitator as moderator and assistant moderator respectively.
- The researcher used a focus group schedule to guide discussions (refer to Appendix 5G).

The use of the assessment materials was pilot tested prior to its use in the research, as discussed below.

5.4.3 Pilot study

Step eight (Phase 3) consisted of the pilot study where the assessment materials were designed and pilot tested. The pilot study is considered a prerequisite for the successful completion of a research project as it provides the opportunity "…to try out particular procedures, measurement instruments, or methods of analysis" (Leedy & Ormrod, 2005:110). The various activities included in the pilot study occurred sequentially. The pilot study is described in Table 5-13 and the outcomes of the pilot testing and the adjustments required are summarized in Table 5-14.

Table 5-13: Description of the pilot study

Aspect of the pilot study	Discussion
Aim and objectives	- The aim of the pilot study was to test the assessment procedures. This aim was realized by the following objectives: - To familiarize the researcher with the procedures included in the research and the context (Strydom, 2006c:208). - To identify potential logistical and practical problems related to the workshops. Aspects such as the sequence of presentation, the duration and pace, the content of the curriculum, as well as catering arrangements were assessed. - To develop the assessment procedures. The sub-objectives for each of the data collection methods were as follows: *Questionnaires* -To detect possible flaws (e.g. ambiguous instructions, inadequate time limits, etc.) prior to use in the main study *Focus group schedules and procedures* - To familiarize the researcher with the focus group procedure - To determine whether the questions in the meeting guide corresponded with the problem under study - To establish clarity of the questions in order to elicit the required information - To provide additional information to prepare the final draft of the meeting schedule *Portfolio assessments* - To develop the instructions and procedures included in the portfolio assessments - To develop the rubric for scoring the portfolio - To modify the original instructions - To assess the data collection format to obtain more meaningful data.
Context	The pilot study was conducted in a school in a semi-rural area where many of the residents were poor and unemployed. The three workshops were conducted at a specific school that was geographically central to the three schools included in the pilot study. The training venue was equipped with electricity and the necessary amenities required for hosting a workshop. The training took place in the staffroom where tables were grouped in a U-shape, each accommodating three teachers from every grade level. The staffroom lent itself to this purpose, as it was spacious and light, and was equipped with comfortable chairs.
Participants	A pilot study was conducted with 12 participants who had similar characteristics than those of the target group (Struwig & Stead, 2001:7; Strydom, 2006b:206), which were deemed an adequate number for representing the main sample (25%). Three schools were included in the pilot study (which were of similar nature to those selected for the main study), but they were not included in the main study to avoid contamination or dilution of data (Struwig & Stead, 2001:7).

Table 5-13*: (Continued)*

Aspect of the pilot study	Discussion of pilot study
Participants (cont.)	Some of the participants used more than one LoLT to teach. The majority (66%) of the participants in the pilot study were mature teachers (> 36 years) who were mostly (88%) suitably qualified for the foundation phase. Gr. R participants were underrepresented in this group because schools in this context did not yet include Gr. R classes. The majority (83%) were Sepedi-speaking (Northern Sotho) and 78% used this language as the LoLT. In this group, 25% used English as LoLT, which consisted mainly of the Ndebele-speaking (L1) participants.
Data collection procedure	- A briefing meeting was scheduled and Questionnaire 1 was completed (needs assessment). - The three workshops were presented with two three-month intervals in 2005. On the day of each workshop, the pre-training questionnaire (Q 2/4/6) was applied prior to the onset of each workshop, and the post-training questionnaire (Q 3/5/7) directly afterwards. - A follow-up meeting with the group was held two weeks after the first training to monitor their progress with the implementation of strategies, and the portfolio assignment. - A focus group with the 12 trained teachers was conducted 4-6 weeks after the workshops. After this focus group meeting it was decided not to continue with the intended follow-up sessions planned for later. Instead, it was decided to replace the follow-up meetings with a semi-structured focus group, as a smaller group with <12 participants could provide more in-depth information on the phenomena under study. - The semi-structured focus group procedures were also developed according to guidelines obtained from the literature (Bloor *et al.*, 2001:37; Krueger, 1998a:15; 1998b:21; 1998c:15; Morgan, 1998:59; Steward & Shamdasani, 1990:51). The meeting schedules were language edited before experts in the field approved their format and content. - The portfolio assignments were discussed during the workshops, and had to be submitted six to eight weeks following the training. The portfolio assessment procedure was based on guidelines obtained from literature (Du Toit, 2004), as well as the input from experts. These portfolios gave the researcher an indication of how the participants had applied the strategies learnt, and were composed of practical examples and several assessment documents (e.g. learner assessment, self-assessment, and peer evaluation).

Table 5-14: Outcomes of the pilot study

Objective	Problems identified	Adjustments
To familiarize the researcher with the real-world context of the research	The researcher undertook a study within a context that posed a cultural gap between her and the participants. It was therefore necessary for her to become orientated in terms of her feelings for the people and the context, in order to gain a better understanding of the process.	The pilot study enabled the researcher to spend more time in the specific contexts. The researcher spent several days with the district facilitators in visiting schools, meeting the principals, and becoming acquainted with the contexts. This allowed her to get a realistic feel for the participants, and the challenges they have to face in their classrooms.
To identify potential problems related to the workshops	- Training started too late in the morning. - Participants were grouped according to grade levels, with the result that they did not necessarily know each other, making it difficult to obtain spontaneous participation within the groups. - Too much information was included in the workshops, which resulted in the training continuing until too late in the afternoon. - There was not sufficient time available for the completion of the post-training questionnaires. - The lunch was rated negatively.	- Arrangements were double-checked to ensure that the venues were unlocked and available from 07h00. This allowed sufficient time to set up and to prepare the venues. - Arrival time for the participants was 08h00, and the training started at 08h30. The researcher started on time and did not wait for late comers. - Ice-breaking activities were introduced. - A bell (a can filled with stones) indicated when to terminate group discussions. - The information to be trained was reviewed and unnecessary information was cut out of the presentations. - The pace was adjusted so that the training could be completed before the lunch break. Activities of a more practical nature were scheduled for after the lunch break.

5.4.4 Section summary

This ‘Early development’ section described the tools, materials, equipment, and documents used in the research and addressed the development of the assessment material. This phase also included the pilot study.

5.5 Implementation and advanced development

With reference to Figure 5-2, the implementation and advanced development phase (Steps 9 – 12) addressed the procedures for data collection and data analysis, as well as the interpretation and validation processes. Prior to embarking on the actual research, it was necessary to perform preliminary procedures as groundwork to the workshops and the actual data collection.

5.5.1 Preliminary procedures

The timeline for each programme and data collection schedule are presented in Table 5-15.

Table 5-15: Time line and data collection schedule during the two years of implementation

Workshop	Date	Focus group	Portfolio assessment
Semi-rural areas			
Information briefing session and needs assessment	21 July (Year 1)		
Workshop 1 (Pilot)	23 July (Year 1)	10 August (Year 1)	
Main study	13 August (Year 1)	23 August (Year 1)	
Workshop 2 (Pilot)	3 September (Year 1)	20 September (Year 1)	30 September (Year 1)
Main study	17 September (Year 1)	27 September (Year 1)	15 October (Year 1)
Workshop 3 (Pilot)	8 October (Year 1)	27 October (Year 1)	25 November (Year 1)
Main study	22 October (Year 1)	10 November (Year 1)	30 November (Year 1)
Urban/densely populated areas			
Information briefing session and needs assessments	23 February (Year 2)		
Workshop 1	21 March (Year 2)	24 April (Year 2)	30 June (Year 2)
Workshop 2	22 March (Year 2)	25 April (Year 2)	
Workshop 3	27 April (Year 2)	(a) 25 May (Year 2) (b) 30 May (Year 2)	30 August (Year 2)

The development of the CPD programme commenced with an application for funding by writing and submitting a proposal in order to gain entry into the field (with reference to Figure 1-5). This specific in-service training programme was implemented in two previously disadvantaged contexts with low socio-economic schools (SES) for a period of one year in each context. The programme spanned a period of two years, of which the second year was a duplication of the first, only in a different context.

It was necessary to obtain permission and ethical clearance to conduct the research and to gain entry to the contexts, as well as to obtain the cooperation from the two contexts.

(a) Obtaining permission for the study

The Gauteng Department of Education was contacted to explain the proposed project. Departmental officials expressed their interest and invited the researcher to the GDE head offices to present the project to specific officials in decision-making positions. These officials approved of the project in concept and made recommendations in support of the project. The topic of investigation was of interest to the National Department of Education as both literacy and numeracy were prioritized as areas of improvement in performance (Department of Education, 2007:2; Gauteng Department of Education and Gauteng Institute for Curriculum Development, 1999). Furthermore, the national imperative was capacity building in the implementation of the NCS. Final approval for the research was provided within three months. During this time, the researcher prepared and submitted a formal research proposal to the Research Proposal and Ethics Committee, Faculty of Humanities, University of Pretoria, and obtained ethical clearance and approval to proceed with the research. These preliminary procedures required the development

of the assessment procedures and the training materials, which were part of the 'Design phase' (refer to Figure 5-3).

Specific district facilitators were appointed by the GDE to assist with the logistics of the programme implementation. The district facilitators contacted the principals of the selected schools and explained the purpose of the proposed training to obtain their approval. The trainer/researcher also visited several of these schools with the district facilitators to develop a better understanding of the context. This was an important step for the researcher to become culturally sensitized, and prepared her to conduct the research in a culturally competent manner.

The planning and design phase determined the participants' training and information needs with a questionnaire that was completed at the onset of the programme at the briefing meeting. This information allowed the trainer/researcher to develop the training and assessment material.

(b) Briefing meeting

The programme was formally introduced by a briefing meeting at the beginning of each year. In the semi-rural context, this briefing meeting was held at a school, and in the following year (urban context), it was held at the Department Communication Pathology, University of Pretoria. The district facilitators scheduled this meeting three weeks prior to the first workshop with the aim of informing the participants about the programme (what it would require of them, the potential benefits) to obtain informed consent and to determine their information and training needs.

After the initial introductions and an ice-breaking activity in small groups of four, the trainer/researcher presented all the relevant information regarding participation in the programme in a Microsoft Office PowerPoint presentation (PPT) (Appendix 3B, Appendix 3C, Appendix 3D).

Logistics in terms of the training venues and dates for training differed for the two contexts:

- The district facilitator of the semi-rural context selected the training venue and training dates according to the specific district's schedule. The Teachers' Training Centre was accessible to the schools in the semi-rural area, and the district facilitator notified the schools in advance (in writing) of the specific dates of the briefing meetings. The determination of dates was therefore a top-down decision.
- In the urban/densely populated area, an attempt was made to select the venue and dates for training in a democratic manner by mutual consensus. Although the participants selected the University of Pretoria as a venue (as it was central to the various schools included in the group), it was more difficult to reach consensus regarding the training dates, and the district facilitators eventually opted for the preferences of the majority of participants.

5.5.2 Data collection procedures

(a) Procedures in Phase 4: Evaluation of the programme and advanced development

Three one-day workshops were scheduled for each year. Because three topics were trained per year (3 research units), and repeated in the second year (in another context), there were six research units over a two-year period (apart from the three research units of the pilot study), as shown in Figure 5-12. In the semi-rural area, the workshops were conducted on Saturdays, and in the urban area, two workshops were held on public holidays, and one during the school holidays.

The duration of each workshop was scheduled to be between 5-6 hours long. The

data collection procedure of each research unit consisted of a sequence of five steps, schematically presented in Figure 5-11.

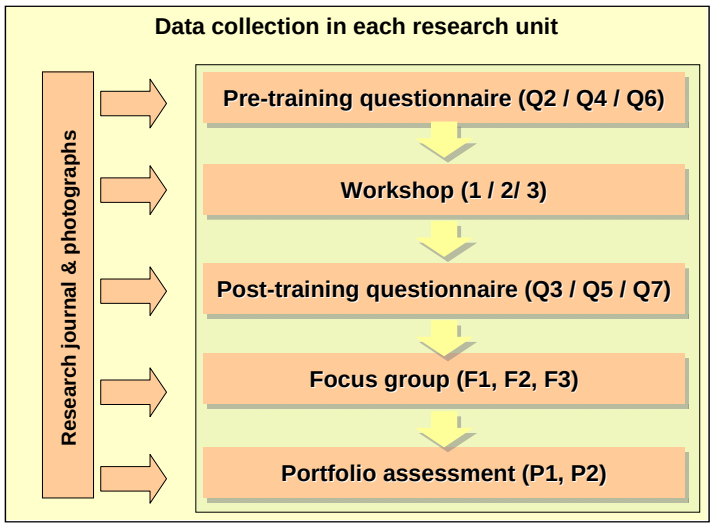

Figure 5-11: Data collection procedure for each research unit

The data collection procedures were developed as three research units in each of the two years (refer to Figure 5-12).

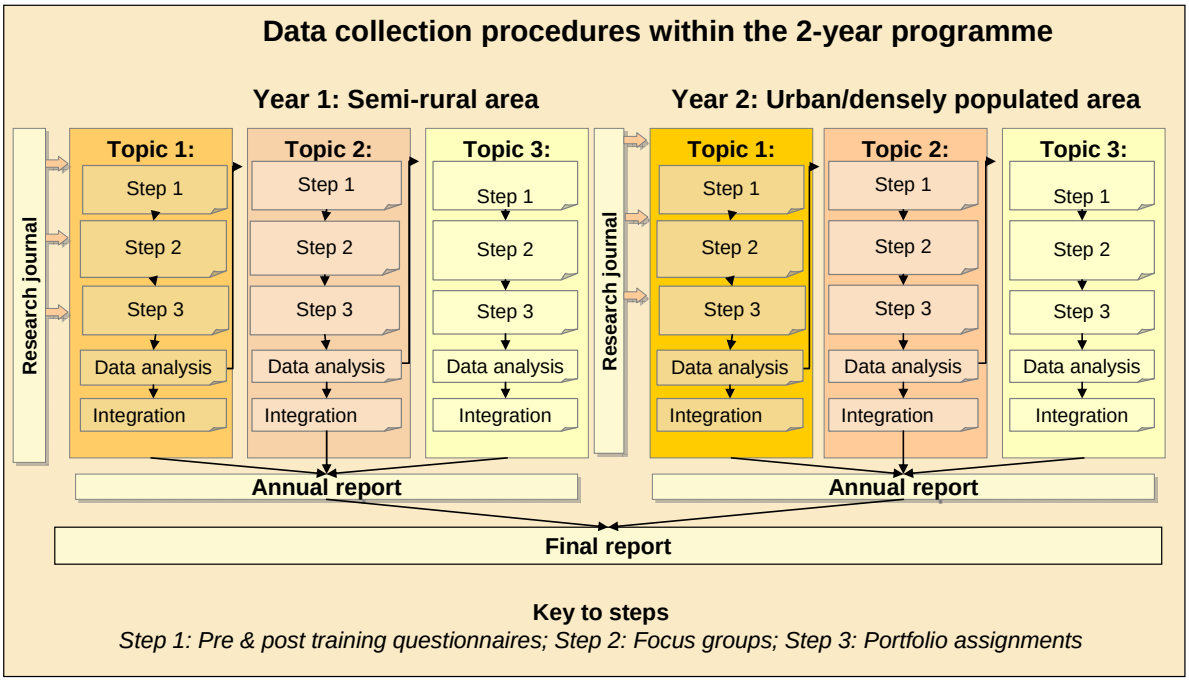

Figure 5-12: Data collection in six research units over a two-year period

At the onset of each annual programme, an information meeting/briefing meeting was scheduled where data were collected for a needs assessment by means of a

questionnaire (refer to Q1 in Appendix 5B). Participants were requested to complete the questionnaire upon arrival, prior to the presentation. The researcher collected these questionnaires prior to the presentation to minimize bias. After the presentation, the participants were requested to sign informed consent forms if they wished to continue with the programme. Participants deposited these documents in a box when exiting the room. This step was separate from the evaluation procedure as it formed part of the design and development phase in the overall process (Phase 1, Figure 5-3). The two strands of data collection are described below.

(i) Data collection procedures in the quantitative strand

Data collection in the quantitative strand included the use of questionnaires, portfolio assessments, financial statements, and attendance registers (refer to Appendix 5A). These procedures are described as follows.

(ii) Procedures regarding questionnaires

The following procedures were adhered to in each of the three workshops of each year:

- The participants in each workshop were selected according to the procedures described in Section 5.3.3. Pre-training questionnaires (Q2/Q4/Q6) (refer to Appendix 5B) were completed prior to training. The researcher collected the completed questionnaires in person prior to training.
- After the training the post-training questionnaires were completed (Q3/Q5/Q7) (refer to Appendix 5B) and placed in a box at the door when the participants left the room.
- An exception was made in the aforementioned procedures for Workshop 2 of 2005, where pre- and post-training questionnaires were not completed. At that time, initial results became available from focus groups and from Workshop 1 indicating that questionnaires were unsuitable as measuring instruments to

assess knowledge gains in that particular context. From a practical perspective, a decision was made (in consultation with two experts) to discontinue the use of questionnaires, and to include portfolio assessments to assess applied knowledge in stead. The participants, however, evaluated the workshop by completing questionnaires consisting of closed-ended questions directly after the workshop. Two weeks following workshop 2, the statistical advisor to the programme recommended continuing with the pre- and post-training questionnaires to allow for comparison. The individual schools were telephoned to request their cooperation in the completion of the post-training questionnaires, which were then faxed to the participating schools and returned by fax. All consecutive workshops included the completion of pre- and post-training questionnaires.

(iii) Procedures regarding portfolio assignments

At the conclusion of Workshops 2 and 3, all the participants were requested to compile portfolio assignments (refer to Appendix 5E). No portfolio assignment was completed following the first workshop in 2005 as the need for an emergent dimension in the assessment of the programme only became clear (Miller, 2003:442) after the results from pre- and post-training questionnaires were received from the pilot study of Workshop 1 (semi-rural context). For this reason, one portfolio assignment had to cover the implementation of strategies taught in Workshops 1 and 2. This was deemed to be acceptable because the first two workshops ('Listening for learning', and 'Language for learning') shared a mutual knowledge base on the process of learning, allowing the two topics to be consolidated in one portfolio assignment. Although three portfolio assignments were scheduled for the urban context, many teachers opted to combine the first two assignments as the first two workshops were, for practical reasons, conducted on two consecutive days.

District facilitators provided support with the portfolios during school visits. The trainer reviewed the procedure for the completion of the assignment with the entire group during the closing session of each workshop. The four teachers from each school were required to form a nucleus group in order to provide support to one another. Preparing the assignments, this school-based support group was required to convene once a week to discuss the theme of the week, and to plan their lessons accordingly. They were encouraged to share their ideas and resources within each theme.

The assignment required each teacher to plan a weekly lesson (according to standard GDE procedures), and to integrate the strategies learnt in the workshop within this programme. They had to use a different topic/theme each week, and the planning and implementation had to be repeated for each of the three weeks. Participants were encouraged to rely on their workshop handouts and the training support materials (e.g. manuals and CDs) in planning their lessons. In addition, the district facilitators who also attended the workshops provided support regarding the portfolios during routine school visits.

Participants were required to implement the strategies learnt in the workshops for three consecutive weeks within a given period, which allowed them the flexibility to accommodate exam periods or school holidays. The participation of three learners (a poor learner, an average learner, and a competent learner) in their classrooms had to be monitored within this implementation period.

The participants were required to submit practical examples of teaching material or learners' work with their lesson plans and classroom activities (e.g. a story, an artwork, a song, and/or a rhyme) for each theme. Every week, each participant had to be observed by a peer from the school-based support group while implementing the strategies. The observer had to complete a peer evaluation form that was

developed for this purpose. The aim of this exercise was for teachers to support each other and to learn from one another. This was thought to be particularly helpful to the Gr. R teachers who were not necessarily well qualified and had limited exposure to practical implementation.

At the end of the three-week implementation period, each participant had to complete a self-evaluation form that was provided for this purpose. All the documents were included in the file provided with the handouts, and a representative of each school submitted these at the following contact session. With the final portfolio assessment, one of the participants from each school collected the portfolio assignments and delivered them to the researcher. The trainer assessed the portfolios by using rubrics with scoring guidelines. The participants each received personalized feedback on their assignments, individually sealed in an envelope and put into one large envelope addressed to each school included in the research, to be distributed by the district facilitators.

(iv) Budget estimates

Budget estimates informed the inquiry on the cost benefit of the programme. Financial status reports were updated on an ongoing basis at the conclusion of each topic trained (research unit). The management of the project was facilitated by using Microsoft Office Manager (2003) to keep accurate count of costs and time spent. Brief descriptions of time and costs were used to expound the cost benefits of the programme (Rallis & Rossman, 2003:496).

(v) Attendance registers

Attendance and attrition were monitored and used as data in the process and output components of the evaluation. All the participants who attended a contact session (briefing meeting, workshops, or focus group meetings) signed attendance registers. Copies of these were provided to the GDE for their own record keeping of support

provided, and for documenting the professional development of individuals. The GDE was considered to be a partner in the development of this programme and was acknowledged as such, when necessary.

(vi) Data collection procedures in the qualitative strand

Multiple sources of qualitative data were used to describe the process and the outcomes of the programme, including a research diary, focus groups, digital photography, correspondence, and testimonials (refer to Table 5-4). These procedures are discussed below.

(vii) Research diary

The aim of the research diary (refer to Table 5-4) was to document the research process and to reflect on issues arising (McMillan & Schumacher, 2006:329). It also provided insight regarding the factors that could affect the outcomes. Entries were made from the initial contact sessions with GDE officials through to the end of the second year, and were qualitatively analyzed. No specific procedure or schedule was followed and entries were made whenever the programme took a specific turn, or after a specific event took place and the researcher felt the need to reflect on specific issues. The researcher would document and reflect on the session following all contact sessions with the participants, preferably within hours of the event. These entries were used to share ideas with experts and colleagues, and therefore elicited meta-reflection.

(viii) Focus groups

The aim of the focus groups was to explore the value of the training in terms of the participants' experiences in implementing the strategies, and their perceptions of the in-service programme (Rallis & Rossman, 2003:496). They also provided an indication of proposed knowledge gains. Focus groups (refer to material used in Table 5-4) were conducted with 12 participants within 4-6 weeks following each

workshop to establish the value of the learning experience, monitor the implementation of the strategies taught, and identify any problems with the portfolio assignments and the implementation of strategies.

Two focus groups were conducted at the Teachers' Training Centre following Workshops 2 and 3 in the semi-rural area (2005). In the rural context, however, all three workshops were evaluated by focus groups. The first two focus groups were conducted at the University of Pretoria, Department Communication Pathology in a conference room where teachers were seated around a table (refer to Photograph 3 in Appendix 6E).

At the request of the participants, the focus group following Workshop 3 was split into two individual sessions at opposite ends of the city. One of the focus group sessions was conducted in a school's staffroom, whereas the other was conducted in a classroom at a Teachers' Training Centre, where tables and chairs were arranged to form a circle (refer to Photograph 4 in Appendix 6E).

In order to balance the number of focus groups in each context, it was decided (in consultation with experts) to add the two focus groups conducted for the pilot study to the database for those conducted within the semi-rural context (2005). This decision was made because the sizes of the focus groups for the pilot and main study were similar, and this addition could contribute to the richness of data.

Participants for the focus groups were selected according to the specifications set out in Section 5.3.3. Incentives used for recruitment (Steward & Shamdasani, 1990:51) included the crediting of the additional hours of participation on attendance certificates, a pleasant atmosphere where participants were given the opportunity to interact with colleagues, and snacks and refreshments. The procedure was as follows:

- Participants arrived at the venue after school and were served refreshments.
- The venue was set up with all participants seated around a table, with name cards placed in front of each to allow for more informal participation on a first name basis (Krueger, 1998a:13). Bowls of sweets and small boxes of fruit juice were provided at every placement. Audio-recording equipment was used to record the discussion. Two tape recorders with external microphones were placed at central positions on the table to record each session, the one being of high quality, and the other as backup (Bloor *et al.*, 2001:4, 41) (refer to Photographs 13 and 15 in Appendix 6E).
- Participants were welcomed, introduced, informed of the goals of the meeting, and requested for permission to audiotape the session. They were also assured of confidentiality and their right to withdraw from the study at any time. Participants were given the option to answer all questions in their L1, which would be translated into English by the district facilitator. Apart from two participants who opted to participate in their first language, English was the preferred medium of communication. The district facilitators served as assistant moderators and as interpreters to those who chose to use an indigenous language.
- Focus group schedules were used to guide the discussion (Appendix 5G). Questions were structured in an indirect manner in order not to affront anyone, but these questions often had to be rephrased as parallel questions (Morgan, 1998:55) to accommodate the limited language proficiency in English of many of the participants.
- The focus group schedule was prepared to progress from general questions to more specific questions. It started with an ice-breaking question that focussed on what the participants had been doing since their previous workshop, followed by

questions to refresh their memories of the topics trained in the previous workshop. They were requested to share their own experiences in implementing the strategies. The next set of questions focussed on their impressions of the workshop, followed by questions about the value of the training. They were asked to identify the strengths and the weaknesses of the programme, as well as what they would like to have changed. The session was concluded with a summary of the meeting.

- The trainer/researcher acted as the moderator of the focus group, and the district facilitator as assistant moderator or external rater (Morgan, 1986:21), and also as interpreter when necessary. The assistant moderator documented significant quotes and summarized each question discussed on the summary sheet specifically designed for this purpose. In both contexts, the assistant moderators were familiar with research procedures, however, this was by chance and may not be the same in future programmes.
- Each focus group was planned for 60 – 90 minutes to accommodate the participants' schedules and commitments. At the conclusion of the session, the assistant moderator verbally summarized the responses to questions (from the aforementioned summary sheet). These summaries were presented to the group for approval, thereby increasing the validity of the data (Bloor *et al.*, 2001:15, 16, 18). Opportunity was provided for debriefing the participants on request (Bloor *et al.*, 2001:55), which was necessary in only one instance. The researcher/moderator took field notes to supplement the summary and transcription of the audio recording.
- After the participants had departed, the researcher and the assistant moderator met to reflect on the procedures, the participation, and outcomes of the session. They compared notes and confirmed the key ideas (Morgan, 1998:20).

- The researcher further reflected on the focus group shortly after the session by keeping a research diary.
- The audio cassettes were transcribed verbatim according to guidelines obtained from the literature (Bloor *et al.*, 2001:55). For reasons of anonymity, speakers were referred to as 'participant 1', 'participant 2', etc. These transcriptions were then qualitatively analyzed with ATLAS-ti (Thomas Muir Scientific Software Development, 2003-2004). A complete list of primary documents included in the database is presented in Appendix 6A.

(ix) Correspondence and testimonials

Relevant correspondence with stakeholders (e.g. the GDE) and testimonials obtained from participants or district facilitators were added to the database and qualitatively analyzed with ATLAS-ti (Thomas Muir Scientific Software Development, 2003-2004).

(x) Photographs

Photographs were taken at the workshops and the focus groups and examples of portfolio assignments were also photographed (Appendix 6E) to document procedures and occurrences as it could provide a view on the actual events (Harper, 2005:48).

(b) Conclusion of programme in each context

At the end of each annual programme, those participants who complied with the requirements received certificates of attendance from the University of Pretoria.

5.5.3 Data analysis procedure

The process of data analysis categorized, ordered, manipulated, and summarized the data to create a meaningful description of results (Struwig & Stead, 2001:169).

The first step was to reduce the data that were gathered through the various collection procedures (Miles & Huberman, 1994:11). The data analysis procedures to answer the various research questions are summarized for both strands of the research in Table 5-16 and explained in the following sections.

(a) Quantitative analysis

The data for the quantitative strand were obtained from portfolio assessments, attendance registers, financial statements, and closed-ended questions in the questionnaires. The data obtained from questionnaires were first coded, captured, and cleaned in a text format (Struwig & Stead, 2001:169). They were analyzed using a range of different statistical methods.

Descriptive statistics was used to describe, summarize, and make sense of the quantitative data (Johnson & Christensen, 2004:437). In this study, descriptive statistics had an exploratory function that described broad tendencies (Leedy & Ormrod, 2005:257) in terms of demographics, but also the participants' opinions of the programme and training. In addition, descriptive statistics described the gains made by the group in terms of knowledge, skills, and confidence.

Descriptive statistics (Leedy & Ormrod, 2005:258) was used to order the data to identify input parameters and describe the information needs. Numerical indexes such as averages, measures of relative standing (percentile ranks), and measures of spread (e.g. mode, median, mean, and a comparison of the mean) were calculated. The calculations also included measures of variability, for example range, variance and standard deviation, and the normal distribution.

Table 5-16: Statistical analysis implemented to answer research questions

Component	Research question	Quantitative data sources	Data analysis procedure	Qualitative data sources	Data analysis procedure
Input	What are the training needs of foundation phase teachers? What previous support was provided to the teachers by the school and GDE? What were the input strengths to the programme? What were the input challenges to the programme?	Questionnaires	Descriptive statistics	Research diary Focus groups Correspon-dence	Qualitative descriptive analysis
Process	Can the information be used in the classroom? Is the material relevant to the NCS?	Questionnaires (evaluation of the workshops)	Descriptive statistics	Research diary Focus groups Testimonials Questionnaires Observations	Qualitative descriptive analysis
	Was the material useful? Was any essential information omitted from the training? Was any unnecessary information included?	None	No statistical procedure		
	How relevant was the training approach?	Post-training questionnaires	Descriptive statistics	Research diary Focus groups Observations Feedback from external rater	Qualitative descriptive analysis
	Were the training methods used appropriate to accommodate various learning styles?	Portfolio assignments	No statistical analysis		
	Did the trainer have the necessary attitude and skills to present the material in a way that encouraged learning?	Questionnaires (workshop evaluation)	Descriptive statistics	Research diary Testimonials Focus groups Open-ended questions	
	Were the workshops of appropriate length and pace?	Post-training questionnaires	Descriptive statistics	Observation Research diary Feedback from external rater	

Table 5-16: *(Continued)*

Component	Research question	Quantitative data sources	Data analysis procedure	Qualitative data sources	Data analysis procedure
Process (continued)	How appropriate were the assessment methods used? Did the assessment methods provide sufficient information to draw conclusions?	Portfolio assignments	Descriptive statistics	Research diary Observation	
	What was the attendance?	Attendance registers	Descriptive statistics	Research diary Open-ended questions in questionnaires Focus groups	Qualitative descriptive analysis
	How did logistics affect the programme?	None	No statistical procedure	Research diary Focus groups Observation	Qualitative descriptive analysis
Output	How did the participants benefit in terms of the following? - Knowledge - Skills - Attitude	Questionnaires Portfolio assessments Attendance registers	Descriptive statistics Student-*t* test Regression analysis Exploratory factor analysis	Focus groups Research diary Testimonials	Qualitative descriptive analysis
Outcomes	How did the participants implement the strategies in the classroom? How did the participants experience the effect of the strategies on their learners?	None	No statistical procedure	Research diary Focus groups Informal discussions	Qualitative descriptive analysis
	Were the objectives met?	Compared the outcomes with the objectives. Required overview of entire programme			
	What was the cost-effectiveness of the programme?	Financial statements Attendance registers	Costs estimation	None	None

To determine the impact of the workshops the averages were calculated for the different year groups, as well as the confidence levels using the 'Students' t-statistic' (Leedy & Ormrod, 2005:274, 306), to assess the statistical significance of the difference between the two categories. These findings, together with the results obtained from the QUAL strand, were then integrated to develop a better understanding of the impact of the key parameters on the outcomes of the support programme, as well as the success thereof.

The impact of the workshops was evaluated by comparing three key findings for a range of different input parameters. The three key findings considered were the following:

- The increases in the scores for the questionnaires completed prior to and after each training session (referred to as "QuesGain" in the results tables)
- The average scores achieved in the post-training questionnaires by each teacher (referred to as "PostQues" in the tables)
- The average score awarded for the portfolios (referred to as "Portfolio" in the tables).

The variables were individually summarized in the data set. The relationship between variables (e.g. age, experience, and qualifications) was determined by correlating them with participants' performance in questionnaires and portfolios. Regression analysis and exploratory factor analysis (Montgomery, Peck & Vining, 2001:47) were employed to explore specific relationships obtained from the input parameters. The results obtained from the aforementioned key findings were assessed for different categories of the following input parameters:

- The basic qualifications of the participants
- The ages of the participants

- The years of experience of the participants
- The year of participation (which reflects the nature of the environment being semi-rural or urban)
- The number of workshop attendances.

Note that the latter parameter was personal and may be influenced by motivation and logistical arrangements, while the other parameters depended upon the selection of the group of participants.

For each workshop, knowledge gains were assessed by comparing the pre- and post-training scores. These knowledge gains were obtained for each group per workshop, but were also compared across the three workshops (per year), as well as across the two contexts to determine whether one context differed from the other. Data from different categories from pre- and post-training questionnaires were statistically analyzed to measure change in knowledge. Comparisons of mean scores between Q2 (4/6) and Q3 (5/7) and a *t*-test analysis (or analysis of variance) (Lange, Little & Taylor, 1989:881) indicated whether there was a statistically significant difference between the pre-test and post-test measures of the questionnaires. The statistically significant difference (*p*-value) implied that the changes that occurred were not due to chance factors. The *p*-value is concerned only with probability, and is not an indication of the importance of findings (clinical significance).

In the case of the portfolio data, all the scores in the portfolio assessment were calculated as a percentage, using a Microsoft Office (2003) Excel spreadsheet (Appendix 5F) (Leedy & Ormrod, 2005:274). Averages were calculated for the group and compared across portfolios and across contexts. The individual participant's performance was also related to performance in questionnaires. Results indicating the change in confidence levels were described for the group. Data sets from two

different sources (portfolio assessments and questionnaires) were also compared using regression analysis (Montgomery *et al.*, 2001:47), which sought to provide predictive values of gains made. For this purpose Microsoft (2003) Excel Add-in Tools were used to perform the linear regression technique (Montgomery *et al.*, 2001:46). For each linear regression, the regression coefficient was calculated, which provided an indication of the correlation between the two data sets: A regression coefficient close to 1 signified a strong correlation, while a value less than 0.5 showed that little, if any correlation existed. The quality of the quantitative strand of the research was determined by confidence levels that were derived statistically.

It is crucial that the cost effectiveness of the proposed intervention be assessed. Levin (2001) pointed out that every country invests huge amounts in education, and need to ensure that these investments are well-spent. A cost effectiveness analysis consists of a comparison of interventions based upon their costs and the outcomes generated by such interventions. These outcomes can be measured in a number of ways. This type of analysis should be distinguished from a cost-benefit analysis, in which both the inputs and the outcomes are measured in monetary terms.

In assessing the cost-effectiveness of the programme, it was necessary to attach a monetary value to a training event. This posed some challenges as training cannot easily be isolated from other variables (Kelly, 1993:5) and not all the outcomes were quantifiable (Levin, 2001:57). Notwithstanding, a financial model for this programme was developed to assess the cost-effectiveness of the CPD programme (Rae, 2002:176). The value of the repeated events was used to provide a standard of comparison between events.

It was necessary to assess the benefits of the programme, and then to compare that ratio with other norms used in the particular programme/organization (Weisbrod, 1962:106). In such an analysis, the cost of the different activities and inputs has to

be calculated. By implementing activity-based costing principles (Pineno, 2008:1369), the various cost drivers were identified and the costs of their contributions to the intervention was estimated. In the case of an educational programme, Issa (2006:19) suggested that the direct, indirect, setup and infrastructure costs, as well as the hidden costs, be included. Here, the direct costs reflected the actual cost of doing the work, the indirect costs reflect the overhead and operational costs of the organization, the setup costs account for the initial costs for developing the programme, the infrastructure costs include the costs of the facilities etc., and the hidden costs reflect the value of contributions in kind.

The inherent principles of the balanced scorecard model (Kaplan & Norton, 1992:71) were used to assess the outcome of the proposed programme, and considered the impact upon the clients (or learners), the processes, the human development perspective (i.e. the training of the teachers), and the financial impact of the endeavour. Measures (e.g. absenteeism, management time, and dealing with problems) were quantified and assigned an agreed value (Kelly, 1993:5).

(b) Qualitative analysis

All documents (including open-ended questions from questionnaires, focus group transcripts, diary entries, testimonials, and correspondence) were transcribed and entered in a database as 49 primary documents (PDs) within a single hermeneutic unit (HU). The HU includes all documents related to the research topic (Frieske, 2004:28) and is presented in Appendix 6A. There were 2,900 items coded with the ATLAS-ti data analysis tool (Thomas Muir Scientific Software Development, 2003-2004:28). By using Microsoft Excell as an organization tool 134 codes were grouped in 36 categories, which in turn were organized as 9 themes. These themes were

used to answer 9 of the 11 research questions[12] that were assigned to the four components of the Logic Model framework (refer to Appendix 6B re the code structure for analyzing the qualitative data). The last two questions were answered by quantitatiave data and a holistic view of all other questions).

The researcher identified units that were relevant to answering the research questions (Ryan & Bernard, 2000:781) and were coded with the ATLAS-ti software suite (Thomas Muir Scientific Software Development, 2003-2004), and categorized. After having reviewed these categories, the major themes were identified and placed within the Logic Model framework to answer the various research questions. By using ATLAS-ti (Thomas Muir Scientific Software Development, 2003-2004) it was possible to count the occurrence of the codes (enumeration) to determine the prominence of the various categories.

The parallel analysis of QUAN and QUAL data provided a richer understanding of the variables and their relationships, but limited the investigation to a single type of analysis. The data was displayed separately (QUAN and QUAL) to answer each research question.

Throughout the process it was necessary to determine to what extent the quantitative and qualitative inferences confirmed each other, as well as to determine whether similarities and differences existed across levels of analyses (Creswell & Plano Clark, 2007:106). Therefore, the data were explored further and transformed to allow the simultaneous analysis of the two data sets (Tashakkori & Teddlie, 1998). Following the initial analysis, the qualitative data (codes) were converted to quantitative data by reducing the data to numerical information consisting of three dichotomous categories (Creswell & Plano Clark, 2007:138). All coded items were

[12] Although eleven research questions were addressed in the research, only nine were assessed with the use of mixed methods. The remaining two of the eleven questions answered the questions on whether the research objectives were met and what the cost-effectiveness of the programme was.

binarized in an Excel spreadsheet according to the following values:

- 0 = not applicable;
- 1 = neutral value that referred to comments, reflections, comments;
- 2 = positive value, which confirmed the research question;
- 3 = negative value related to critique, or recommendations for improvement. The negative value could imply that the research question was refuted.

The frequencies of the various values were calculated and categorized, and were compared with those of the quantitative strand. The quantified QUAL data were summarized and presented on three levels (refer to Appendix 6B): on theme level (depicted in Table 1, Appendix 6B), category level (depicted in Table 2, Appendix 6B), and in specific cases on a code level (Table 3, Appendix 6B). Results from the two strands of the research were integrated by means of a matrix (Creswell & Plano Clark, 2007:140). The interpretation of the inferences was then subjected to a validation process (Onwuegbuzie & Teddlie, 2003:378) before final conclusions could be drawn.

(c) Integration of QUAN and QUAL

Figure 5-13 illustrates the integration strategy used for the data analysis in the study. The data (QUAN and QUAL) were displayed separately to answer each research question. Comparisons could be made by examining the similarities of the quantitative and qualitative data in the discussion of each research question (Creswell & Plano Clark, 2007:140). This implied that the statistical results were reported but simultaneously specific quotes or information about a theme that confirmed or disconfirmed the quantitative results was provided. The legitimating process is expounded in the next section.

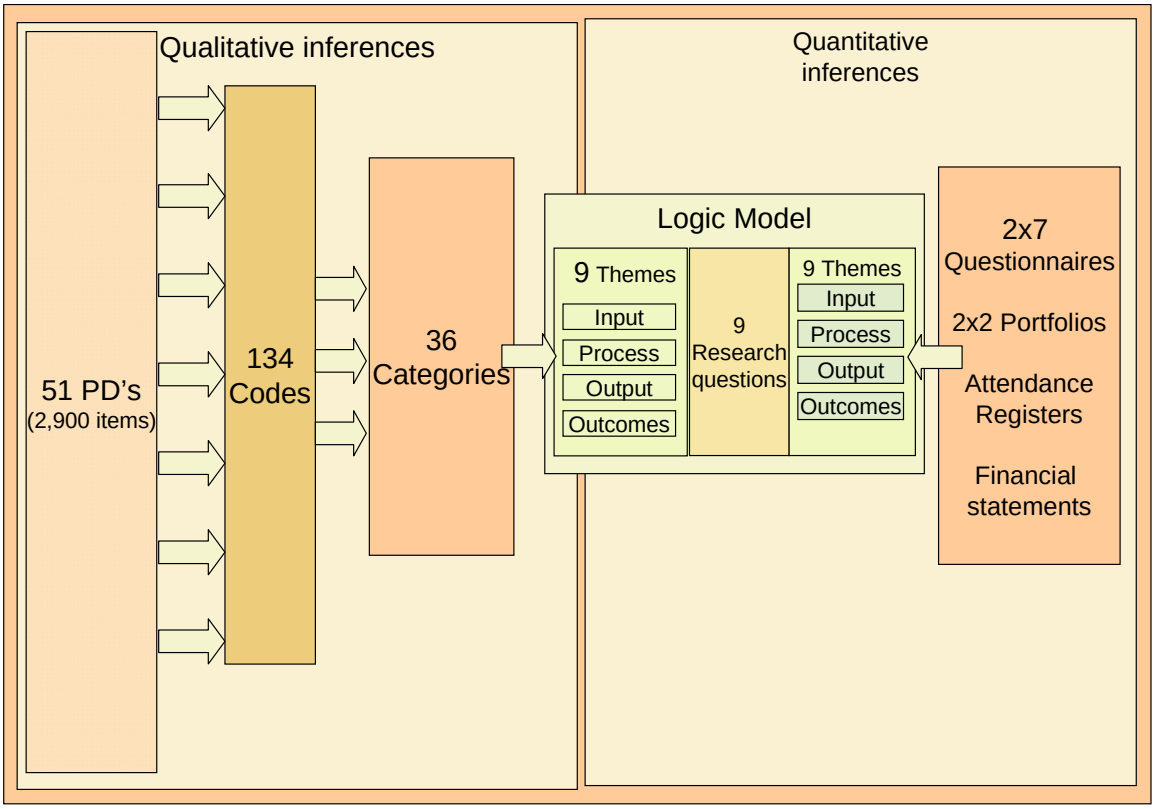

Figure 5-13: Integration of data obtained from the two strands of the research

5.5.4 Legitimizing the research

The process of legitimizing the research (which is the mixed methods nomenclature for validity, reliability, and trustworthiness) determined quality (Onwuegbuzie & Johnson, 2006:55; Stake & Thrumbull, 1982:31; Teddlie & Tashakkori, 2003:37, 42).

(a) The three processes determining the value of the research

The aspects that were considered are presented in Figure 5-14 and are discussed as follows:

(i) Methodological rigour

The methodological rigour (also know as design quality) was concerned with the application of method, and provided the standards for the assessment of this evaluation (Teddlie & Tashakkori, 2003:40).

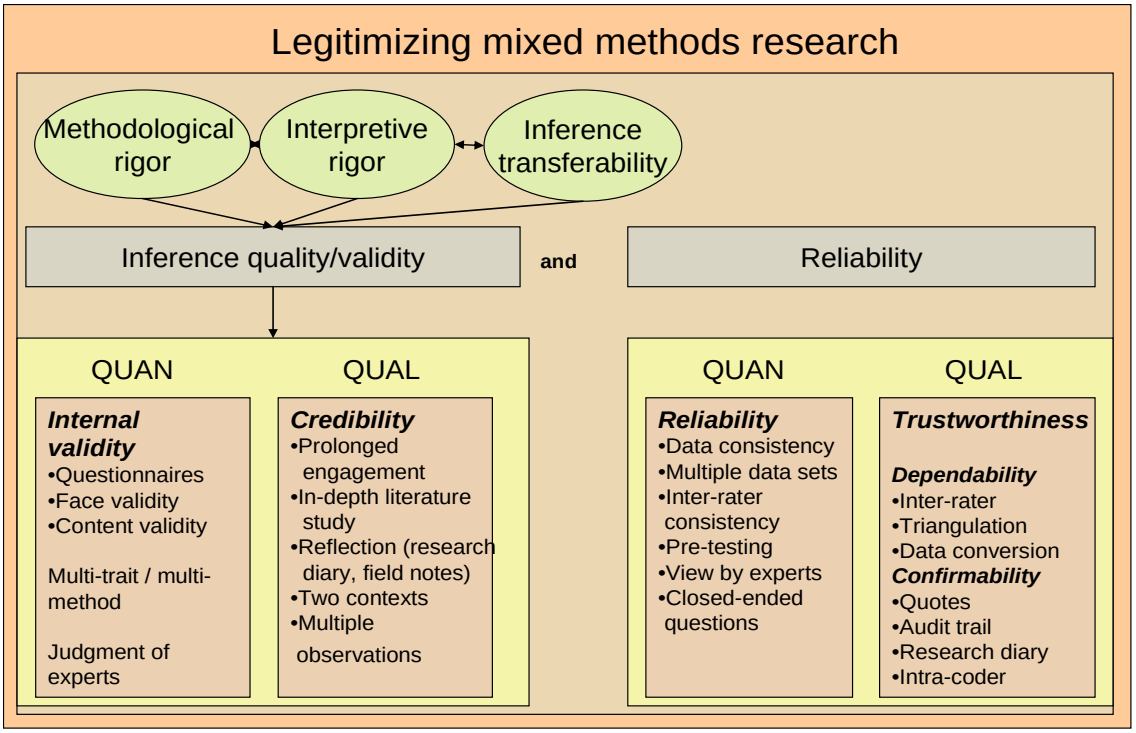

Figure 5-14: Aspects related to the legitimization of the research

Aspects such as 'within-design consistency' and 'design suitability' were considered. To determine the *reliability of the design*, the methodological rigour was also obtained through legitimating sample integration. In this study, the sample sizes of the qualitative and quantitative research were not constant throughout the data collection process. In the quantitative strand, the questionnaires were used for the full sample of 48 (96 in both contexts), but in the qualitative sample, a much smaller group of 12 participants were selected (non-randomly) from the original sample for the focus groups in a nested design. It had to be determined whether the qualitative sample, which was non-representative, had an effect on the quality of the meta-inference, as it could affect transferability.

From a statistical point of view, it is preferable to compare similar samples, and therefore the relatively small sample in the focus groups was compensated for by the data obtained from the open-ended questions in the questionnaires. In addition, a sufficient number of eight focus groups were conducted over the two years, which

created an adequate database and provided thick descriptions. The assumption is that if the inferences obtained from both the quantitative and qualitative strands are the same, then the quality of the meta-inference is high. The possibility of generalizing the findings therefore depended on the quality of the meta-inference obtained from the study (Onwuegbuzie & Johnson, 2006:53).

(ii) Interpretive rigour of the study

Interpretive rigour was ensured by conceptual consistency (consisting of both cross-inference consistency and theoretical consistency), interpretive agreement, and interpretive distinctiveness (Teddlie & Tashakkori, 2003:41). Conceptual consistency was ensured by triangulation when the inferences drawn from the two strands could be compared and converged to answer the research question. Theoretical consistency was ensured by relating the inferences to the literature. In order to ensure interpretive distinctiveness (Onwuegbuzie & Johnson, 2006:48) rival inferences had to be ruled out and, when this was not possible, the researcher had to provide plausible explanations.

The inferences obtained from both strands, as well as the integration thereof, were scrutinized by two experts (Johnson & Christensen, 2004:141) and confirmed by feedback (Leedy & Ormrod, 2005:100). Prolonged engagement and multiple measurements enhanced the inference quality (Johnson & Christensen, 2004:141) as the researcher was involved with the two contexts over a period of two years, and multiple sets of data were collected in six research units.

The combination of inferences from the qualitative and quantitative phases of the study raised the question of how the researcher could accurately present both the insiders' view ('emic' view) and the observer's objective view ('etic' view) (Johnson & Christensen, 2004:255). Following the focus group meetings, the 'etic' view of the researcher had to be justified with an 'emic' view from the assistant moderator (who

completed a summary sheet (refer to Appendix 5G) and provided quoted examples in support). This summary was presented to the group for verification at the conclusion of the focus group, and the group agreed that the information was accurate and that it could be used for the research. This method differed from conventional member checking (Creswell & Plano Clark, 2007:196) in that it was done directly after the focus group, and not as a completed final report at a much later stage. This adapted form of member checking was a practical measure to save on cost and to make it more convenient for the participants in terms of time. The completed report was discussed with the district facilitators, which was more practical at the time than convening with the participants.

To justify the meta-inference of the study, two research experts outside the study reviewed the qualitative and the quantitative findings, as well as the integration of the two strands, and agreed by feedback that it was plausible (Creswell & Plano Clark, 2007:196).

(iii) Inference transferability

Inference transferability is related to the external validity of the research, and is concerned with the extent to which the research findings can be generalized to other people, contexts, times, and outcomes (Johnson & Christensen, 2004:255). The three strategies employed to obtain external validity included conducting the research in a real-life setting, replicating the research in two different contexts (semi-rural and urban), and taking a representative sample from the schools included in this context (Leedy & Ormrod, 2005:99). From practical experience it is known that schools usually have 3 - 4 classes in each grade level. The selection of one representative from each grade level in each school provided a sample consisting of approximately 25% of foundation phase teachers from the schools included in the study. The sample was therefore selected to be representative of a limited number

of schools in a specific context.

Although the use of non-probability sampling affected the inference transferability of the results, its potential was not entirely excluded. Teddlie and Tashakkori (2003:42) believe that any inference has some degree of transferability. Mixed methods inferences are more transferable than inferences made from either QUAN or QUAL components (Onwuegbuzie & Johnson, 2006:57). Stake and Thurnbull (1982:1) described the concepts of *naturalistic generalization* as a way of making rough generalizations when non-random samples were used. They were of the opinion that it is possible to generalize to other people, settings, times, and treatments, provided that the delineators were similar to the original study. As was previously discussed in Section 5.3.4, the socio-economic profile of the research was comparable to the rest of the country, which allow rough generalizations to be made.

In order to generate a meta-inference in the study, it was necessary to first determine the inference quality of both the QUAN and QUAL strands independently (also known as *multiple validities legitimation*) (Onwuegbuzie & Johnson, 2006:59). The evaluation of inference quality in this case is internal validity (a term used in quantitative research) and credibility (a term commonly used in qualitative research).

(b) Inference quality

The three processes discussed above (within-design consistency/methodological rigour, interpretive rigour, and interpretive transferability) (Onwuegbuzie & Johnson, 2006:53) determine the design quality ('inference quality') (refer to Figure 5-14). In this thesis the term 'inference quality' is used when referring to 'validity' because it provides a common nomenclature when combining qualitative and quantitative research (Onwuegbuzie & Johnson, 2006:53; Tashakkori & Teddlie, 2003b:35).

(i) Internal validity

To determine the internal validity (quality of the quantitative strand) of this study, the "…alternative plausible explanations of the results had to be ruled out, controlled for, or eliminated" (Onwuegbuzie & Johnson, 2006:48). The quantitative strand of the research included a one-group 'pretest-posttest' design, which in itself was subject to a number of threats to the inference quality (internal validity). It was necessary to statistically analyze this threat directly in order to determine whether it actually operated in the study.

To ensure the validity of the questionnaires, the questionnaires were designed as accurately as possible to ensure that they would measure what they were supposed to measure (McMillan & Schumacher, 2006:194). Several steps were taken to ensure validity in the quantitative strand of the research. Face validity of the questionnaires was obtained from pre-testing, and the opinions of three potential participants who were not included in the study. A positive reaction to the questionnaires would ensure cooperation from the participants (Leedy & Ormrod, 2005:92), which could affect other types of validity and reliability.

To ensure content validity, two expert professionals in the field checked the phrasing of questions and the assignment of items. Furthermore, the questions asked in the questionnaires were pertinent to the study's objectives. Close consultation with a statistician at the Department of Statistics of the University of Pretoria ensured that the questionnaires were adequately compiled for statistical analysis. Although content validity is not a scientific indicator of a measuring instrument's accuracy, it does provide a good foundation for validity.

(ii) Credibility

Inference quality (internal validity) in qualitative research is considered to be research that is plausible, credible, and trustworthy, which in turn makes it defensible

(Johnson & Christensen, 2004:249). Qualitative data provided insight into the context and a better understanding of the participants' perceptions and experiences in the two contexts. A sample size of 96 for open-ended questions in the questionnaires was considered adequate to control the extraneous variables, and behaviour towards all respondents was kept constant. This sample size augmented and supported the much smaller sample size used in the focus groups. An attempt was made to limit attrition by offering certificates to those participants who cooperated fully and completed the programme (Struwig & Stead, 2001:139).

Qualitative research is vulnerable to researcher bias. This problem was minimized by consciously reflecting on potential biases and predispositions by keeping a research diary. To obtain descriptive validity of the focus group meetings (Johnson & Christensen, 2004:250), the researcher made extensive use of the assistant moderator (refer to Paragraph Q) to record and describe the participants' behaviour during the focus group meetings. Furthermore, the authenticity of the focus group summaries was verified by reading the summaries of responses to each question in the focus group schedule back to the group for confirmation (member checks) at the end of each topic.

After each focus group discussion, the two facilitators convened to correlate and compare their impressions and procedures. Agreement was reached by cross-checking the observations of the researcher (the moderator) with that of the district facilitator (the assistant moderator in the focus group). The transcripts from focus groups were subjected to inter-rater validity (Leedy & Ormrod, 2005:100) with 80% agreement of coding.

Validity and reliability were increased through triangulation where focus group data were corroborated by various other data sources (e.g. testimonials, correspondence, research diary entries, and field notes), and also by using various methods (Babbie

& Mouton, 2002:275). Triangulation required of the researcher to act as 'detective" (Johnson & Christensen, 2004:141), to carefully consider cause and effect, and to systematically eliminate alternative explanations. This was made possible by use of other data sources such as field notes, diary entries, personal communication, and correspondence (refer to Table 5-4). In addition, thick descriptions were used to explain the context, allowing the reader to draw his/her own conclusions from the data presented (Leedy & Ormrod, 2005:100). Quantifying the qualitative data (refer to Section 5.5.3(b)) enriched meaning when used in addition to the narrative description of themes (Johnson & Christensen, 2004:141).

(c) Reliability

Because validity is not possible without reliability (Leedy & Ormrod, 2005:29) (refer to Figure 5-14), this issue was addressed for both the quantitative and qualitative strands in the following manner:

(i) Reliability in the quantitative research

In order for the measuring instruments to be considered reliable, the test scores had to be accurate, consistent, and stable (Struwig & Stead, 2001:130). Measures that improved reliability in this study were consistency over time, internal consistency, and inter-rater consistency (Struwig & Stead, 2001:230).

Data were collected in three research units per year, which yielded multiple data sets for each participant over time. This in turn allowed participants to be their own control and therefore increased the reliability of the results. Internal consistency was reached through pre-testing of the questionnaire and reviewing by experts to ensure that questions were clear and not potentially confusing. Error variance was limited by ensuring that the assessment procedures were comprehensive and instructions were clearly understood. To limit the time of completion, dichotomous items (yes/no

or true/false) and checklists were included.

A sufficient number of closed-ended questions provided a way for the respondents' expectations to be clearly spelled out, which contributed to the questionnaire being more reliable and consistent (Fink, 1995:33). Consistency was maintained by using a rubric (Appendix 5F).

The participants were motivated to complete the questionnaires once they understood the purpose of the questionnaires. Certificates from the University of Pretoria were offered as an inducement to complete the programme by attending the three workshops, and to comply with all data collection procedures.

(ii) Dependability and confirmability in the qualitative strand of the research

As the constructs of *dependability* and *confirmability* (Johnson & Christensen, 2004:141) are of concern in qualitative research, the entire research process was documented in a research diary. The researcher made use of extensive quotes to confirm inferences made when writing the report. Transcriptions of primary documents are presented as an audit trail (refer to Appendix 6A) to provide a measure of internal reliability (Johnson & Christensen, 2004:141).

Dependability and conformability were also enhanced by the inter-coder and intra-coder text analysis described in the previous section. . Trustworthiness in terms of external reliability was further established by providing details of all the participants with regard to age, demographic information, and educational settings (Naudé, 2005:181).

5.5.5 Section summary

The implementation phase consisted of the data collection (Step 9), data analysis (Step 10), and validation (Step 11) of the findings. The data collection and analysis

procedures were conducted separately for each of the two strands of the research. Integration (Step 12) was obtained by transforming the qualitative data to numerical values (quantification) and by comparing the inferences.

5.6 Conclusions

The renewed emphasis on accountability of educational programmes requires that CPD programmes for teachers be evaluated for quality. This chapter formulated a research model used for the development and evaluation of a support programme for foundation phase teachers. A programme development model was used as basis to cater for the initial formulation, followed by the implementation of the programme and finally the evaluation. The complex nature of the research environment requires the use of both quantitative and qualitative research methods. A mixed method approach was therefore used for evaluating the results. The questions to be answered in the evaluation of the programme were placed within the Logic Model framework to provide a holistic view of the programme and a systematic analysis of the proposed CPD programme.

5.7 Appendixes

These appendices are available on the separate Compact Disk.

Appendix 5A *Components of the questionnaires*

Appendix 5B *Workshop questionnaires*

Appendix 5C *Letters for informed consent*

Appendix 5D *Letter to the donor*

Appendix 5E *Portfolio assignments*

Appendix 5F *Rubrics*

Appendix 5G *Focus group schedules and summary sheets*

Appendix 5H *Learning support material*

Chapter 6 Results and discussion of the input component

"…all research is a practical activity requiring the exercise of judgment in context: it is not a matter of simply following methodological rules"

(Hammersley & Atkinson, 1994: 23)

Aim of the chapter

The aim of this chapter is to describe the input component of the continued professional development (CPD) programme by answering specific research questions. The topics covered in this chapter are depicted in Figure 6-1.

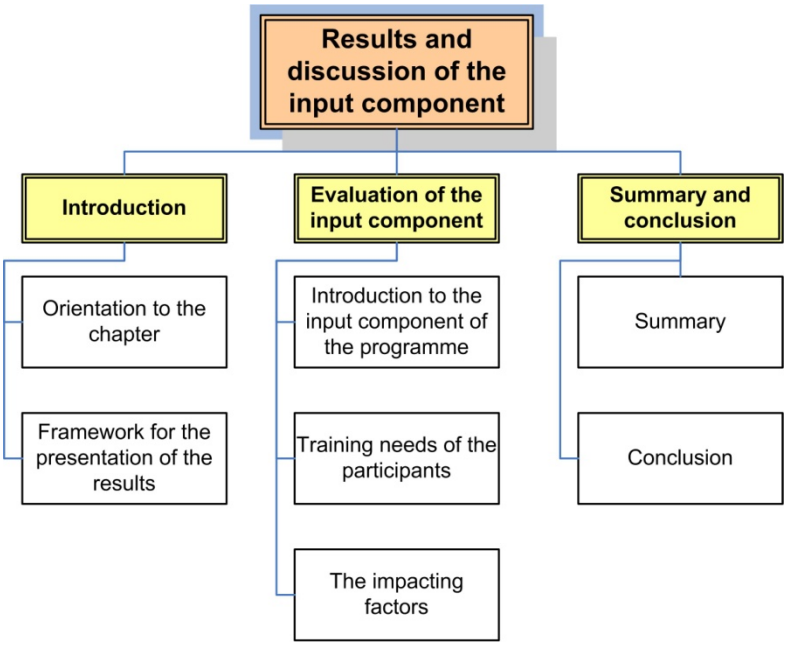

Figure 6-1: Outline of the chapter

6.1 Introduction

6.1.1 Orientation to the chapter

Evaluation of educational programmes ensures quality and strengthens educational interventions (Crouch, 2008:1). Programmes are evaluated mainly with the purpose of improvement (Patton, 2003:223) and therefore evaluation was an intrinsic part of the development process of this particular continued professional development (CPD) programme. The development process encompassed an early development phase that was followed by an advanced development phase (refer to Figure 1-5). The early development phase of the CPD programme was addressed within the input component of the framework, whereas the advanced development phase was evaluated within the process, output, and outcomes components (refer to Section 4.3.1) (Coffman, 1999:322). The aim of the research was to determine the value of this specific CPD programme and the research question was answered by systematically addressing the various sub-questions in a chronological order within the Logic Model framework (refer to Section 4.3.1).

6.1.2 Framework for the presentation of the results

Quantitative and qualitative data were collected and analyzed concurrently and the inferences were converged within the 'triangulation convergence design' (Creswell & Plano Clark, 2007:119). This chapter presents the results obtained from both quantitative and qualitative strands of the research, hence referred to as the QUAN and QUAL strands (Onwuegbuzie & Collins, 2006:1; Teddlie & Tashakkori, 2003:8). In some cases, however, only one of the strands was available due to the nature of the topic, and in those cases the respective data set was accepted as being sufficiently representative. A dictionary of all codes is presented as Appendix 6C

and a list of all codes with accompanying quotes is presented in Appendix 6D, which can be used to track categories alphabetically with their accompanying quotes and data sources. The text is further enhanced by digital photographs (see Appendix 6E). In an effort to elucidate the QUAL strand while maintaining the flow of the discussion, selected quotes are presented as footnotes. For ethical reasons not all the data could be used to answer the research questions that were assigned to the 'process', 'output', and 'outcomes' components of the programme as data were also collected from trainees who attended workshops without signing of informed consent at the onset of the programme. The research therefore focused primarily on those participants who signed informed consent and participated in all activities of the programme ("core group"), and only compared their results with the entire group when necessary.

The evaluation of the CPD programme is conducted by systematically answering the research questions. In answer to each research question the qualitative inferences are discussed first, followed by a discussion of the relevant quantitative inferences, to finally be converged and integrated (refer to Figure 5-6 in Section 5.3.1). In the conclusion of each of the four components of the evaluation framework a critical assessment and summary of the results are provided. This chapter evaluates the CPD programme by answering those questions grouped within the input component of the Logic Model framework.

6.2 Evaluation of the input component

6.2.1 Introduction to the input component of the programme

The questions in the input component are presented in Table 6-1[13].

[13] The electronic version of this thesis is hyper-linked. Press 'control + left click' for quick access to paragraph.

Table 6-1: Questions posed to evaluate the input component of the programme

Research question	Aspects assessed	Par no
Question #1: What were the participants' training needs?	Need for competence Need for support Need to implement the NCS Previous support	6.2.2
Question #2: What was the impact of the prevailing factors on the proposed programme?	Input strengths Input challenges: - Context - Language - Learners	6.2.3 6.2.3(b)

6.2.2 Training needs of the participants

The training needs were addressed by both strands of the research.

(a) QUAL strand: Training needs

The QUAL strand of the research indicated that the participants did not feel comfortable implementing the NCS and therefore expressed a need for training and support[14] (n=299) (refer to the theme 'training needs' in Table 1, Appendix 6B). The following needs were identified, namely to 'increase competence' (n=96) and to 'implement the NCS' (n=32) in terms of listening and language skills (with specific reference to the language required for numeracy), as well as a 'need for support' (n=148). The participants' need to increase their 'competence' (refer to Table 3 in Appendix 6B) implied a need for more 'experience' and 'knowledge' so that they could support all their learners ('learner directed') with more 'confidence'.

Educators are expected to become specialists in their subject fields with sufficient knowledge and skills to teach the NCS (Du Toit *et al.*, 2002:158), which causes many teachers to feel vulnerable and unsure. The participants' need for support may

[14] (to)… 'be empowered in teaching foundation phase, especially with the new curriculum system' (Line 48, Un-tabled Open questions Form 1 registration)

I want knowledge on what I teach and my learners to understand and have confidence in what they've been taught (Line 52, Un-tabled Open questions Form 1 registration)

reflect their perception that they cannot meet these expectations (Gouws & Dicker, 2006:416).

(b) QUAN strand: Training Needs

A lack of confidence in meeting the requirements of the NCS was also evident from the results obtained in the QUAN strand of the research, which further elucidated the participants' training needs. Figure 6-2 depicts the participants' confidence in facilitating the components of literacy and numeracy in the foundation phase curriculum prior to training, whereas Figure 6-3 is a comparison between the participants in the two contexts (semi-rural and urban). Figure 6-2 shows that only 34% of the participants felt confident in facilitating the skills required for literacy and numeracy at the onset of the programme while the remaining 66% were uncomfortable or unsure.

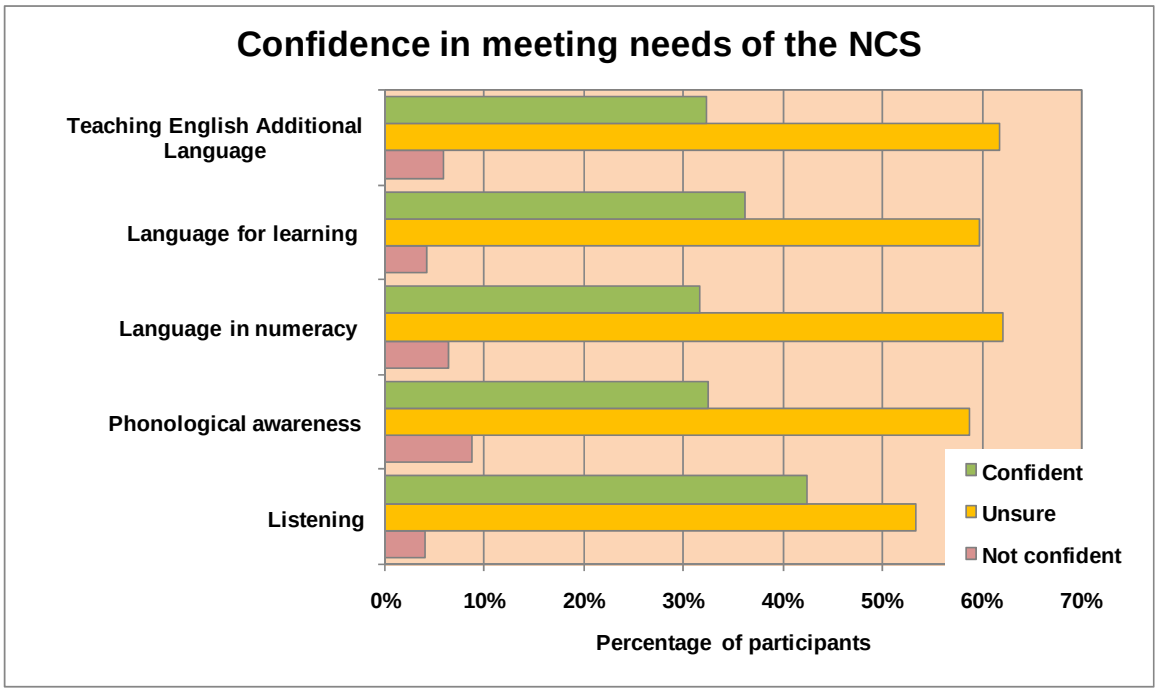

Figure 6-2: Confidence of teachers in meeting the various aspects in the NCS

Similar results were obtained across the two contexts (refer to Figure 6-3) as only 35% of the participants were confident in meeting the requirements of the NCS,

indicating that 65% required additional support. The validity of the findings was high as the results from the two contexts were similar (refer to Figure 6-3). Considering the relationship between between teachers' self-efficacy and learners' performance (Gibson & Dembo, 1984:581) it is understandable that performance is unacceptably low.

The participants expressed a need for professional development activities that could help them become more competent in implementing the NCS. These findings are verified by those of McDonald and Van der Horst (2001:1 in Gouws & Dicker, 2006:419).

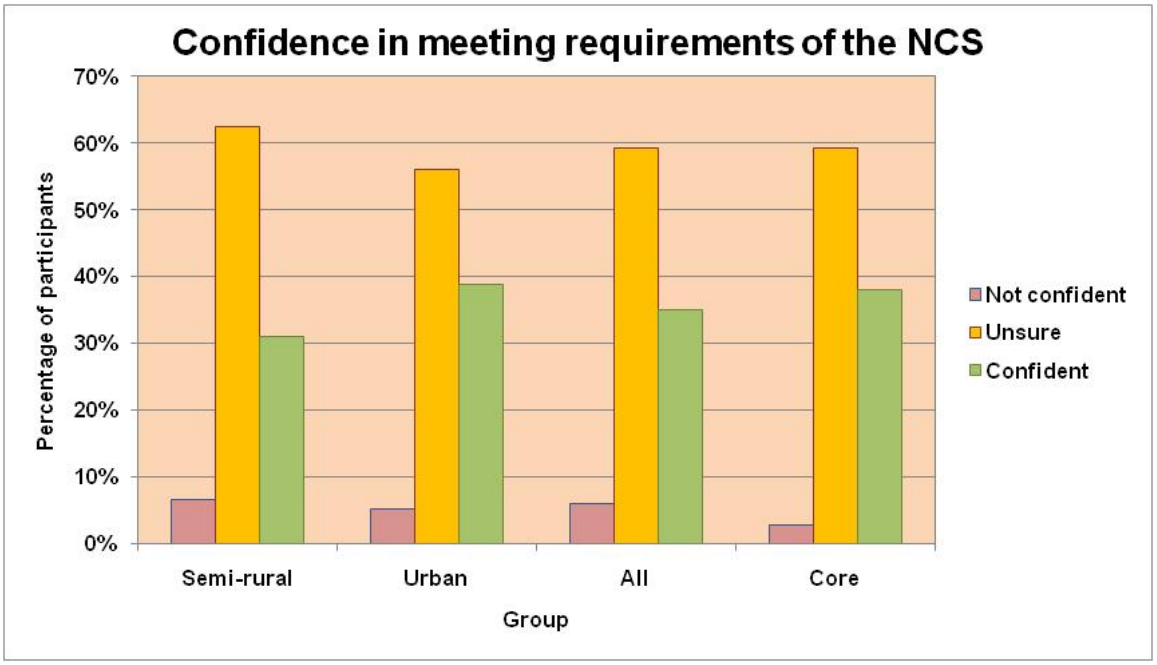

Figure 6-3: Comparison of confidence levels in facilitating the NCS between the participants in the two contexts

The need for support was more pronounced in the semi-rural context (67%) than in the urban context (55%). The qualitative and quantitative inferences drawn confirmed that many of the participants had received prior support, but analysis of the QUAN results indicated that the urban context received more support than the semi-rural context (refer to Table 6-2), which explains the findings.

Table 6-2: Comparison between the two contexts with regard to previous support

Prior to training (workshops)	Semi-rural (n=48)	Urban (n-48)
Quantitative strand	60%	76%

The need for support in the semi-rural context may have been more pressing as participants received less previous support than those in the urban context. Previous research (Taylor & Vinjevold, 1999c:142) reported that teacher support had a significant effect on their conceptual knowledge. It is possible that the participants in the urban setting were more familiar with terminology and information explained in the workshops than their colleagues in the semi-rural areas, who had received less support. As the country is redressing past inequalities, such results have implications for future planning (refer to Section 1.1.1.) (Department of Education, 1995:11). The participants had to indicate their preferene in the manner of support they required, which is illustrated in Figure 6-4.

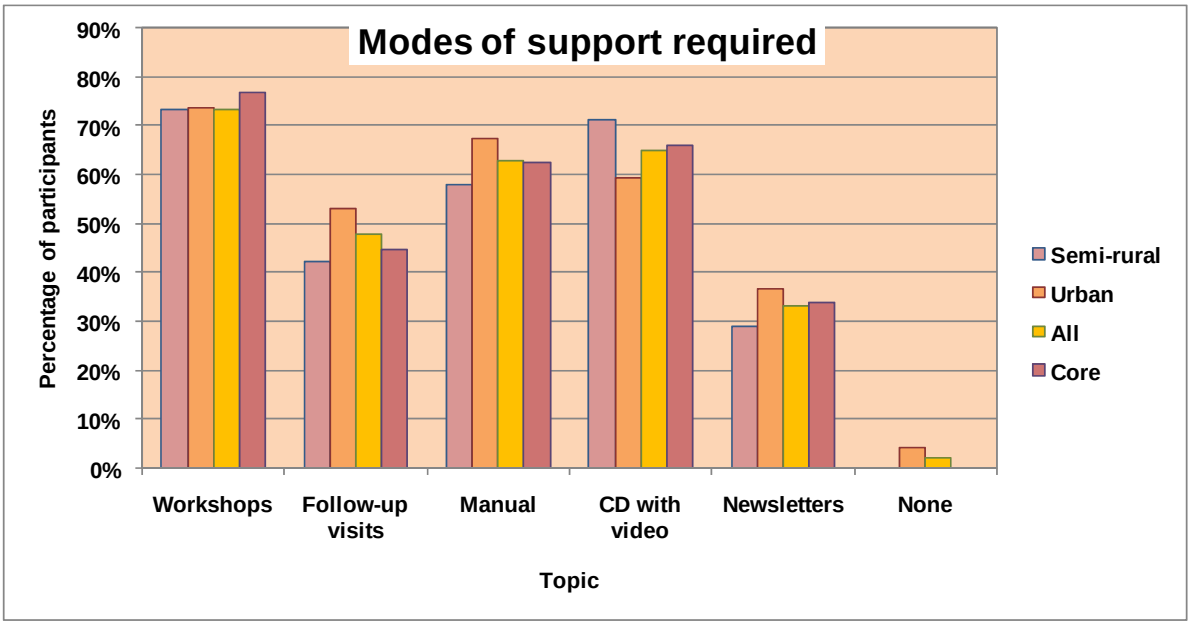

Figure 6-4: Modes of support required

The results show (refer to Figure 6-4) that the participants preferred workshops (training component), training support materials, and follow-up visits (mentoring

component) as modes for support. These preferences guided the trainer/researcher in the development of this CPD programme to include a training component and a mentoring component.

(c) Convergence of results: Training needs

The convergence of the results as depicted in Table 6-3 shows that both strands of the research concur in terms of the participants' need to increase their competence and to implement the NCS.

Table 6-3: Convergence of inferences with regard to training needs

Component	Question	Aspects assessed	QUAL	QUAN (n=96)
Input1	What were the participants' training needs?	Need for competence	98%, n=96	66%
		Need to implement the NCS	81%, n=32	65%
		Need for support	91%, n=23	65%
		Previous support	91%, n=23	68%

Both strands of the research indicated a need for support, notwithstanding the support (e.g. workshops) that most of the participants (>68%) had received previously (refer to Table 6-3). These results answered the first research question and justified the development of this CPD programme. The need for training in the NCS is not specific to the contexts of the current research, but has been identified as a national priority as it was cited as one of the reasons for the poor performance of South African learners (Govender, 2009:9).

6.2.3 The prevailing factors that impacted on the programme

(a) Input strengths

Two factors that had a positive impact on the programme were the infrastructure provided by the Department Communication Pathology (of the University of Pretoria)

and the institutional support provided to the trainer by the Gauteng Department of Education (GDE) (n=19) (refer to theme 'input strengths' in Table 1, Appendix 6B). Collaboration with the GDE was established on provincial level (GDE), district level, and school level. Collaboration at the provincial level paved the way for the roll out of the programme as training times were negotiated with the trade unions, and district facilitators were assigned to support the trainer/researcher with the logistical arrangements. The district facilitators also provided input in the workshop material and supported the trainer/researcher in the research. Diary entries confirmed the hospitality of the schools,[15] which ensured more effective implementation of the programme. The time and effort spent on the preliminary phase of the programme were worthwhile and ensured the smooth implementation of the programme.

(b) Input challenges

A number of factors that may have impacted negatively on the programme were also identified. The QUAL strand identified challenges (n=174) with regard to the learners, the context in which education is provided, and the qualifications and language use of the teachers (refer to theme 'input challenges', Table 2, Appendix 6B). The inferences drawn from the first three challenges were obtained from qualitative data only, but the use of language in the programme was informed by both strands of the research.

(i) Learner-related challenges

The participants expressed a need to be competent in order to support *all* learners (refer to Section 6.2.2) because they were particularly concerned about learners who experience *'barriers to learning'* or who have *'special needs'* (refer to Table 3 in Appendix 6B). The participants complained about learners' poor *'behaviour',* with

[15] * School was very hospitable and supplied water, cookies and Coke for the use of the presenter and GDE officials (Line 29, Diary entry 6 on the 21 July 2005)

resulting *'discipline problems'.* Large classes (e.g. reports were obtained of 60[16] or even 74 learners in a single class) could have been the cause of discipline and behaviour problems. This problem is not unique to this context, but is the reality of education in South Africa. Large class sizes is a problem to be addressed by Government (HSRC, 2006:2), but teachers should also be supported to manage large classes.

Some participants experienced difficulty in teaching learners who were not school ready (refer to codes 'school readiness' and 'difficult for learner/gap in learners' knowledge' in Table 3, Appendix 6B*).* The contexts of this study were comprised of low-income households (refer to Section 5.3.5) with limited access to learner support materials in homes and prevailing low literacy levels of primary caregivers (Howie, 2007, as quoted by Bateman, 2007b:1; Botha *et al.*, 2005:697; Howie, 2004:160). Learners from low-income and poverty-stricken homes are at risk of not being school ready when reaching school-going age (Department of Education, 1995:75; Winkler, 1998:55). A general delay in school readiness could cause delays in delivering the curriculum as considerable time is required to prepare such learners for formal learning.[17] When struggling to complete the curriculum within the specified period, teachers tend to either omit certain parts or rush through them. Either way, the learners fall further behind their peers. Learners' school readiness therefore affects both learning and teaching.

(ii) Contextual challenges

The following challenges to the programme with regard to the context were identified (refer to theme 'input challenges', category 'environment', Table 1, Appendix 6B)

[16] T: Yeah I think it was ..eh…eh…I had a problem with eh…..getting the learners attention. When I start doing my job... in the morning, I had this tension, because I am dealing with 60 learners (PD6, line 171, Focus group 1, 2006)

[17] "With the Gr 1 educators we are overloaded with more work, especially during the first term, because some of the learners are not from preschools. Do something". (Line 111, Un-tabled Open questions, Form 1 registration)

(n=53), namely classes being too large, lack of infrastructure (refer e.g. to PD 9, Line 184, Focus group 2 in 2006), limited resources[18], and underqualified teachers. Rembe (2005:3) reported that the underprovision of classrooms resulted in overcrowding in many township and rural schools. Limited infrastructure detracts the focus from teaching and learning (Adler *et al.*, 2003a:54). Such contextual challenges may cause low morale in teachers and even, in some cases, health problems[19] due to stress (Olivier & Venter, 2003:188).

The participants also complained about a shortage of teaching resources and stationery for learners. This necessitates learners to borrow from each other and to share, and results in noisy classrooms.[20] Resource availability may have an affect on the outcomes of the programme (Adler *et al.*, 2003a:58) as it slowed down the pace of teaching and inhibited the teachers to implement the strategies.

Participants currently in the system teaching Gr. R were not required to be professionally qualified and some had received very little training. As described in Chapter 5 (refer to Section 5.3.1.8) the training of 29% of the participants was not accredited by the GDE, which explains the low literacy levels of some of the participants as evidenced by the completed questionnaires and portfolio assignments.

The results show an improvement from the earlier audit of the ECD sector conducted in 2000 where 43% of ECD practitioners did not hold qualifications that were recognized by the Department of Education (Badroodien *et al.*, 2002:19). Du Plessis and Louw (2008:63) reported that only 12% of the teachers, who were primarily

[18] The problem is we do not have books to refer to like the pamphlet we got at the workshop (Line 131, Un-tabled open questions Forms 2&3)

[19] T: Yes Ma'm, it was tough. Today, I was teaching three classes. Sometimes I go to doctors saying to tell them that I was sick (Line 171, Focus group 1, 2006)

[20] I am experiencing problems with regard to LO 1. Learners find it difficult to adjust, most of without stationary and they disturb others hence there is noise in class (PD 54, Line 52, Un-tabled reflection of teachers in the 2006 listening & language assignment 2006)

Caucasian, in urban pre-schools in their study were not qualified. This difference may be attributed to previous inequalities in the education system.

(iii) Language-related challenges

The language used by the participants in the classroom (LoLT) presented a challenge[21] (n=68) (see category 'language', Table 1, Appendix 6B). The fact that the language used in the classroom was not necessarily the language of learning and teaching (LoLT) in the school[22] posed a challenge. Furthermore, the home language (L1) of the participants was not necessarily the same as the LoLT.[23] The results obtained from the QUAN strand illustrate the various home languages (L1) in the two contexts (refer to Figure 6-5), whereas Figure 6-6 shows the use of LoLT.

According to Figure 6-5 and Figure 6-6 the language use in these two contexts was diverse (Dyers, 2003:61; Naudé, 2005:29). In both contexts Northern Sotho as L1 was the most prevalent (>53%). Participants whose home language was isiZulu also used it as LoLT. In the semi-rural context 53% of the participants used Northern Sotho as L1, but only 40% used it as LoLT. This implies that 13% of the participants taught in a language other than their L1, as opposed to the township context where only 6% Northern Sotho L1 speakers taught in another language. These findings show an improvement from previous studies (Du Plessis & Louw, 2008:62; Setati *et al.*, 2003:77) which reported that teachers teaching in a language other than their L1 were quite common in the South African context.

[21] A.M: And the languages of these children? Are they all the same?

T: No, no, no, they are different languages. The others are Shangaan, but they press us to do Northern Sotho (PD6, Line 188, Focus group 1, 2006)

Informal settlements, its all, all…all nations are there. Ndebele, Zulu, Xosa, Swazi, Northern Sotho, Tswana. This inter-marriages, the mother talks to the children maybe Tswana, and then the father is a Zulu, and the father wants to say "I want my child to learn Zulu"

A.M: But are you...are your home languages the same as the school's LoLT?

T1: You know, the school has maybe three to four LoLT (PD6, Line 192, Focus group 1, 2006)

[22] I was thinking of those learners who are unable to show their potential because of the LOLT and you find the educator unable to code switch due to the limited vocabulary of other languages (Line 29, Testimonials from teacher support educators)

[23] T: The problem is the language, the language that I speak to them (Line 101, Focus group 2 in 2005)

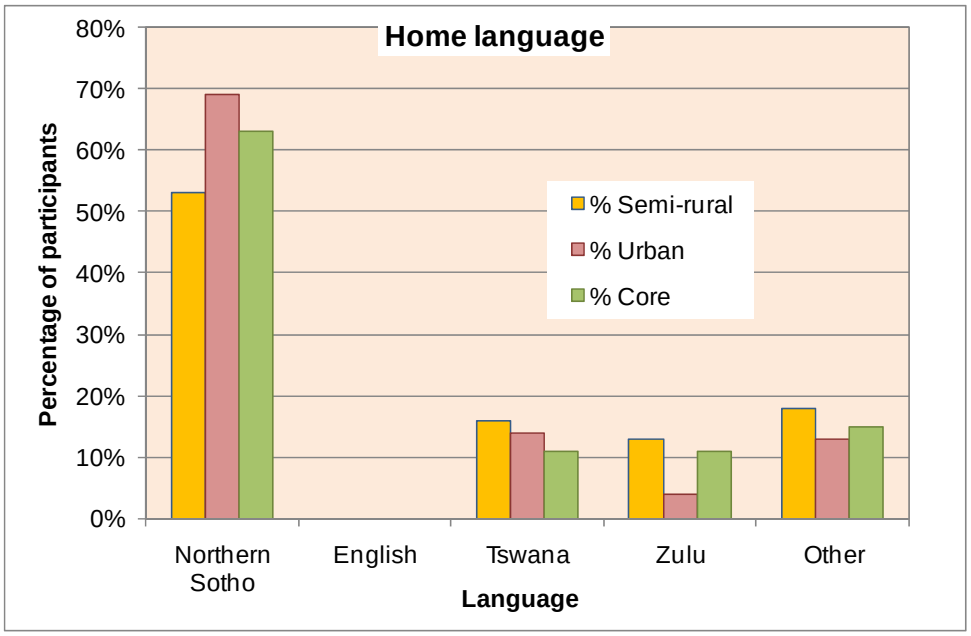

Figure 6-5: Various home languages in the two contexts and of the core group

Figure 6-6 shows the language of learning and teaching (LoLT) in both the urban and semi-rural contexts, as well as for the core group of participants.

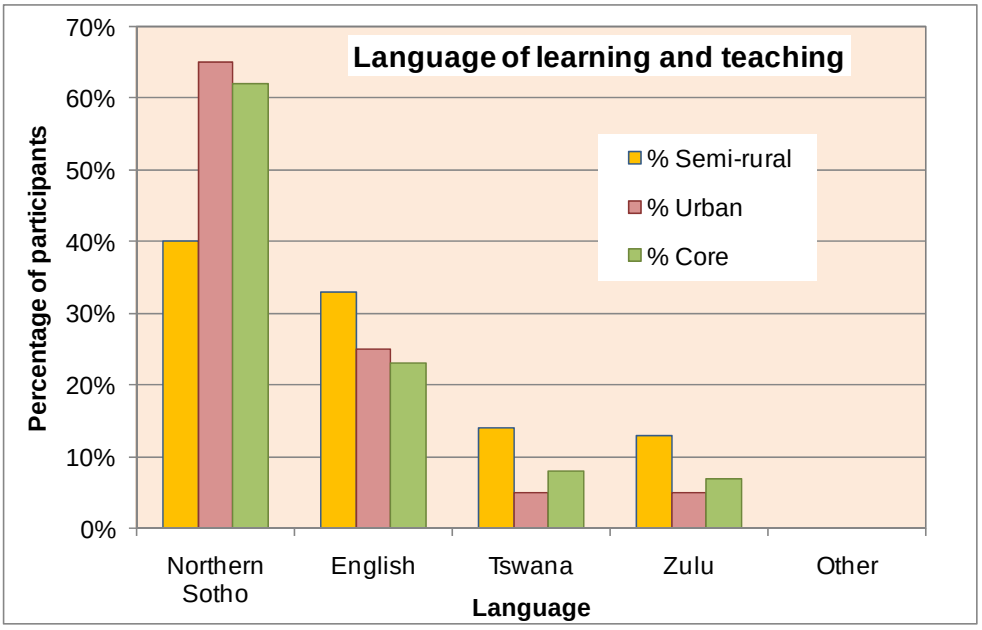

Figure 6-6: The language of learning and teaching in the two contexts and of the core group

Linguistic diversity, especially in the urban, densely populated context, can be attributed to the increased migration from rural to urban contexts following the 1994 elections. Migration has had an adverse effect on the language profiles of schools in

townships and informal settlements as these communities are no longer homogeneous (Pile & Smyth, 1999:314). Marriages between various cultures result in many households having more than one L1. In this case the linguistic diversity in the classrooms required some participants to use more than one LoLT and therefore some of them preferred to teach in English. The results (refer to Figure 6-6) show a higher prevalence of English as language of learning and teaching (ELoLT) in the semi-rural area (33%) than in the urban area (25%).

These results contradict previous research by Setati *et al.* (2003) who found that ELoLT was more commonly used in the urban contexts. This may be attributed to the fact that the semi-rural context had received less support than the urban context (refer to Table 6-2), specifically in terms of language policies and the advancement of best language practices. Teachers need to provide adequate language models for learners to follow and therefore the effect of ELoLT in these contexts (as used by teachers who are not necessarily proficient in English) may have significant implications for teaching and learning (Dawber & Jordaan, 1999:14).

Figure 6-6 shows that on average only 28% from the entire group used ELoLT in their classrooms across contexts. This implies that 72% of the participants used an indigenous language as LoLT. Setati (1999:317) reported a decade ago that all Gr. 1 teachers in Gauteng were using ELoLT. These findings were also recently confirmed by the Human Sciences Research Council (HSRC) (Kassiem, 2008:4) that reported that the demand for English as LoLT in the foundation phase has progressively decreased in preference for the L1 of the learner. It appears that the Language in Education Policy (Department of Education, 2002:1) is being implemented, and that efforts to promote the use of indigenous languages as LoLT in the foundation phase are successful.

Although none (0%) of the participants' L1 was English, they had to participate in the

CPD programme in English (refer to Figure 6-6). The raw data obtained from questionnaires, portfolios, and focus groups show that the participants' proficiency in English was mostly inadequate, which confirmed findings from previous studies in similar contexts (Du Plessis & Louw, 2008:63; Lemmer, 1995:88; Setati *et al.*, 2003:77). The participants' limited proficiency in English could be the reason for non-response in the questionnaires and portfolio assignments, or inhibited participation in focus groups (Lemmer, 1995:88).

Table 6-4 depicts the convergence of the two strands of the research with regard to the prevailing factors that may have impacted on the outcomes. These challenges were inherent to the education system.

Table 6-4: Convergence of inferences with regard to the prevailing factors

Theme	Category/Aspects assessed	QUAL	QUAN (n=96)
Prevailing factors	Input strengths	93%	
	Challenges related to the context	86%	
	Insufficient qualifications		26%
	Challenges related to the learners	54%	
	Challenges related to language use	75%	28% (ELoLT) 100% English L2

6.3 Summary and conclusion

6.3.1 Summary

The results in this chapter determined the participants' training needs, which confirmed the need for workshops. The Provincial and institutional support ensured the roll out of the programme. Several prevailing factors that could impact on the programme were identified, which were related to the participants, the context, the learners, and the use of language. The 'process component' of the CPD programme was evaluated next.

6.3.2 Conclusion

The detrimental effects of apartheid were still evident in schools in these contexts. The challenges currently within the system emphasize the need for support, but also for planning from Government. The South African education environment is complex and, together with the new requirements of the NCS, places high demands on teachers, which many find difficult to meet. There is a need for CPD programmes for foundation phase teachers that focus pertinently on the facilitation of listening and language, as well as the language for numeracy, which this study aimed to meet.

6.4 Appendix

These appendices are available on the separate Compact Disk.

Appendix 6A *Primary documents*

Appendix 6B *Code structure*

Appendix 6C *Dictionary of codes*

Appendix 6D *List of codes with quotes*

Appendix 6E *Digital photographs*

Appendix 6F *Memos noted in coding of primary documents*