Chapter 3 Components of the support programme

"Language is a tool for learning"

(Owens, 2001:4)

Aim of the chapter

The aim of this chapter is to describe the three components included in the continued professional development (CPD) programme for foundation phase teachers developed by this study, i.e. the training component (with specific focus on the areas of listening, language, and the language for numeracy), the mentoring component, and the practical component. The various topics addressed in this chapter are portrayed in Figure 3-1.

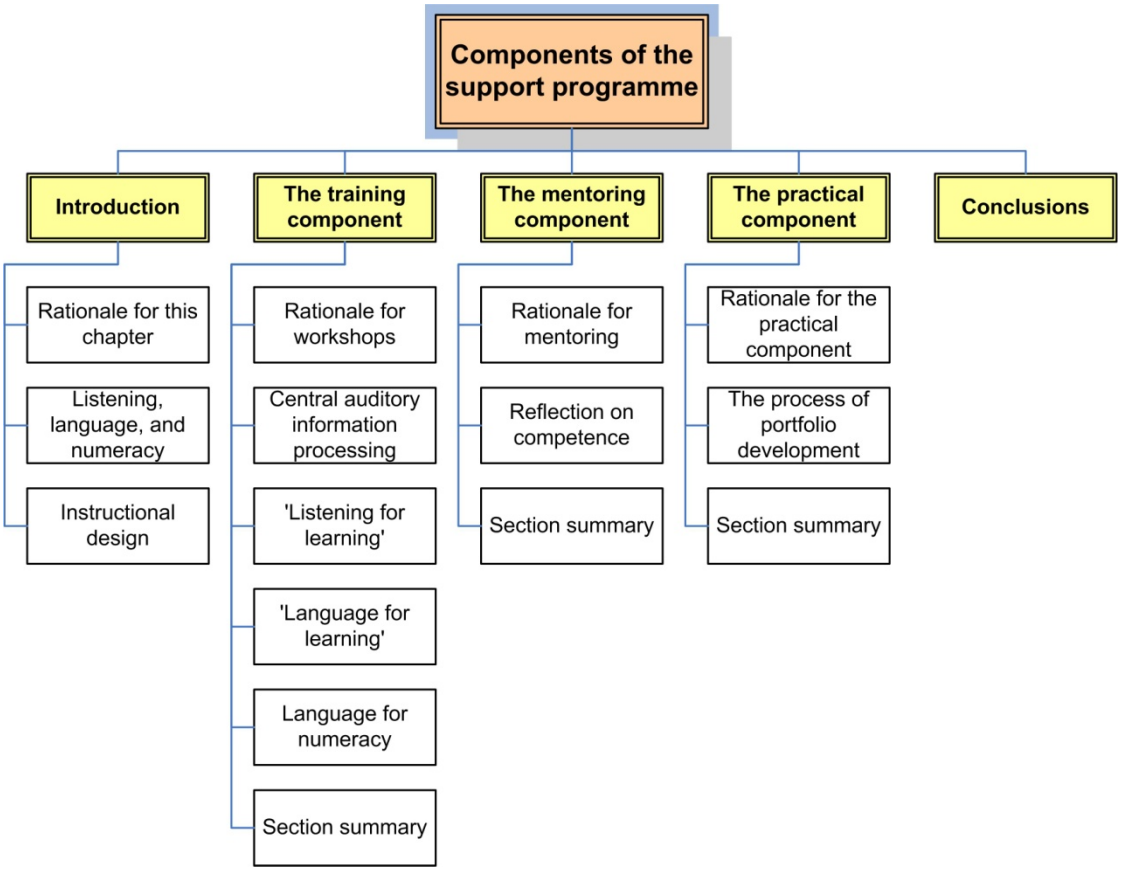

Figure 3-1: Outline of Chapter 3

3.1 Introduction

3.1.1 Rationale for this chapter

Language is an interdisciplinary field of knowledge that is shared by teachers and speech language therapists (SLTs) working in the school context. This common interest stems from language being the foundation for developing competence in reading, writing, listening, and speaking (Cummins, 2000:129; Owens, 2001:4). Teachers are primarily responsible for the teaching of reading and writing, whereas SLTs attend to the cross-modal literacy-language connection between all four modes of language, as they may affect one another. Language deficits may delay the acquisition of these four modes of communication, resulting in learning difficulties (Owens, 2004:382).

Internationally, professional bodies e.g. ASHA (2001:1) recommend that SLTs play a preventative role by providing preschool and foundation phase learners with suitable intervention for literacy development and address reading and writing skills in older learners. Locally, White Paper 6 (Department of Education, 2001b) specifies that SLTs play a consultative and collaborative role in district and school-based support teams that provide training, mentoring, monitoring, and consultation to teachers in order to equip them with skills to facilitate literacy and numeracy. The emphasis in such a collaborative model of support has shifted from supporting the child to supporting the teachers.

The collaborative model of support encourages team members to share their disciplinary knowledge with each other (Engelbrecht, 2001:18), which in this particular case implies a two-way process: SLTs can contribute their disciplinary knowledge in facilitating language development (Gerber, 1987:119), whereas teachers can provide insight into the context. Support to teachers includes the

provision of continued professional development (CPD) activities, which implies SLTs interpreting the NCS for the foundation phase "…as it is pertinent to their redefined role in curriculum delivery" (Moodley *et al.*, 2005:40). Since SLTs focus on the acquisition of listening skills and the development of language, their expertise is best applied to the Literacy and Numeracy Learning Programmes.

General language acquisition programmes in schools require a systems approach, as young learners are members of a whole system (Nelson, 1981:1). According to a systems approach the language acquisition process is an integrated whole, which includes various subsystems that are either internal or external to the child. Language intervention in schools calls for strategies to be implemented for the whole classroom as a group (Wolf-Nelson, 1998:16).

The programme for language development that was compiled for this particular CPD programme integrated various theoretical positions (e.g. principles of biological maturation, linguistic rule induction, behaviourism, information processing, cognitivism and social interactionism) (Kamhi, 1996:56; Wolf-Nelson, 1998:41). Such an eclectic approach did not allow for any one of these theoretical positions to be favoured because all were considered useful to some extent. The continued professional development programme (CPD) that was developed to facilitate listening and language for learning had to provide teachers with strategies and activities that would reflect the integration of these theoretical positions.

In addition to the aforementioned approach to language development, the CPD programme had to consider that the trainees in this case were adult learners and therefore required a specific approach to training and learning. The information to be trained also had to meet the requirements of the National Curriculum Statement (NCS). In considering all of the aforementioned requirements this CPD programme had to balance theory with praxis and provide the trainees with sufficient knowledge

to understand the rationale for teaching learners the NCS, but also provide them with skills and strategies to do so. The specific relationship between the skill areas addressed in the CPD programme is discussed next.

3.1.2 Relationship between listening, language, and numeracy

This support programme was based on the underlying relationship between listening and language for learning, with specific focus on the language required for numeracy, which is explained with reference to Figure 3-2.

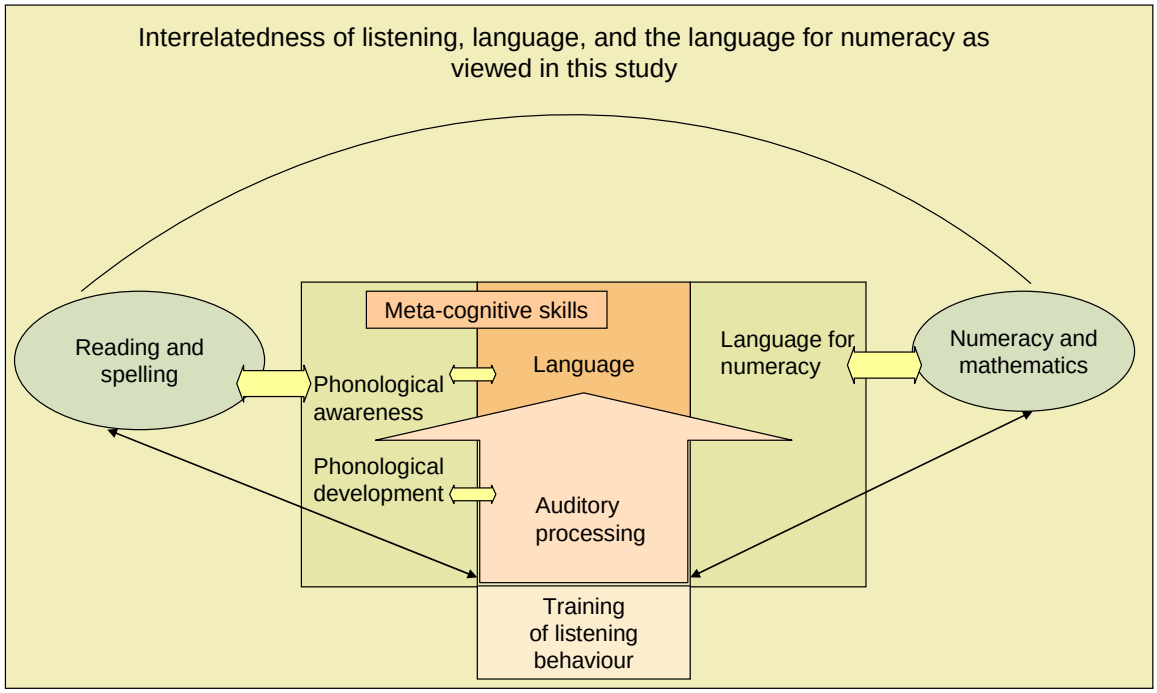

Figure 3-2: The relationship between listening, language, and numeracy

With reference to Figure 3-2 the ability to listen to sound and to attach meaning to it is the basis for developing spoken language (Bellis, 2002:3) and communication (Williams, 1995:v). Language, in turn, is essential for the acquisition of literacy and numeracy because it is the foundation for speaking, reading, writing, and spelling (Beukelman & Mirenda, 2005:359). It is important that young children acquire adequate language skills from early on to allow them to become academically

competitive when going to school. Phonological development (including phonological awareness) (refer to Figure 3-2) provides the bridge between language and literacy (Cline, 1989:367) whereas higher level phonological skills (e.g. sound manipulation and substitution) facilitate written language development in terms of reading and spelling (Adams *et al.*, 1998:10; Gilliam, McFadden & Van Kleeck, 1995:145; Johnson & Roseman, 2003:5; Van Kleeck, Gillam & McFadden, 1998:65).

Learners who do not have adequate and age-appropriate listening and language skills when entering formal education may be at risk for academic failure (Justice & Kaderavek, 2004:201). It is therefore important to address the development of these skills in the foundation phase curriculum.

Language is further required for the development of numeracy and mathematical skills (Rothman & Cohen, 1989:133; Thompson & Rubinstein, 2000:568) and to connect these to other areas of knowledge in the social sciences (Department of Education, 2002:6). Mathematics consists of problem solving, which relies on underlying auditory processing skills and language competencies (Bellis, 2002:3; MacMillan, 2002:9) (view Figure 3-2). Learners have to be able to read in order to understand numeracy and mathematic concepts. However, learners' mathematical thinking is to a large extent determined externally by their teacher's own mathematical understanding, the language the teacher uses, and the nature of the class discourse (Naudé, 2004:121). It is important that teachers are made aware of both the internal and external factors related to language that may affect learning. The planning of a CPD activity is not restricted to the training material, but also includes the instructional design.

3.1.3 Planning the instructional design of a CPD programme

Bruner (1966:14, 40) depicted the structure of any domain of knowledge as

progressing through identifiable stages (refer to Figure 3-3), namely the enactive stage where knowledge is created by concrete actions, to an iconic stage where knowledge is created from observing action, to the stages of concrete and formal operations where knowledge is created in symbolic terms that are independent of experiential reality. `

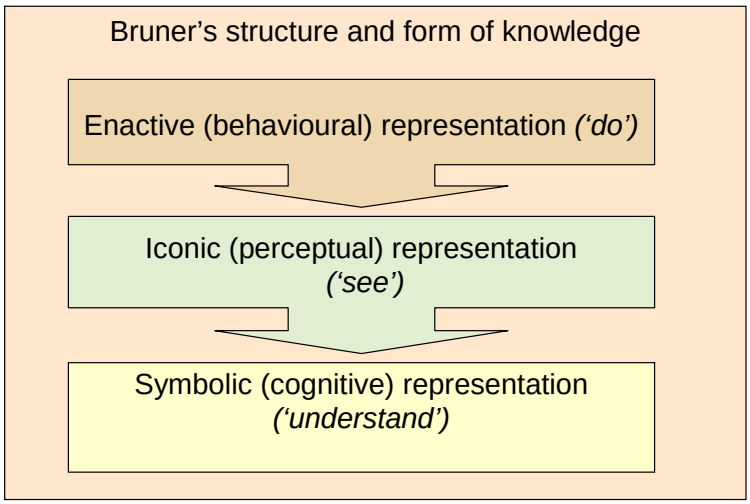

Figure 3-3: The structure and form of knowledge (Bruner, 1966:14)

These three levels of representation (Figure 3-3) follow a developmental sequence. It is important that trainees are afforded the opportunities to 'do, hear and see.' Programmes that aim to provide basic skills and knowledge firstly need to provide background information to facilitate the understanding of principles. Direct instruction through lecturing (*symbolic/cognitive level)* requires trainees to listen and read and is deemed effective in teacher training programmes (Haupt, Larsen, Robinson, & Hart, 1995 in Riley & Roach, 2006:364).

Learning also needs to take place on the *iconic level* where trainees observe practical demonstrations and engage in role play in the workshops. Learning on the *enactive* level can be facilitated by providing trainees with opportunities to practise these skills in role-play situations or in small groups. When trainees apply their skills in the real-life context of their classrooms, learning on this level is reinforced. The

enactive level is suitable for the training of simple skills that have to be physically demonstrated (Bruner, 1966:14, 40).

Neither activity nor experience is possible without reflection (Silberman, 1996:2). The Lancaster model (Binstead, 1980:25) included these three aspects (refer to Figure 3-4).

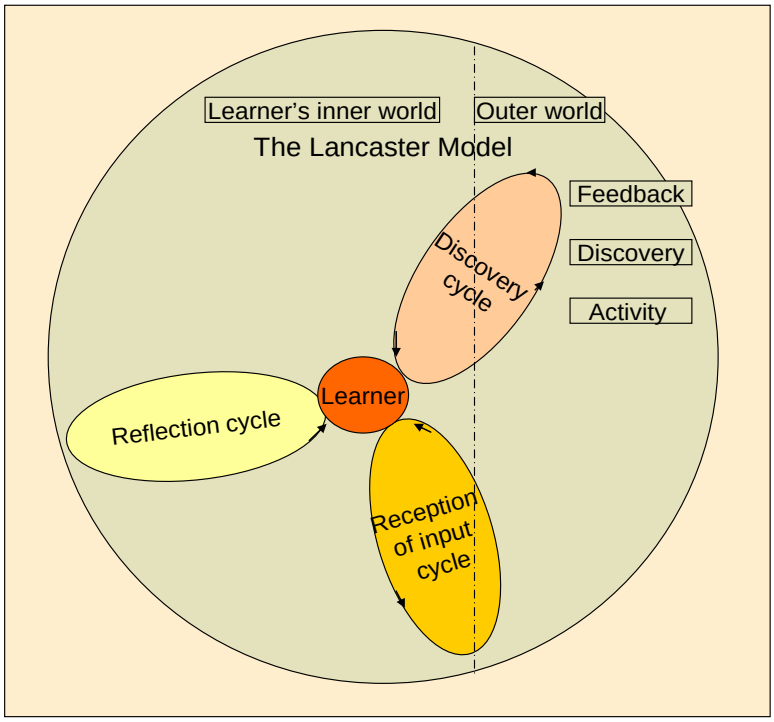

Figure 3-4: The Lancaster model of learning (Binstead, 1980:21)

In this model (refer to Figure 3-4) learning is described as a cyclical process consisting of three different forms, namely the *input level and generation of output* (reception of information in a written or verbal form), a *discovery level* (obtained through written pro forma's, peer supervision, or by interview), and *reflection* (e.g. where the learner is encouraged to try out new strategies in practice) (see Figure 3-4). In order to create effective learning experiences it is necessary for trainers to combine all three of these cycles in various forms. Such a combination of learning cycles (Binstead, 1980:1, 30; Bruner, 1966:14) is comprehensive and accommodates most learning styles, which made it suitable for use in this study.

This CPD programme included a training component, a practical component and a mentoring component. The workshops (*training component*) consisted of direct instruction as basic knowledge had to be provided first, but allowed for discussion and practice sessions in small groups where participants could reflect. Role play sessions allowed the pairing of discovery and reflective cycles together, which resembled an experiential cycle of learning (Dennison & Kirk, 1990:2; Kolb, 1984:12). The process of concrete experience, reflective observation, reflective conceptualization, and active experience is thus emphasized (Binstead, 1980:22; Du Toit, 2004:153).

Miller and Watts (1990:139) were of the opinion that one-day training events (such as the workshops conducted in this CPD programme) at most allow for raising awareness on a specific topic and recommended that additional time be scheduled outside the learning event to obtain significant change in behaviour. Following the workshops, the participants had to apply the newly acquired strategies in their classrooms. This implementation period was the *practical component* of the programme and required the completion of a portfolio assignment.

The portfolio assignments were individually assessed and personalized feedback was provided. Such feedback, together with the small group support teams located at each participating school and the provision of a training support materials (a manual with prepared examples of lessons, and video material of how strategies can be applied in the classroom), constituted the *mentoring component* of the programme. The training support materials were intended to aid in the implementation of the strategies learnt in the workshops as an additional input cycle. Focusing on the training component first, the three topics of the training workshops are discussed in the following section.

Planning the curriculum for a workshop is dependent on what the students need to

learn and therefore the outcomes need to be defined before teaching strategies can be developed. In setting training objectives, it is firstly necessary to consider the trainee and his/her previous training experiences (Killen, 2007:11, 73; Rubin & Spady, 1984:38). In addition, taxonomies (Anderson & Krathwohl, 2001:232; Bloom *et al.*, 1956:1; 1964 in Dennison & Kirk, 1990:12; Miller & Watts, 1990:139) provide useful frameworks for planning learning events and assessments. The curriculum design for the training component is presented in Appendix 3A.

3.2 The training component

3.2.1 Rationale for including workshops in the programme

Literature reports indicated that teachers have expressed a preference for training through workshops rather than lectures (Earley & Bubb, 2004:1). Workshops have also been identified as important 'confidence boosters' (Baxen & Green, 1999:264). Considering that confidence is an important component of competence, this CPD programme presented a series of three workshops - 'Listening for learning' (see Appendix 3B), 'Language for learning' (Appendix 3C), and 'Language for numeracy' (Appendix 3D). These three skill areas form an integrated whole and should be facilitated as such in the classroom.

Each workshop was designed as scaffold for the next, and together the three workshops addressed the specific skill areas included in the Literacy and Numeracy Learning Programmes of the NCS (Department of Education, 2002:1). These three workshops therefore demonstrated to teachers how to present and explain new information in their classrooms, and provided them with the opportunity to first observe the strategies before they were required to apply them and to reflect on them (Bruner, 1966:2).

3.2.2 Central auditory information processing

Information processing theory (Massaro, 1975 in Bellis, 2003:3) proposes that comprehension relies on the extraction of information at various stages of processing but that complex interactions between sensory and higher-order cognitive/linguistic operations occur both simultaneously and sequentially throughout the central nervous system. Information processing is a complex process (Hamman and Squire, 1996, 1997 in Owens, 2004:22) that involves sensory input on many levels. The integration of the input is regulated by meta-cognition and requires selective attention, inhibition, and the coordination of stimuli and concepts (Kuder, 2003:31).

Auditory input integration (refer to Figure 3-5) requires two processes. Firstly, it necessitates the neuro-physiological encoding of auditory signals from the auditory nerve to the brain, which occurs in the auditory system prior to higher-order cognitive and linguistic operations at the cortical level (Bellis, 2003:3). Such processes can be influenced by higher-order factors (e.g. attention, memory, and linguistic competence) with complex feedback and feedforward mechanisms.

Secondly, auditory processing includes the higher-level neuro-cognitive processes relating to cognition, language, attention, and memory (Bellis, 2003:54). Both encoding and neuro-cognitive competencies are required for processing incoming information and are of vital importance for learning when the child enters school (Bellis, 2002:3). For the purpose of teachers facilitating listening and language in the classroom, auditory processing is viewed from a psycholinguistic perspective (Richards, 2004:21) consisting of three levels which each has a different effect on learning (Figure 3-5). The first level, the 'signal reception' level, and the second level which refers to the 'signal manipulation' level or to the perception of speech (Gillon, 2002:3-4), were addressed in the workshop "Listening for learning'.

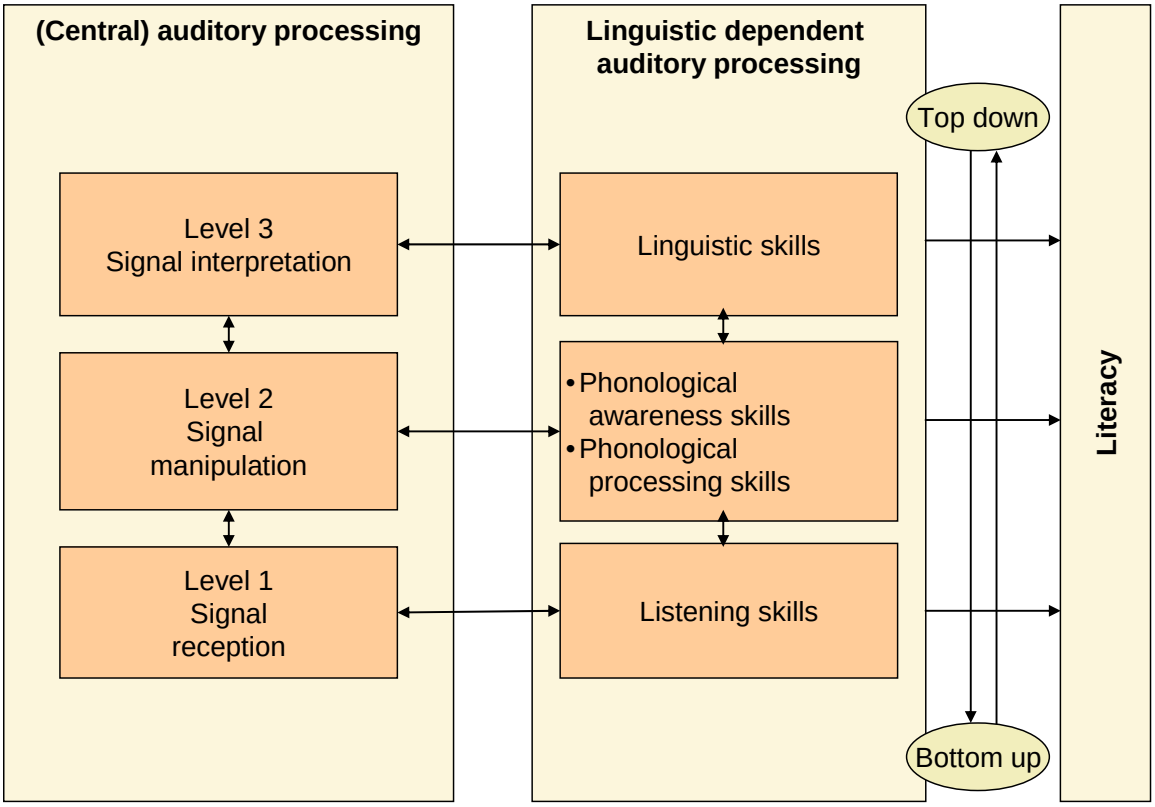

Figure 3-5: Central auditory processing (psycholinguistic perspective)

According to Figure 3-5 the third level is the 'signal interpretation level' where meaning is extracted from the auditory input. At this level the focus is more on linguistic skills than on auditory skills (Richards, 2004:21). The workshops 'Language for learning' and 'Language for numeracy' focussed on the third level of auditory processing because both workshops related to language.

As not all learners have mastered auditory processing skills by school-going age (Bellis, 2003:48), it is necessary to address this aspect at school entry. Facilitation of auditory processing may improve language comprehension and learning. Such information therefore needs to be conveyed to foundation phase teachers and was therefore included in the CPD programme.

3.2.3 'Listening for learning'

The workshop 'Listening for learning' was aimed at facilitating Level 1 ('Signal

reception') (Figure 3-5) as learners need to learn the art of listening actively, attentively, and analytically in order to learn (Adams *et al.*, 1998:15). Listening is therefore an important first step in the processing of auditory input and also the first step in acquiring phonological awareness. Listening is included in the literacy programme of the NCS for Grades R to 3 as Learning Outcome 1 (LO1) (Department of Education, 1997:6). As listening and language are interrelated, the facilitation of auditory processing skills needs to be included as part of an integrated approach in the classroom.

(a) Facilitating listening

Listening is an active process that involves an awareness and localization of sounds, as well as the behaviour (characteristics) of a good listener (Bellis, 2003:336; Truesdale, 1990:9). Facilitating listening requires teachers to firstly make learners aware of sound and to provide them with positive reinforcement for active attention to sound (Bellis, 2003:331). Such facilitation of listening may imply a shift from the didactic approach to listening where learners are instructed to listen, to a whole body listening approach that focuses on active *attending* in class (Bellis, 2002:3). In order to facilitate listening, it is necessary to create an optimal listening environment and limit all interfering factors (Catts, 1991:196; Goldberg, Niehl & Metropoulous, 1989:327; Goldsworthy, 1998:1).

Acoustic and teacher-based environmental modifications are necessary in order to enhance listening in the classroom. Information regarding such modifications should therefore be included in a CPD programme for teachers (Bellis, 2003:333). Teachers need to be aware of how to minimize signal disruptions and how to teach listening behaviour that facilitates auditory attention (e.g. whole body listening strategies).

(b) Phonological awareness

With reference to Figure 3-5 the second level of auditory processing is 'signal manipulation', which relates to the 'perception of speech' (Gillon, 2002:3-4). According to Bellis (2003:95), "…it is not easy to separate acoustic and phonemic processing from one another or from higher-order linguistic influences". Consequently, an integrated intervention approach is required. This level includes both phonological awareness and phonemic processing. Phonemic processing refers to the ability to categorize speech sounds, and phonological awareness is related to the identification and manipulation of phonemic elements of spoken language (Richards, 2004:7).

Apart from listening skills, the skills to be addressed in phonological awareness training are the following: rhyming, alliteration, segmentation, sound blending, and sound manipulation. Other skills include auditory closure, auditory association, and phonemic analysis skills linked to phoneme identification, grapheme-phoneme identification, and grapheme-phoneme correspondence (Richards, 2004:7).

Phonological awareness is critical for the ability to analyze (segment) speech units and to synthesize (blend) speech sounds into words, which makes it a strong predictor of success in reading and writing (Blachman *et al.*, 1999:260; Goldsworthy, 1998:1; Muter & Diethelm, 2001:187; Van Kleeck *et al.*, 1998:65). Poor phonological awareness, in turn, negatively affects the acquisition of reading and spelling (Ehri *et al.*, 2001:251; Johnson & Roseman, 2003:5; Rvachew, Chiang & Evans, 2007:61). Learners need to develop phonological awareness skills to an age-appropriate level at school entry. Those learners who are unable to read by the end of Gr. 1 tend to lag behind and may develop learning problems as they are unable to use language, reading, and writing to access or express their knowledge (Crouch, 2008).

Many learners from low socio-economic schools[4] (SES) have not developed adequate phonological awareness skills when entering school (Nancollis, Lawrie & Dodd, 2005:326). Torgeson *et al.* (1995, in Johnson & Roseman, 2003:39) ascribed limited phonological awareness in learners from low SES to limited or no prior literacy experience or structured pre-school education. Phonological awareness training in the foundation phase curriculum is a preventative strategy that enhances literacy development. It is of particular importance for learners from low SES, as they are at risk of experiencing difficulties in developing literacy learning (Nancollis *et al.*, 2005:326).

Central auditory processing difficulties (Jerger & Musiek, 2000:467), in particular poor development of the skills on the second level i.e. phonological awareness (Ehri *et al.*, 2001:251; Johnson & Roseman, 2003:5; Rvachew *et al.*, 2007:61), can cause problems with reading and spelling, which points to a common ground between these two processes (refer to Figure 3-5). To prevent problems with reading and spelling it is necessary to address both these skills, which justifies the inclusion of such information in teacher training programmes.

Problems with central auditory processing affect listening, comprehension, language, and learning (Jerger & Musiek, 2000:467). Deficits in auditory processing resemble a deficit in language competence (specifically in comprehension abilities), which raises the question as to what the exact relationship is between language and auditory processing. It has yet to be determined incontrovertibly where central information processing ends and where language processing begins (Bellis, 2003:93) (refer to Figure 3-5), but there is currently general agreement that these two processes are not interchangeable.

[4] Demographic data obtained from the 2001 national population census (StatsSA, 2001) indicate that a significant proportion of schools in South Africa could be classified as low SES, being situated in communities with household incomes of less than R38 400 per annum.

Apart from inadequate listening skills many learners from low SES also demonstrate poorly developed or disordered language skills, which places them at risk for inadequate literacy development (Justice & Ezell, 2001:133; Justice, Skibbe & Ezell, 2006:400). Limited language proficiency impacts on meta-linguistic ability, resulting in poor phonological awareness (see Figure 3-2). It was therefore essential that the CPD programme included strategies for facilitating language development.

Several teachers in the current education system feel unsure about the facilitation of phonological awareness and have a need for support. Less than 5% of the teachers in Lessing and De Wit's (2008:48) study in Mpumalanga and Limpopo Province reported that they had confidence in teaching the subskills for literacy acquisition. This may be attributed to the fact that the role of phonological awareness in the development of literacy only became fully known in the early 1990's (Lessing & De Wit, 2008:48) and therefore was not included in the professional training of teachers until much later. Many teachers currently in the system have not been trained in this aspect, which warranted its inclusion in this CPD programme.

3.2.4 'Language for learning'

With reference to Figure 3-5 the third level in the process of auditory processing ('signal interpretation' level) is located in the language domain rather than in the auditory domain. This level focuses on the development of vocabulary, conceptual terminology, expressive language retrieval and organization, word meanings, and semantic relationships (Richards, 2004:7). The second and third workshops in this programme aimed at providing teachers with strategies for facilitating development in these areas. According to Vygotsky (1998:23, 243), learners need a 'knowledgeable other' (e.g. the teacher or parent) to provide them with the relevant insights within cultural and social exchange. Language is an integral part of the literacy programme

for the foundation phase and teachers need knowledge about the complex nature of language as well as strategies to facilitate comprehensive language development across subject lines.

Inadequate oral language skills are the reason why many learners, especially those in previously disadvantaged areas with low SES (Justice, Meier & Walpole, 2005:18), experience difficulty in making the shift from the language used at home to the abstract and de-contextualized language used in the classroom (Justice & Kaderavek, 2004:212). Inadequate oral language development may result in poor academic performance (McDonald, 1991 in Snow, Burns & Griffin, 1998:47; Taylor & Vinjevold, 1999c:134) (refer to Figure 3-6), which points to a link between language and literacy.

(a) The link between language and literacy

As shown in Figure 3-6 emergent literacy involves both written language awareness and phonological awareness (Justice & Ezell, 2001:20), which are both based on normal oral language (particularly vocabulary development) (The National Reading Panel, 2000 in Justice *et al.*, 2005:18). Figure 3-6 shows that age-appropriate oral language development is required for the development of reading competence (National Reading Panel, 2000 in Justice *et al.*, 2005:18), and therefore oral language proficiency is regarded as predictive of reading achievements as well as other written language achievements at a later stage (Catts *et al.*, 2002:1142).

Figure 3-6 shows that adequate print-related language (e.g. familiarity with books and visual symbols) is required for continued oral language development (Bishop & Adams, 1990:1027; Justice *et al.*, 2006:401). A similar reciprocal relationship exists between phonological awareness and reading, as each facilitates and is facilitated by the other *(Ibid.)*. Learners' language learning is a crucial precursor to literacy.

Poor literacy development contributes to later problems in language (Snowling, Bishop, Chipchase, & Kaplan, 1998 in Justice *et al.*, 2006:401).

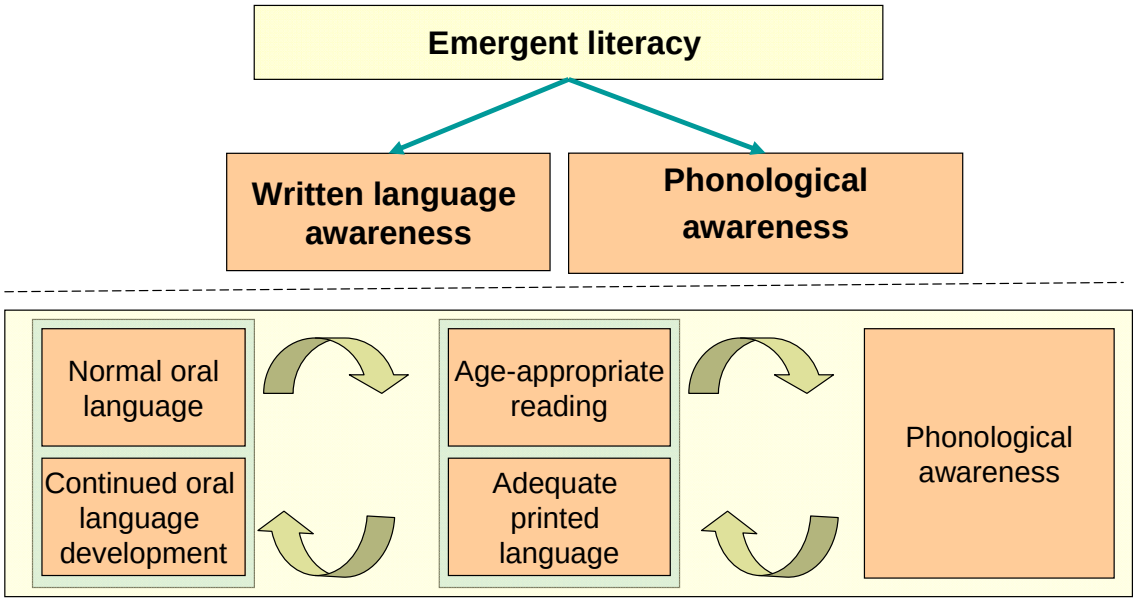

Figure 3-6: The link between language and literacy development

Locke *et al.* (2002:3) reported that pre-school children who were raised in impoverished environments performed on lower levels in oral language assessments than the general population, which put them at risk for delayed written language skills. Access to printed material in shared reading experiences, as well as parental beliefs about literacy, have been identified as having an effect on writing (Wolf-Nelson, 1998:380). Learners raised in poor communities mostly have limited exposure to printed material and subsequently may have very different attitudes to and experiences of the printed text than their peers from more affluent contexts (Nancollis *et al.*, 2005:326).

Considering that the study was conducted in a semi-rural context and townships where low SES are prevalent, it is possible that there was a high incidence of learners with poorly developed language and limited phonological awareness skills. Such contexts require a variety of experiences to facilitate the natural transition from oral language used at home to functional literate language used in school (Snowling,

Bishop, Chipchase, & Kaplan, 1998 in Justice *et al.*, 2006:401). This specific programme aimed to increase teachers' knowledge of what language entails and how it can be facilitated through a variety of relevant activities and strategies (Owens, 2004:173, 180, 187).

(b) Facilitating language for literacy

In order to facilitate language for literacy teachers need to be aware of the following aspects:

(i) A 'balanced approach'

Language develops along a continuum, from oral language learnt in the home through concrete operations, to the de-contextualized language required for written language used in school (Justice & Kaderavek, 2004:212). ASHA's position statement (2001:16) advocates that *"children need to experience reading, spelling, and writing for authentic communication purposes in which vocabulary, grammar, and discourse skills converge".* Current evidence (Justice & Kaderavek, 2004:212) regarding the acquisition of literacy skills suggests a balance of both contextualized and de-contextualized (discrete) skill intervention as best practice. This specific programme supported a 'balanced approach' to the facilitation of literacy (Justice & Kaderavek, 2004:201), which creates opportunities to develop an understanding of the language (Goodman, 1986:7) and then uses this understanding as basis to teach discrete skills within a phonics-oriented, code-based approach (Justice *et al.*, 2006:403). Such a balanced approach to literacy encompasses both the top-down and bottom-up approaches illustrated in Figure 3-5, and is most appropriate in the foundation phase where the focus is on facilitating emergent literacy. Teachers need to be able to create suitable contexts in which such skills can be facilitated in the classroom.

(ii) The use of a theme

The use of a central theme creates several language-rich experiences and allows the learners to develop the vocabulary related to a specific topic (Department of Education, 2002:8), as well as to integrate skills across the curriculum. A central theme is instrumental in the creation of a meaningful context that facilitates understanding and allows for the use of a variation of intervention activities. Figure 3-7 shows an example of a slide used in the workshop to train teachers in the use of a theme.

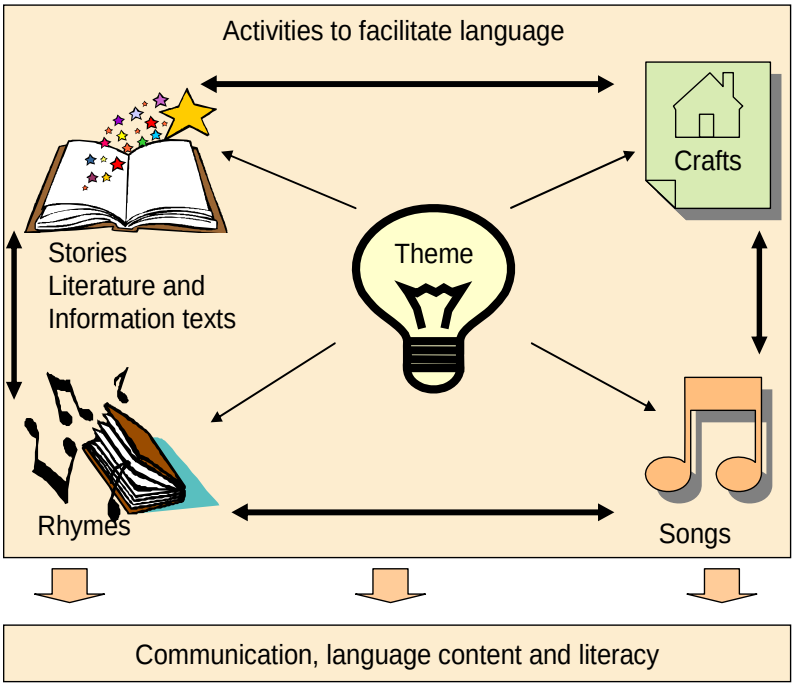

Figure 3-7: The role of a theme in creating a meaningful context for language

When activities such as those shown in Figure 3-7 are provided, language learning, auditory processing, and phonological awareness are supported synchronously as these skills are interrelated. Such activities have been found not only to be fun for learners, but also to foster the use of language for interaction and problem solving (Van Kleeck *et al.*, 1998:74). Themes allow the learner to incorporate new learning into existing frameworks and to gain familiarity with concepts (allowing them to express these in language), as well as to develop understanding. Apart from

providing activities for listening and speaking, teachers are required to encourage reading and writing within the general theme of the week. The use of themes integrates the thread of language throughout the curriculum in all classroom activities.

Songs and nursery rhymes support and expand vocabulary pertaining to the original theme of the story, and highlight semantic and syntactic forms (Paul, 2001:72). When songs and rhymes are acted out or are accompanied by movements, they not only allow for repetition of vocabulary, but also provide the opportunity for multimodal experiences that facilitate learning. This allows for participation of all learners until they have sufficiently internalized the language to eventually participate through the verbal medium. Such strategies provide a 'script' for learning language, as learners are encouraged to fill in parts that have purposefully been left out once the learners have become familiarized with the story, song, or rhyme. Other advantages of using themes are that the careful selection of stories, songs, rhymes, and craft activities allows for cultural diversity (Goodman, 1986:18) and various learning styles (Gardner, 2004:3), which are both required to create an optimum learning environment. By creating a variety of experiences (refer to Figure 3-7) teachers can provide valuable opportunities for learning in class.

(iii) Facilitating the four language systems required by the NCS

The CPD programme was further guided by the National Curriculum Statement (NCS) (Department of Education, 2002:6) and the skills that learners require for learning, namely listening, speaking, reading, and writing (Johnson & Roseman, 2003:13; Williams & Snipper, 1990:132). Table 3-1 shows that each of these language systems is associated with either receptive or expressive modes of communication (Johnson & Roseman, 2003:13).

The four language systems shown in Table 3-1 are integrated in the NCS as

listening, speaking, reading, viewing, writing, thinking, and reasoning, as well as language structure and use (Department of Education, 2002:6).

Table 3-1: The four language systems that children have to acquire

Aural system (Language by ear)	Oral system (Language by mouth)	Print system (Language by eye)	Written system (Language by hand)
Receptive Heard words	Expressive Spoken words	Receptive Printed words	Expressive Written words

Language is not restricted to the oral modality, but also includes the visual modality (Johnson & Roseman, 2003:13). Learners developing written language awareness discover that print is a highly organized system that reflects oral language and guides them to an understanding of the alphabetic principle (Justice & Ezell, 2002:28). Learners need the opportunity to develop all four modes of language.

Many teachers who are inadequately qualified (Monyatsi *et al.*, 2006:216; Rembe, 2005:109) may feel unsure of their own knowledge base and as a result rely on rote-learning methods in facilitating language and literacy. A study by MacDonald (1991, in Taylor & Vinjevold, 1999c:134) reported that black learners (generally from the most disadvantaged homes) spent limited time on reading and writing activities as they were mostly exposed to oral input by their teachers, who occasionally required chanting in response. Lessing and de Witt (2008:9) were of the opinion that the teachers' own lack of conceptual knowledge of language and the subskills required for literacy acquisition were at the root of this phenomenon. It appears that learners from the most disadvantaged homes may be further challenged by the inadequate teaching practices prevalent in their classrooms.

Outdated teaching practices (e.g. rote learning) do not facilitate the development of meta-linguistic skills (Johnson & Roseman, 2003:13) required for learners to identify and analyze specific sounds to allow them to read or write. It is the researcher's

opinion that every attempt should be made to remedy this situation by equipping teachers with an understanding of the underlying concepts of language for learning, and by equipping them with strategies and skills to implement the NCS. The workshop 'Language for learning' (Appendix 3C) further addressed the two types of language required in the classroom, namely basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP) (Cummins, 2000:59).

(iv) BICS and CALP

Despite education policies (Department of Education, 2002) which stipulate that foundation phase learning should be in the first language (L1) (mother tongue), many learners in South Africa have to learn in a language other than their own (O'Connor & Geiger, 2009:254; Setati *et al.*, 2003:73). Teachers often fail to differentiate between a learner's language proficiency when expressing him/her socially and his/her ability to use the language required for academic success. This specific programme addressed the two kinds of language which are used in classrooms, namely basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP) (Cummins, 2000:59; Dawber & Jordaan, 1999:12). BICS refers to the social language which is mainly used for daily personal and emotional needs, such as interacting with peers and adults, and may take 2-3 years to develop as an additional language (Dawber & Jordaan, 1999:14; Roseberry-McKibbin & Brice, 2000:5).

CALP (Cummins, 2000:59; Naudé, 2004:123) refers to vocabulary, concept knowledge (to understand language), meta-linguistic insights (e.g. the hidden meaning of words), and the ability to process de-contextualized academic language. It takes approximately 5-7 years to develop to the required grade level (Dawber & Jordaan, 1999:14) as it includes reasoning, problem solving, and other cognitive processes required for academic success, and is crucial for numeracy and

satisfactory performance in mathematics. Young learners who have to learn in a language other than their L1, often lack competence in CALP because they have not necessarily been exposed to the LoLT prior to starting school.

Teachers need to be aware that linguistically diverse learners may make errors in expression and comprehension, and also have difficulties in processing information presented in the language of learning and teaching (LOLT) (Du Plessis, 2005:4). These learners process academic information at a slower rate. Some learners (especially in low SES) may also demonstrate poor language development in L1 (Justice & Ezell, 2001:133; Justice *et al.*, 2006:400). Learners with a weak oral language in their L1 are at a disadvantage when learning in an additional language. This variability between learners needs to be accommodated by creating opportunities and experiences to facilitate the development of informal (BICS) and formal language (CALP). Information regarding the facilitation of language may be of value to teachers who have to implement the NCS, and was included in this CPD programme. This specific CPD programme aimed to be an introductory skills training course that focused on strategies for teachers to also facilitate the language required for numeracy and mathematics.

3.2.5 Language for numeracy

Teaching of numeracy often tends to focus on mathematical computation rather than on the linguistic base of numeracy because teachers may not be aware of the important role that language plays in numeracy development (Brown, 1953 in Rothman & Cohen, 1989:133). The aim of the workshop 'Language for numeracy' was to alert teachers to the importance of language use in numeracy and to empower them to facilitate the acquisition of the language required for numeracy development.

(a) Development of numeracy concepts and vocabulary

It is generally accepted that children display informal mathematical knowledge and skills before the commencement of formal mathematics education. Young children acquire mathematical concepts of grouping, ordering, and transforming through play (Donovan *et al.*, 1993:60). By the age of five normally developing children have acquired the emergent numeracy concepts and skills of comparison, classification, and one-to-one correspondence, as well as seriation, the use of number words, structured counting, resultative counting, and a general understanding of numbers (Torbeyns, Van den Noortgate & Ghesquirer, 2002:250).

At the onset of Gr. R many children have acquired an understanding of the language of measurement, position in space, selection criteria for sorting, exploring, building, and matching with shapes (Kuder, 2003:60). Of particular importance is the vocabulary that develops from this emergent phase of numeracy. Emergent numeracy skills and the associated vocabulary (Torbeyns *et al.*, 2002:252) are summarized in Table 3-2. Learners who are proficient in language acquire the language of mathematics as one component of a complex symbolic communication function (Pound, 2003:17).

Exposure to books and stories encourages learners' exploration of reality and unreality and reinforces the vital vocabulary necessary to describe quantities, patterns, shapes, and amounts (Torbeyns *et al.*, 2002:252). Learners from disadvantaged communities where poverty is prevalent may not have had access to books or experiences that would allow them to develop appropriate concepts and vocabulary for numeracy. Foundation phase teachers (especially in Gr. R and Gr 1) need to implement strategies and provide various activities to facilitate developmental growth through the stages shown in Table 3-2.

Table 3-2: Emergent numeracy skills with required matching vocabulary

Concept	Vocabulary
Concept of comparison: Ability to compare objects in terms of quantitative and qualitative properties	- Same/different - More than/less than - Number words: one, two, three, four, etc. - Smallest/biggest; longest/shortest, tallest/shortest, lots; many/few; most/least; the same (equal)
Classification: The pre-requisite is that learners must be able to sort.	- Comparative words, e.g. same/different; long/short; more/less; too many/not enough; none
One-to-one correspondence:	- Also includes comparative words, e.g. same/different; long/short; more/less; too many/not enough; none; degrees of comparison (e.g. short, shorter, shortest)
General understanding of numbers	- Counting plus all of the above

(b) Role of language in numeracy

The most recent report of the Third International Maths and Science Study (TIMSS) (Mullis *et al.*, 2003:2) ascribed the poor performance of learners in numeracy and mathematics in South Africa to inadequate language capabilities as many learners did not understand what was expected of them when they were assessed. It can be very confusing for a learner when the teacher states a problem in one way whilst the text presents the same problem in a different manner with different vocabulary (Raiker, 2002:58). Although the majority of learners may have a natural ability to eventually come to terms with such multimeanings, others may remain confused. However, the language required for numeracy is complex and requires knowledge of various kinds of discourses, including specific vocabulary and terminology.

(c) Numeracy discourse

Figure 3-8 illustrates that the language for numeracy requires competence on four different levels (Gawned, 1993:27). The focus of this study is specifically on levels three and four concerning the specific vocabulary and terminology used for numeracy, as shown in Figure 3-8. With reference to Level 3 four different

discourses (Gawned, 1993:35) need to be considered, namely the language of reasoning (problem solving), the language of the mathematics curriculum, the language of activities, and the language of mathematics literacy.

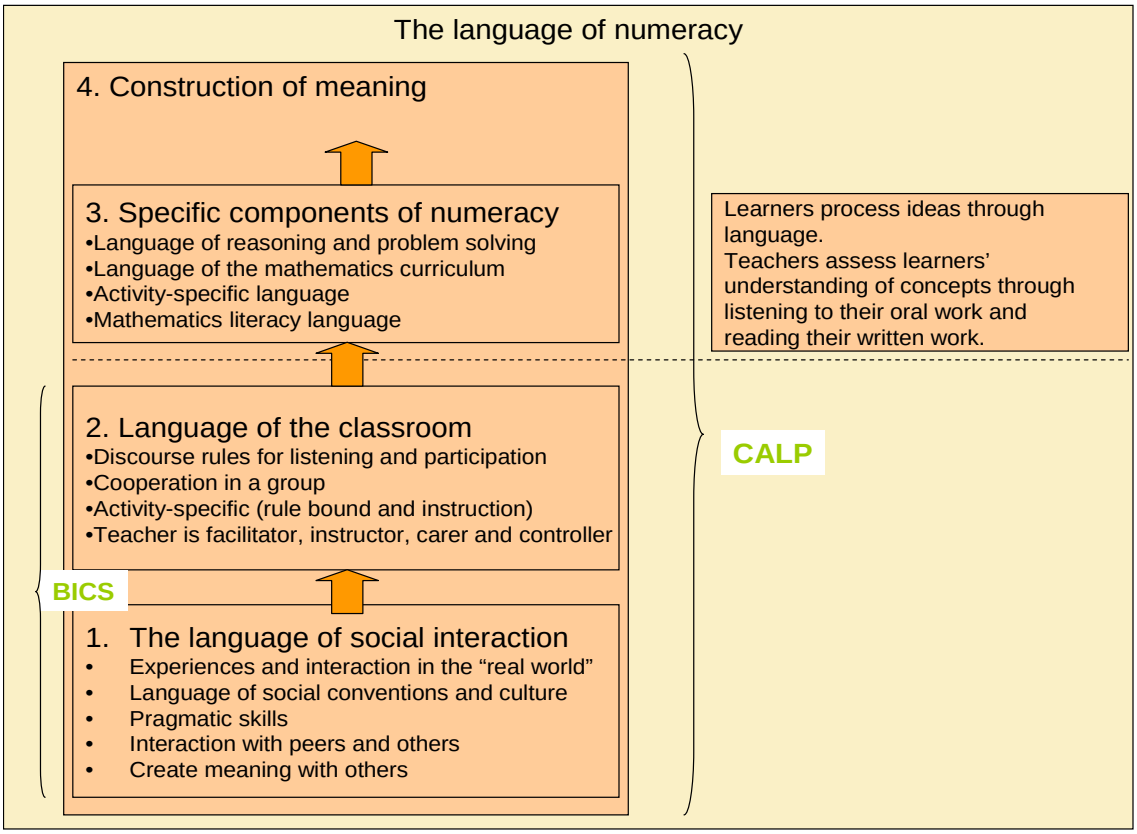

Figure 3-8: The language required for numeracy

These domains of language use relate to the CALP required in the numeracy skill area, which can only develop once competence is developed in BICS (refer to Section Figure 3-8). These four types of mathematical discourses were the focus of the third workshop and are discussed below.

(i) The language required for numeracy: Level 3

Teachers need to be aware that although learners have to acquire the terminology and vocabulary included in the subject material, the language they use to teach and to discuss numeracy also warrants careful consideration. It is important to pay attention to conceptual confusion when everyday metaphors are used in the classroom. Studies by Reeves and Long (1998:322) conducted in the Western Cape

and by Setati (1999:146) in Mamelodi (Gauteng) reported that incorrect use of mathematical language in classrooms had a negative effect on learning. Teachers use both formal and informal language when teaching (Reeves, 1993:95). Formal language in itself consists of procedural, calculative, and conceptual language that provides the reasons for proceeding or calculating in particular ways. Setati (1999:146) found lessons to be dominated by procedural discourse and that conceptual discourse was limited. Before teachers can effect any changes in practice they need to be cognizant of their own use of language and, if necessary, make purposeful modifications.

- The language of reasoning

The language of reasoning (problem-solving language) (Gawned, 1993:35) (Figure 3-8) is used by teachers and learners in problem-solving contexts and includes complex sentences used for inferences, justifications, comparisons and predictions. This type of language is determined by the language used for description, comparison, and reflection.

The best way to facilitate this type of discourse is through 'discussion' that clarifies meaning and helps learners to absorb terminology and understand the concepts (Department of Education, 2002:6). Teachers need to create opportunities for talking about learners' ideas in relation to their experiences. Classroom discourses need to be of a meta-cognitive nature to create an awareness of thought, e.g. to encourage, predict, and hypothesize, as well as to create opportunities in terms of questions and situations for the use of 'if/then', 'what if?', 'why?', 'what would happen?', 'what did happen?' and 'how did you know?' (Reeves, 1993:91).

- Language of the mathematics curriculum

Language of the numeracy curriculum (Figure 3-8) includes terminology which has to

be explicitly taught and learnt (Botha *et al.*, 2005:697) as it is essential for developing higher level thinking skills such as analysis, discussion, problem solving and design in relation to the subject matter (Galusha, 1998:8). Fluency in the use of terminology will increase learners' performance in numeracy.

However, much of the terminology used in the classroom is unfamiliar to young learners of school-going age. Their teachers may assume differently, which creates unrealistic expectations on the part of the teacher. In addition, many of the mathematical terms cannot be translated directly into the indigenous African languages and need to be described. Even though attempts have been made to create technical and scientific terminology lists in the indigenous languages of South Africa, they have not yet been standardized or penetrated the system (M. Alberts[5], personal communication, November 29, 2007). More specifically, they have not been turned to account in developing learner material at foundation phase level. According to V. Ramsingh[6] (personal communication, September 27, 2007) teachers at grass-roots level have to improvize to the best of their knowledge by using terminology that has not been standardized. The use of non-standardized terminology may cause confusion and lead to miscommunication (M. Alberts, personal communication, November 29, 2007). In addition, indigenous languages have distinctive grammatical and morphological structures that differ considerably from English, which makes the use of English workbooks in classes where the LoLT is an indigenous language undesirable.

The learning of the language of the mathematics curriculum requires that learners firstly develop an understanding of the underlying concepts through their own experiences, problem-solving solutions, and strategies (Du Toit *et al.*, 2002:156).

[5] PanSALB (Pan South African Language Board)

[6] Ms. Valerie Ramsingh is the numeracy coordinator at the Gauteng Department of Education (GDE)

The development of relevant vocabulary can be facilitated with manipulatives, shapes, and collections of objects through play. Such a constructivist viewpoint is in accordance with the NCS (Botha *et al.*, 2005:697; Windschitl, 1999:752). Teachers need to be aware of possible ambiguity in word meaning, and be empowered to actively teach unfamiliar terms.

- Activity-specific language

Tasks/activities serve as medium through which numeracy/mathematics can be learnt (Gawned, 1993:33) (Figure 3-8). Such tasks require both *descriptive language* and *procedural language*. Descriptive language allows the user to participate in an activity (e.g. labels, attribute terms and noun phrase constructions to discuss relationships between numbers, concepts, etc.), whereas *procedural language* is used to explain how procedures need to be conducted and provide reasons for classifying or grouping items in a particular manner. Learners need to be encouraged to talk about procedures when working in groups and to engage actively with real objects.

- The language of mathematics literacy

The language of mathematics literacy (Figure 3-8) refers to the representation and recording of mathematics (e.g. graph construction, diagramming, mapping, writing the digits accurately, etc.) and can be described pictorially, or can be depicted in signs and symbols in any other language (Gawned, 1993:33). This type of mathematic language therefore becomes a language in its own right. Syntax is very important, and teachers need to match the sentence structures used for writing mathematical problems with the learners' levels of comprehension. Accordingly, learners' written language needs to be practised in the classroom. The teaching of language for numeracy is an integrated process that cannot be taught in isolation.

(ii) Construction of meaning in mathematics (Level 4)

With reference to Level 4 of language for numeracy in Figure 3-8 (Gawned, 1993:30) learners ultimately have to derive meaning from the language of numeracy and mathematics. Learners learn when they are able to understand. When foundation phase teachers teach young learners the vocabulary for simple arithmetic within a meaningful context, they provide them with the tools for mathematics. Learners with a well-developed vocabulary can devote all their attention to the new concepts and the next step and do not experience difficulties in understanding the meaning of the words used. Teachers therefore need to ensure that learners acquire the necessary vocabulary and language competence to enable them to understand the mathematical concepts being taught. Rothman and Cohen (1989:137) suggested that the teaching of terminology and vocabulary for numeracy should commence when the learner is being taught the vocabulary necessary to start reading.

Learners need to be presented with several opportunities to discuss and share ideas about mathematical concepts and processes. According to a study by Reeves and Long (1998:324) a lack of such opportunities was one of the reasons why learners performed poorly in the Third International Mathematics and Science Study (TIMMS 1995) (Howie, 2007, as quoted by Bateman, 2007b:1; Botha *et al.*, 2005:697; Howie, 2004:160).

Teachers need to purposefully allow more opportunity for dialogue about these concepts and processes and encourage learners to apply them to their lives in small groups. Group work where learners interact and discuss concepts and procedures, and during which teachers can listen to discussions and reinforce correct usage, has been prescribed within the NCS (Setati *et al.*, 2003:90). Monitoring such small group work should be approached with caution as the discourses may be diluted in comparison to the teacher-led discourses used in the subject-specific matter.

Contrary to this view where group work is advocated, the most recent TIMMS study (Mullis *et al.*, 2003:4) reported that teachers in countries with the highest scores in mathematics opted for whole class teaching and not for small group teaching. As both these approaches can be recommended it is preferable to use whole class teaching to lay a foundation for understanding, but to also allow for small group work to discuss and reflect on the information. In order to support the workshops of the training component this CPD programme included a mentoring and practical component, as discussed next.

3.2.6 Section summary

This section discussed the three workshop topics in the training component of the CPD programme. The section on 'Listening for learning' explained the importance of facilitating listening skills as a first step in acquiring auditory processing and phonological awareness skills. The section on 'Language for learning' explained the integration of contextualized and de-contextualized language in the acquisition of literacy skills, whereas the section on 'Language for numeracy' outlined four levels of numeracy vocabulary that learners need to acquire in the process of becoming competent in numeracy. The next component of the CPD programme to be discussed is the mentoring component.

3.3 The mentoring component

3.3.1 Rationale for including mentoring in the CPD programme

There has been a marked change in perspectives on knowledge and learning over the past three decades. This shift can be traced from individual cognitive processing to a more 'situated' learning/cognition, and from individual cognition to groups and learning cultures (Lave & Wenger, 1991 in Sundli, 2007:201). Such a shift creates a

niche for mentoring in the process of professional development. Mentoring is viewed to be crucial in linking theory and practice, and has become an important component of teacher education. It aims to enhance reflective practices and professional development of teachers. Mentoring programmes that focus on training, support, and retention help create an environment that fosters psychological and cognitive growth (Feaster, 2002). Furthermore, a culture of mentoring is thought to encourage teachers to pursue continuing professional growth and self-inquiry, which they are required to engage in for the duration of their professional careers (Campbell & Brummett, 2007:50).

Although a significant body of literature exists on the role of mentoring in CPD programmes in developed countries (Cunningham, 2005:60), limited information is available for developing countries (Halai, 2006:700), particularly regarding the application and generalization of information to the prevalent conditions (Weber, 2007:279). The lack of local knowledge on mentoring calls for fieldwork and more qualitative methodologies (Campbell & Brummett, 2007:50) to contribute to the conceptualization of the process. This programme adopted the 'Do, Review, Learn, Apply' model (DRLA), which was described by Dennison and Kirk (1990:4) (refer to Figure 3-9).

The DRLA model shown in Figure 3-9 was used to organize experiences (e.g. monitoring the participation of various participants when applying a particular set of strategies) that provide opportunities for colleagues to discuss their professional learning deriving from these experiences and to encourage the 'mentees' to record their reflections on the experience (e.g. self-evaluation). The mentoring component supported the training component in the CPD programme and served as link between the theoretical and practical components of the capacity building process (refer to Figure 1.4).

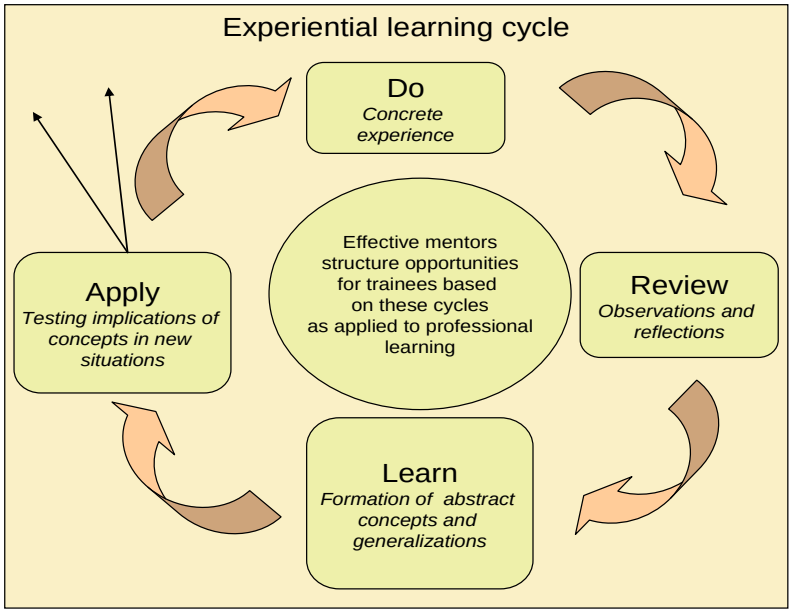

Figure 3-9: The DRLA model of learning

3.3.2 Reflection on competence

The objective of mentoring is to have the mentee progressing through various stages of self-knowledge about his/her competencies. A summary of a theoretical dichotomy of competence (Dubin, 1961 as derived from Cunningham, 2005:61; Dennison & Kirk, 1990:22) is depicted in Figure 3-10.

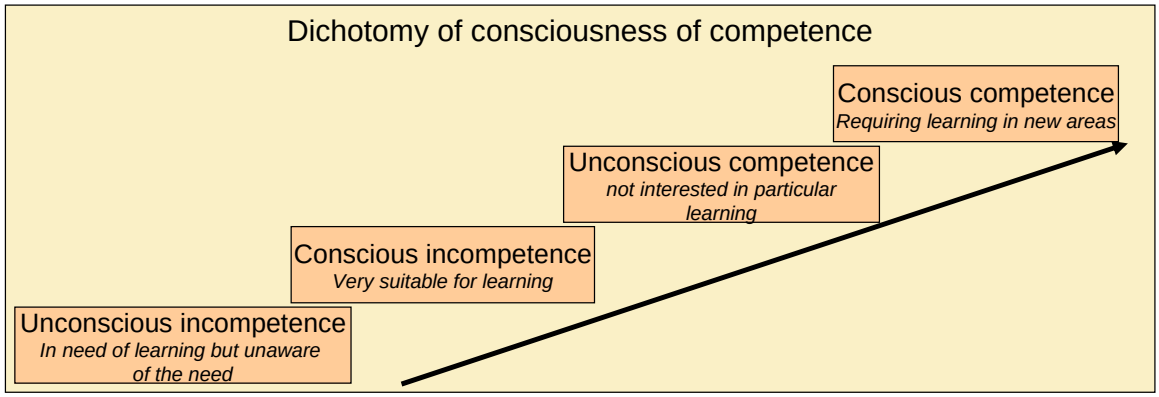

Figure 3-10: Dichotomy of consciousness of competence

The dichotomy of competence shown in Figure 3-10 provides multiple levels of competence and therefore provides an opportunity for progression. Once mentees achieve the ultimate level of competence (conscious competence) they become

ready to acquire learning in new areas. In addition to making mentees aware of their level of competence, mentors also need to guide trainees through several stages of skills acquisition (Dreyfus and Dreyfus, 1986 in Cunningham, 2005:63) ranging from novice, advanced beginner, competent, proficient, to expert levels. Mentors need to support the mentees through the first three levels.

Despite the recent emphasis on reflective thinking in teacher support (Cunningham, 2005:58) the traditional role of the teacher as technician remains to be dominant in schools today (Sundli, 2007:203). Mentoring may be applied to assist teachers to critically examine their beliefs about teaching and learning and to connect their learning to the self-inquiry that is expected of them throughout their professional lives (Campbell & Brummett, 2007:50).

Due to time constraints and limited resources the mentoring component in this study deviated from traditional mentoring in that the mentor (trainer) did not observe individuals in the classroom. Instead, peer reviews were employed for constructive feedback on the participants' implementation of strategies in the classroom. The participants therefore were provided the opportunity to mentor each other, but also to become the mentee.

The trainer took on a more conventional role as mentor by providing individual written feedback (Sundli, 2007:203) on practical assignments which included lesson plans. The critical analysis and evaluation of lesson plans are considered a key mentoring strategy (Campbell & Brummett, 2007:53). Such feedback is considered to be the most prominent feature of mentoring in the professional development of teachers (Kwan & Lopez-Real, 2005:275). Although the combination of these two forms of mentoring addressed both components of true mentoring, it was not guaranteed that they would be equally effective for the mentees.

In this CPD programme the practical component consisted of written lesson plans and the implementation of strategies in the classroom. In addition, small groups in each participating school were required to meet once a week for a collaborative planning session (Cunningham, 2005:94). They were also required to observe one another's classroom implementation which created the opportunity to mentor each other and to learn from each other. The district facilitators were required to monitor the implementation of strategies in the classrooms over time.

Mentees were furthermore provided with training support materials consisting of examples of lesson plans on five different themes, as well as a CD of the video material used in the training to demonstrate specific strategies. In this case, the mentees were encouraged to reflect on their own practice. Participants were required to implement their strategies and were given the freedom for trial-and-error learning as it provided them the opportunity to construct their own meaning.

3.3.3 Section summary

The application of mentoring in this particular programme was discussed in terms of group learning, peer learning, and personalized feedback provided by the trainer in order to develop the reflective competence of teachers. The third component in this particular programme was the practical component, which was integrated with the training and mentoring components.

3.4 The practical component

Participation in the practical component of the programme required the trainees/participants to implement the strategies learnt in the workshops (training component) in their classrooms. The practical components required of them to compile a portfolio assignment that was assessed by the trainer/researcher.

3.4.1 Rationale for including the practical component

Support programmes need to include factors that enhance the learning process (e.g. accommodate individual learning styles and strengthen interpersonal relationships), and restrict those that may affect it negatively. Contrary to traditional learning approaches where teachers have to digest information passively, portfolios based on experiential learning (Dennison & Kirk, 1990:4; Kolb, 1984:4; Smith, 2001) bring together theory (conceptualization and reflection) and practice (experience).

A portfolio is a focused, purposeful collection of traditional and non-traditional work that represents a student's learning, progress, and achievement over a period of time (Wenzel et al. 1998 and Karlowicz, 2000 in Liu, 2007:1117; McMullan *et al.*, 2003:288). Portfolio development provides the opportunity for trainees to become actively involved in the learning process.

The process of portfolio development has been reported (Pitts, Coles & Thomas, 2001:354) to install confidence in trainees and to contribute to the professional growth and development of teachers (Wray, 2007:1). It is an appropriate method of teaching and learning in a context where teachers may feel ill-equipped and uncertain about implementing the new curriculum.

The usefulness of portfolios depends on the stage of learning the trainees have reached (Niemi, 1997, and Al-Shehri, 1995 in Pitts *et al.*, 2001:354) and may have less value in the earlier stages of learning when trainees do not know enough about the subject, or lack appropriate experience to allow them to ask meaningful questions.

Price (1994:35) differentiates between the product role, the proof of achievement, and the process-orientated role which signifies personal and professional growth. It is a collection of evidence of both the products and processes of learning. The

portfolio serves as a vehicle to learning, where the process is more important than the product (Glen and Hight, 1992 in Pitts *et al.*, 2001:354).

In this CPD programme portfolio development firstly created an opportunity for learning as it aimed to stimulate trainees to engage in higher levels of thinking through inquiry and reflection. Secondly, the portfolios were used in the evaluation of the programme to provide information about what was learned, but also about programme strengths, weaknesses and levels of implementation to enable the trainer to gain insight in the efficacy of the instruction and of the programme (Johnson *et al.*, 2006:9; Wray, 2007:1139).

The portfolio as an assessment method is considered to be highly subjective and not suitable to be used on its own (Johnson *et al.*, 2006:6). In this study it was used in addition to other more traditional assessment methods. The use of a rubric was particularly useful as a means of formative evaluation of this programme (Pitts *et al.*, 2001:354) as it quantified levels of performance over a continuum (ranging from ineffective or low levels, to high or expert levels). This rubric measured performance, behaviour, skills, and quality to allow for more consistent scoring that increased the reliability as an assessment procedure.

3.4.2 The process of portfolio development

With reference to Figure 3-11 it is evident that the development of the portfolio is cyclical in nature. According to Figure 3-11 the process of portfolio development consists of problem identification, action planning, implementation, evaluation, reflection, and self-evaluation, and can be achieved collaboratively as it forces trainees to a deeper level of self-examination, and allows the trainer to understand the reasoning behind it (Johnson *et al.*, 2006:22). The compilation of a portfolio requires some form of questioning because the trainees are constantly trying to

perfect their skills and to document these skills and knowledge. Reflection is therefore an integral part of the process.

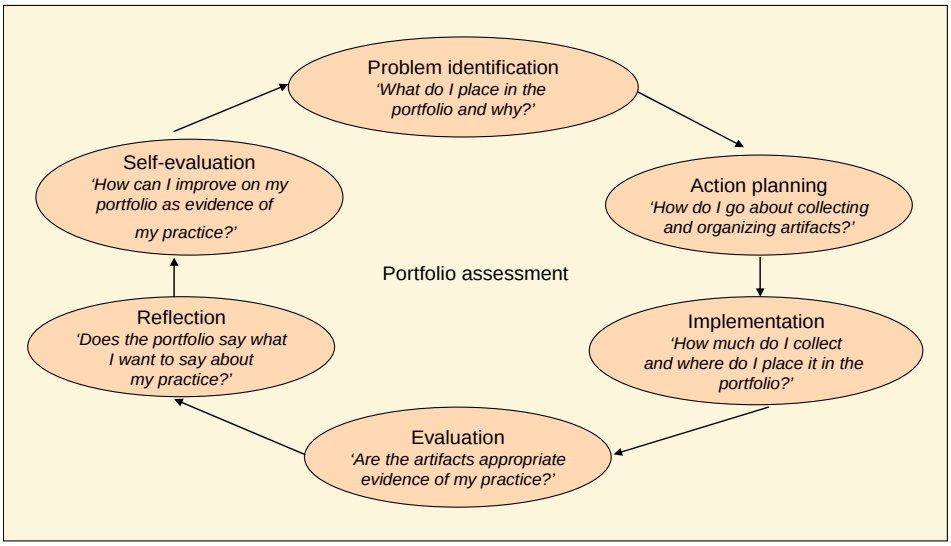

Figure 3-11: The action research cycle as applied to the portfolio

The participants in this study were required to implement the strategies learnt in the workshops for a specified period following the training, and to submit portfolio assignments with samples of learners' work and integrated lesson plans. In order to support each other in their lesson planning, trainees were required to work in groups of four in their schools (Killen, 2007:168). Such collaborative learning entailed the sharing of ideas and resources, which was linked to the theoretical framework of social constructivism (Wray, 2007:1146). The support created by the small group created a safe environment where the participants could support and mentor each other.

The portfolio assignments in this study consisted of specific items such as lesson plans and artefacts, monitoring sheets for three learners' participation in the strategies, peer evaluation, and a self-evaluation (refer to Appendix 5E), which facilitated ownership and self-assessment. Portfolio development required the participants to reflect on the reasons for developing the portfolio and on what they have achieved in the process. This also determined the types of classroom teaching

examples that were collected. Furthermore, portfolio development fostered a more interpersonal approach to teaching and learning as it facilitated collaboration and more dynamic interaction between the trainees/participants, the trainer/mentor, and the learners.

The portfolio assignments encouraged the trainees/participants to become more active in the learning process, and required engagement in more complex thinking and self-evaluation in choosing samples of what they had learnt in the workshops. Skills such as sorting, selecting, describing, analyzing, and evaluating served as evidence of accomplishment, indicating how he/she could improve in personal practice (McMullan *et al.*, 2003:290). Although portfolios may have many benefits as tools for authentic assessment, they require careful guidelines for reflection to become truly meaningful as a learning experience. It is generally understood that portfolios are complicated and time consuming, and that they require sufficient discussion to explain their purpose (Wray, 2007:3).

3.4.3 Section summary

The inclusion of a practical component in the CPD programme reinforced the information trained. The portfolio assignments provided opportunities for reflection and practice-based learning. Rubrics were used to ensure higher degrees of objectivity, consistency, and reliability of scoring.

3.5 Conclusions

Many learners in South Africa are at risk of developing learning problems and therefore it is important that CPD programmes for foundation phase teachers include information regarding the facilitation of listening and language for learning. As the process of learning is as important as the outcomes, a constructivist approach is well

suited for teacher support (Killen, 2007:368). The design of this particular programme encapsulates training, mentoring, and practical, to develop foundational, practical, and reflective competencies. Thus, the design of the CPD programme was not only comprehensive, but also aligned with OBE. This programme, however, needs to be evaluated for future use. It is therefore necessary to explore the process of programme evaluation in the next chapter.

3.6 Appendices

Refer to the separate Compact Disk for all appendices.

Appendix 3A	*Curriculum design for the training component*
Appendix 3B	*Handout for "Listening for learning" – workshop 1*
Appendix 3C	*Handout for "Language for learning" – workshop 2*
Appendix 3D	*Handout for "Language for numeracy" – workshop 3*
Appendix 3E	*Portfolio assignments*

Chapter 4 Programme evaluation

"Not everything that can be counted counts and not everything that counts can be counted."

(Albert Einstein)

Aim of this chapter

The development of a programme is not complete without proper evaluation. The aim of Chapter 4 is to explore literature that describes the process of programme evaluation to serve as the theoretical underpinning for developing an evaluation model for this study. Figure 4-1 provides a schematic outline of topics covered in this chapter.

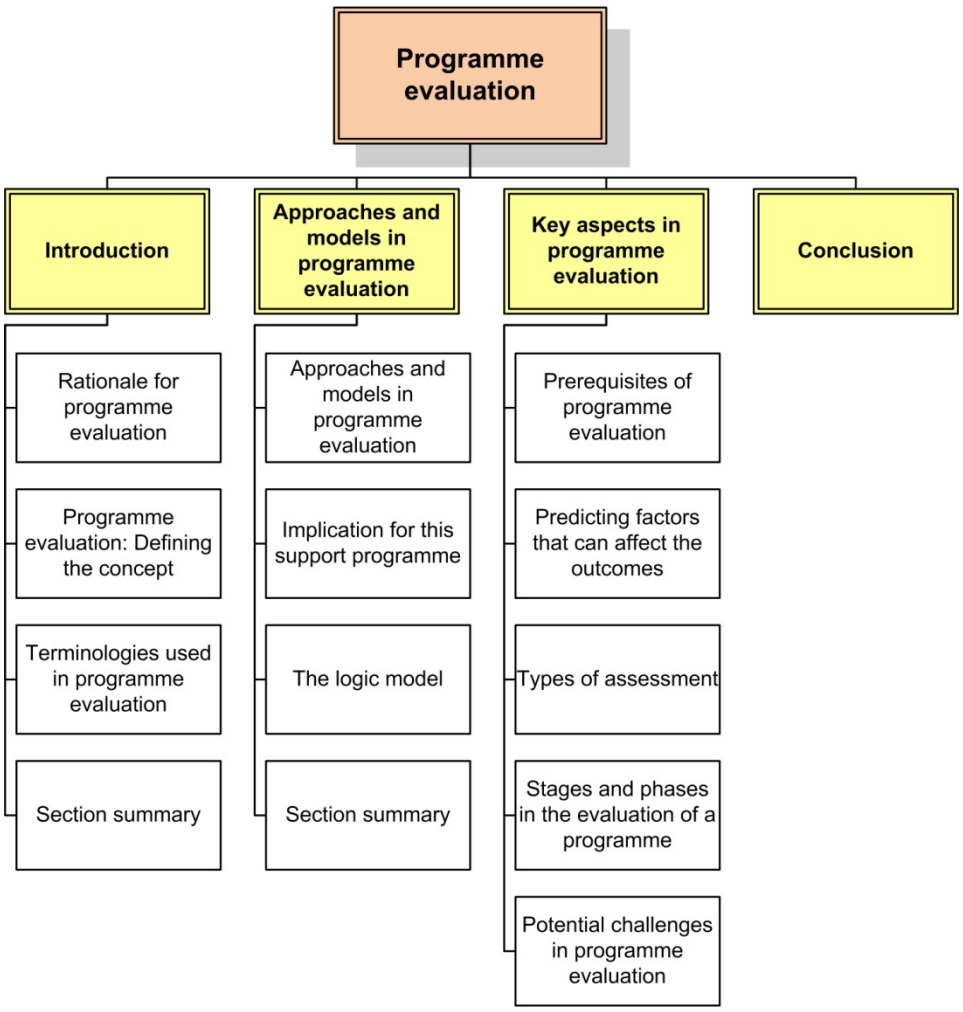

Figure 4-1: Outline of Chapter 4

4.1 Introduction

4.1.1 Rationale for programme evaluation

The support of teachers in South Africa requires a national effort, both from inside the education departments, as well as from private initiatives (e.g. NGOs, universities, service providers, etc.) (Department of Education, 2006:1; Hindle, 2009:9). The increased emphasis on human resources and professional development necessitates the credible evaluation of training practices to allow their future use (Salas & Cannon-Bowers, 2001:471). This renewed interest in accountability, continuous programme improvement, learner outcomes, and the importance of training and professional development in the field of education (Denzin & Lincoln, 2005c:913; Winberg, 1997:81) requires resources in education to be effective and efficient (Belzer, 2005:33; Harrison *et al.*, 2001:200). Therefore educational activities need to be evaluated to ensure that participants will professionally benefit from them (Guskey, 2002:38). Patton (2002:10) described the criterion for judging programmes as the extent to which it can be used to make decisions that improve the programme, which implies that the intended user must be able to value the findings and find them credible.

In the course of time, changes have occurred in educational programme development. Earlier practices in educational programme evaluation focused mainly on learner testing, whereas later efforts consider outcomes (knowledge, skills, and attitudes), alternative programme designs, and the effectiveness of operations (Kellaghan, Stufflebeam & Wingate, 2003:2). This development eventually led to an improvement in the effectiveness of teaching and learning, and ultimately to the quality of education (Lam, 2001: 2 in Beerens, 2000:6; Monyatsi *et al.*, 2006:217). It is important to recognize this shift in emphasis when establishing the value of a

programme. Programmes no longer aim only at providing educators with increased skills, but also at ensuring increased opportunities for ongoing collegial networking, student learning, and at promoting organizational goals (Beerens, 2000:5; Dixon & Scott, 2003:289).

Because much can be gained from cross-fertilization from other disciplines in the field of evaluation (e.g. health, social work, welfare, and the criminal justice system), evaluators of educational programmes should learn from and contribute to the general community of evaluation researchers (Kellaghan *et al.*, 2003:3). However, programme evaluators also need to remain sensitive to the unique features of their own particular area in order to serve the needs of education and its components within a broader systemic approach. Although programme evaluation is mostly done with specific external audiences in mind (Kraiger, 2002:336), it can also be employed by the researcher to understand the programme (Patton, 2002:11). In the latter case, the researcher/evaluator performs the evaluation as part of the development process, but with the intent to share the findings with several stakeholders. As programme evaluation is a complex procedure consisting of various aspects, it needs to be defined before further exploration of the topic.

4.1.2 Programme evaluation: Defining the concept

Definitions draw the attention to the various terminologies used to describe the aspects involved in programme evaluation, and terms such as evaluation research, programme evaluation, and evaluation are used interchangeably as if they are synonymous. Although programme developers (Monyatsi *et al.*, 2006:215; Patton, 2002:10; Patton, 2003:34; Rae, 2002:2) each emphasize different aspects to be included in the evaluation of programmes, they concur that in essence it is focussed on describing the 'value and worth' of the programme.

Rossi et al (2004:3) defined programme evaluation as the "…use of social research procedures to systematically investigate the effectiveness of social intervention". Emphasis on being 'systematic investigation' was also evident in the definitions from the Joint Committee on Standards for Educational Evaluation (1994: 3 in Guskey, 2002:38) and well as Patton (2002:10), which implies careful planning in terms of data collection procedures and appropriate use of methods and techniques in the analysis (Scriven, 2004).

Patton (2002:10) described programme evaluation as the "…systematic collection of information about the activities, characteristics, and outcomes of programs to make judgments about the program, improve program effectiveness, and/or inform decisions about future programming". This definition is comprehensive as it addresses both the purpose of the evaluation, the process, and the outcomes. The systematic evaluation of a programme is crucial for quality control and reliability.

When educational programmes are evaluated it should be professionally conducted to provide reliable and authentic results with regard to the "…merit, worth, and value of things" (Scriven, 2004) which can aid in decision making. The steps followed when conducting a programme evaluation comprise the selection of criteria of merit, the standards of performances (assessment criteria), the gathering of data and, finally, the integration of the results, which implies the judgement of its value *(Ibid.)*.

Such an investigation provides feedback on the effects of the training programme (Hamblin, in Rae, 2002:3) and includes both the processes of validation and evaluation. It implies that more than one source of information have been consulted and that several types of data have been collected/generated.

The Institute of Training and Occupational Learning (ITOL) (in Rae, 2002:2) specifies validation as the process that determines whether the training achieved what it set

out to achieve. This implies that the outcomes need to be compared to the initial objectives of the programme and involves both internal and external measurements (Tredoux, 2002:3, 9). When considering the total value of a programme it includes cost-effectiveness and the overall benefit of the complete training programme (Rae, 2002:2). Evaluation of a programme therefore differs from validation in that it is concerned with the overall benefit of the complete training programme and its implementation ('outcomes'), and not just the achievement of the laid-down learning objectives ('output'). The aforementioned definitions of programme evaluation identified relevant terminologies, which are discussed next.

4.1.3 Terminologies used in programme evaluation

The terms 'evaluation research' and 'programme effectiveness' were already addressed in Chapter 1, but terms such as '*assessment',* and *'evaluation'* continually appear in discussions on programme evaluation and although semantically related, each of these terms has distinctly different roles. When the term 'a*ssessment'* is applied to programme evaluation, it requires attention to individual outcomes and also previous experiences that have led to these outcomes (Kouwenhoven *et al.*, 2003:135). It seeks to measure a learner's skills, performance or knowledge in a subject area, and occurs either prior to, during, or following the learning (ITOL, 2002 in Rae, 2002).

When '*evaluating'* a programme, the entire process is described and judged (Wood, 2001:10), including cost and time factors that can be expressed numerically. Programme evaluation requires an institutional shift in thinking where the goal is not a precise numerical figure, but a global assessment with specific narrative feedback (Wilkes & Bligh, 1999:1270). The term programme '*evaluation'* thus adds a reflective dimension to the overall process and is suitable to describe the process used to

evaluate the value and worth of a programme. Evaluation cannot change anything in the programme, but can only make recommendations for changes in future programmes.

4.1.4 Section summary

This section provided a rationale for programme evaluation, which emphasized not only the need for professional development programmes, but also the need to evaluate such programmes for the sake of accountability. Programme evaluation was defined and a distinction was made between the terms 'assessment' and 'evaluation', 'Programme evaluation' is regarded as a comprehensive description of the total value of a training programme and therefore requires the evaluation of the input, process, output and outcomes, as well as cost-effectiveness.

4.2 Approaches and models in programme evaluation

4.2.1 Overview of approaches to programme evaluation

The approaches to programme evaluation and models of procedures are reviewed to discover their specific focus areas as these allow for tailoring the evaluation of the programme developed in this specific study. It is accepted that the socio-political environment has a strong influence on methodologies, which in turn are intricately linked to individual behaviour, attitudes, and context. Since the early 1900s programme evaluation has evolved through several stages that were described as various *moments* (also referred to as *generations* in some texts*)* (Denzin & Lincoln, 2005d:20; Guba & Lincoln, 1989:12). Figure 4-2 provides a summary of the various moments and illustrates the changes in the roles of evaluators that have occurred over time.

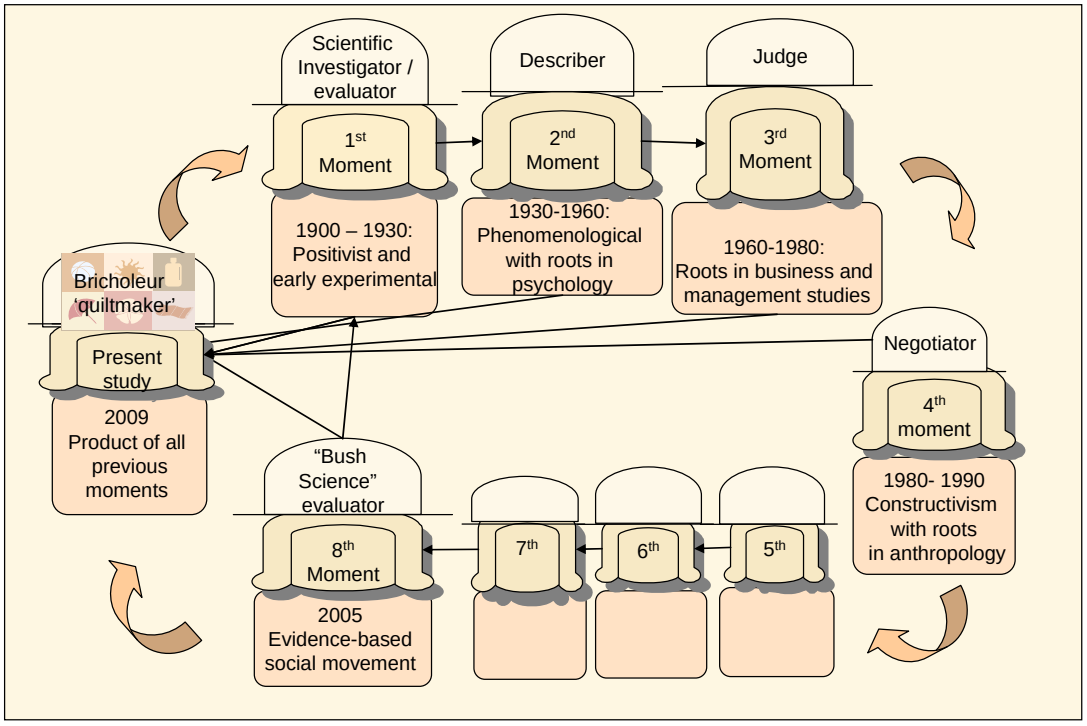

Figure 4-2: The various moments in programme evaluation

With reference to Figure 4-2, it is clear that each moment built on its predecessor and therefore this study can be regarded as a product of all of these moments. The present evaluation draws from the first moment, which has its roots in a positivist philosophical approach. Such an evaluation provides information obtained from experimental designs, linking it to pure 'science' (Denzin & Lincoln, 2005c:913).

Experimental designs rely on established criteria and methods, e.g. measuring, testing, statistically analyzing, and listing attributes. An advantage of experimental designs is their relative ease of administration, but they can be subject to personal bias, or conflicting interests, and a reliance on technology (Denzin & Lincoln, 2005c:913; Winberg, 1997:84). Designs of this nature seek causal links between input and output, and consider the participants included in the study as 'objects' of study. Positivism is criticized for not allowing for an in-depth inquiry into human behaviour and therefore presenting a superficial view on the investigation (Bond,

1993, Moccia, 1988, Payle, 1995 in Crossan, 2003:51). It also disregards the environment in which the programme is implemented. The approach measures achievement against objectives and is therefore suited for quantitative inquiry. This specific programme is rooted in positivism as the gains made in knowledge in each of the workshops are determined with pre- and post-training questionnaires. The role of the evaluator/researcher in this type of evaluation is more of a technical nature where he/she is distanced from the subjects under investigation, posing as an *investigator* (Winberg, 1997:86).

The evaluation of the programme in the current study also relates strongly to the second moment (1930-1960) depicted in Figure 4-2, that stemmed from a phenomenological philosophical approach with roots in the field of psychology. The purpose of such evaluations is to determine whether objectives have been met (Jacobs, 2003:63). Although this type of approach provides information on the number of outcomes achieved, the focus is mainly on the product and as a result presents an oversimplification of the matter. Such quasi-evaluation models aim at supporting decision-making in the sense that they are mainly about success in management terms (e.g. determine whether the programme is on time, on target, and on budget). Programme evaluations that are based on a phenomenological approach serve a monitoring role rather than an evaluative one.

In this study where the CPD programme has to be evaluated against the previously agreed learning outcomes, results need to be explained in an interpretive manner. The evaluation report has to focus on recommendations for the improvement of future programmes. Although the roles of the participants will vary, the evaluator's role is that of a *describer* (Winberg, 1997:86).

To a much lesser extent, the study is also aligned with the third moment (1960) in

Figure 4-2, i.e. programme evaluation that is based on business and management studies and has an economical interest in the value of the programme (Guba & Lincoln, 1989:8). This type of information is important to funding agencies who wish to see a return on their investment, and therefore judgement regarding the worth of the programme is made in terms of costs and benefits (Jacobs, 2003:64). Programme evaluation based on management studies is required for rational decision-making and relies on all stages of the development of the programme.

A summative process produces a final evaluation report. The benefit of this type of evaluation is its concern with productivity and cost-effectiveness, both of which are currently of major importance to organizations and funding agencies. However, it does not allow for cross-examination of the findings. Participants do not play any role in this type of evaluation and the evaluator's role is that of *a judge* (Winberg, 1997:86) in determining whether the programme has provided value for money *(Ibid.).* In this study, this type of evaluation is part of basic project management, as costs have to stay within a stipulated budget and feedback has to be provided in terms of cost-effectiveness in determining the value of the programme.

The previous three moments of evaluation can provide all the necessary answers to stakeholders with measurable statistics (Denzin & Lincoln, 2005c:913), but does not explain human behaviour. People experience life in different ways and develop unique values and roles as a result. Experiences allow for many constructions of reality, and it is for this reason that a fourth moment of programme evaluation emerged (Guba & Lincoln, 1989:8). This fourth moment in evaluation (see Figure 4-2) requires a paradigm shift from behaviourism to constructivism and has a disciplinary base in sociology and anthropology. This movement identifies *the crisis of representation* (Denzin & Lincoln, 2005d:19), which remains to be relevant in the present time.

Evaluators aligned with the fourth moment acknowledge that there are several stakeholders in the evaluation process, and in an effort to describe the programme holistically, they attempt to include as many of their views as possible. As constructivists they reflect on multiple realities and make use of inductive reasoning and inquiry after experiencing these realities firsthand and using methods such as interviews and triangulation (Dirx, 2006:283). In this type of enquiry, the variables evolve over the course of the evaluation during the evaluator's interaction with the participants.

The focus of fourth-moment programme evaluations is on the context and not only on the output or outcomes. It makes use of a wide variety of information to create understanding or 'meaning'. Both quantitative and qualitative approaches are used realistically to explain not only the physical, but also the metaphysical (Letrourneau & Allen, 1999:623), a process which was explained by Guba and Lincoln (1989:8) as 'critical multiplism'. It therefore includes approaches previously advocated by the positivists, but also those aspects that cannot be observed to explain behaviour.

Post-positivist approaches are criticized for their close proximity of the evaluator to the participants, which could cause bias. This personal nature of the research also makes it difficult to replicate or generalize, and it tends to avoid closure, which makes it labour intensive and non-directive (Winberg, 1997:86). In order to conduct such an evaluation, the evaluator has to become a *negotiator* (Winberg, 1997:86). In this particular study, the evaluation report has to be holistic and has to use a descriptive approach to derive at recommendations for future programmes.

The fourth-moment approaches served as basis for the collaborative and empowerment approach (Fetterman, 2002:89) that does not greatly emphasize issues such as confidentiality, credibility, cost, or time, and may at times require distancing between the evaluator and the evaluated. In ideal conditions, and if

strictly controlled, this type of approach can "…improve consumer sample representativeness, the ethical mandate, the quality and span of relevant data gathering, the probability of implementing recommendations, the avoidance of factual errors or other aspects of the quality of the evaluation" (Scriven, 2003:23).

Although these first four moments in Figure 4-2 built on the experiences of their predecessors, they gave rise to many questions and created the need for qualitative research, which resulted in much debate and polarization (Denzin & Lincoln, 2005c:913). Quantitative and qualitative methods, however, need not be used in juxtaposition to each other as it is possible to use them in concurrence, and hence obtain a better understanding of the problem being investigated (Leech & Onwuegbuzie, 2005:267).

Because educational programmes are complex and teaching is spread across varied disciplines in the field, it is not possible to adhere to just one approach. As this would limit the evaluation and create many problems, the ideal appears to be to implement diverse methods. In addition, the use of reflection and narrative with one's own practice could contribute to the quality of the evaluation (Dirx, 2006:285).

Recent international political changes evolved in what is called an *eighth moment* (Denzin & Lincoln, 2005a:15). Programme evaluators influenced by neo-conservatism in the United States, view the approaches that were advocated by fourth-moment evaluators with scepticism (Denzin & Lincoln, 2005c:913). Currently accountability is highlighted, which favours evidence-based practices. The influence of the socio-political environment on programme evaluation is once again emphasized (Datta, 2003:345).

Although cost-effectiveness plays a part in the evaluation of this study and will contribute to the final judgement of whether the programme was a success or not,

this particular programme cannot rely on such information only, as it can potentially suppress creativity or innovation (Winberg, 1997:86).

When reflecting on these moments, it appears that programme evaluation has come full circle (R.E. Owens, personal communication, June 26, 2006). There is renewed interest in earlier positivist approaches with policy-makers and funding agencies now demanding scientific proof of the effectiveness of programmes (NCSALL, 2003:2). Nevertheless, earlier criticism of the positivist approach remains relevant and whether this approach points the way to the future remains to be seen.

4.2.2 Implication for this support programme

As a developing country with a new democracy in a post-apartheid era, South Africa faces challenges that differ from those experienced by developed countries in terms of poverty, HIV and AIDS, language issues, and literacy levels. In this particular context, there is an urgent need to understand how people think and make sense of their own reality, and their ability to adapt to change. Notwithstanding the changes made by the new dispensation in South Africa to governance and policy, attitudinal changes are required to develop an organized, coherent society. It is questionable whether such a state of complete homeostasis is entirely possible, seeing that many complex adaptive systems rarely establish equilibrium (Hudson, 2000:217). Nevertheless, the learning system is known to allow self-organization, rather than attempt to control bifurcation through planned change. Haynes (1995:3), for instance, was of the opinion that the use of chaos theory would strengthen multidimensional assessments that depend on time sampling, longitudinal, and ideographic approaches to assess and evaluate.

The need for multidimensional assessments steers the study towards the eighth moment in programme evaluation with a call to provide evidence of success, and in

part finds common ground with the first moment that provides scientific 'proof' (Muller, 1999:47) of how much knowledge was gained. In addition, the present study resonates with an interprevist-constructivist view of reality (second and fourth moments) (Lincoln, 2003:69). Even though the evaluation of this study does not have strong alliances with the fifth, sixth, or seventh moments, they all contribute to the entire process of programme evaluation as each of these approaches has built on the contribution of the previous one. Just as the present (the eighth) moment is the result of all its predecessors, the evaluation of this CPD programme is influenced by all previous approaches (Denzin & Lincoln, 2005c:914).

The evaluation of this CPD programme has to piece together the parts from each moment to corroborate both quantitative and qualitative information in order to form a comprehensive understanding of its 'value and worth' (Johnson & Onwuegbuzie, 2004:15).

However, as the researcher aimed to provide information to various stakeholders, the evaluation of this programme leans towards what Payne (1994) described as 'management approaches', rather than the judicial, anthropological or consumer models (Payne, 1994:3). The current evaluation considered all but the judicial models for the evaluation of this particular programme.

(a) Management approaches

Management models that were consulted included Patton's (2003:223) 'Utilization focused evaluation', the 'CIPP model' (Stufflebeam *et al.*, 2003), multi-level taxonomies and the 'Programme Logic Model' (Coffman, 1999) among others.

(i) Utilization focused evaluation model

The utilization focused evaluation model (Patton, 2003:223) focuses on 'intended use by intended users' in order to meet the intended users' needs. This type of

evaluation requires intended users to be involved in the interpretation of the findings and the dissemination of such findings for future use. In this case the evaluation was conducted as part of the programme development process as a pilot study and was therefore not intended as a large-scale evaluation that had to be implemented in a wider context.

(ii) CIPP model

Stufflebeam's CIPP model (2003:31) specifically addressed the variables that educational administrators have control over. In the CIPP model, data is gathered to describe the "Context, Input, Process, and Product;" but data analyses relates to the immediate management of the program. This approach was criticized for being biased towards the concerns and values of the educational establishment (Scriven in Stake, 1973) and fell out of favour because programme managers were unable or unwilling to examine their own operations as part of the evaluation.

(iii) Multi-level taxonomies

The four-level Kirkpatrick model for programme evaluation considered *participants' reactions, learning, behaviour*, and *results*. Despite being widely used till this day, the Kirkpatrick model has been also criticized as being a 'flawed four-level approach' (Holton, 1996:643) because it was built on three assumptions (Alliger & Jannack, 1989 in Kraiger, 2002:334). Firstly, it assumed that each level depended on the successful completion of a lower level in the hierarchy. Secondly, it cannot be regarded as a model but rather a taxonomy as it lacks the rigour of a true scientific model. Kirkpatrick's approach is not theoretically based, and has roots in the behavioural perspective that originated in the 50s. More valid models currently used are rooted in an understanding of how people learn, and are in accordance with the more recent cognitively based information-processing theories (Kraiger, 2002:334).

Thirdly, the Kirkpatrick model (Holton, 1996:643) implied that linkages exist between

most of the levels, but failed to specify the relationships between linkages because it does not clarify the constructs at most of the levels. The purpose of the evaluation that steered the methods used was not considered. The model also lacks a financial assessment (Rae, 2002:4) required by stakeholders.

Several followers of the Kirkpatrick approach tried to improve on the original model. Hamblin (Rae, 2002:4) as well as Alvarez *et al.* (2004:392) added a fifth level where the ultimate value of the programme is evaluated, which brought programme evaluation and programme effectiveness closer together. Tannenbaum *et al.* (Cannon-Bowers *et al.*, 1995:141) added post-training attitudes as outcomes and divided behaviour into training performance and transfer performance as outcomes.

Warr, Bird and Rackham (in Rae, 2002:2) took the Kirkpatrick model further by identifying training needs, by evaluating the current conditions of the operational context of the event, by describing the performance problems to overcome in ultimate objectives, as well as the changes in operational performance at an intermediate stage and immediate objectives and their achievement. When compared with the Kirkpatrick (Holton, 1996:643) and Hamblin models (in Rae, 2002:4), the Warr, Bird and Rackham model (in Rae, 2002:2) added to the process of evaluation by specifically focusing on the evaluation of input, but also evaluated the reaction of the participants as part of the output, which makes it a holistic overview of the entire process.

Although these models contributed to the conceptual thinking of evaluation, they remain taxonomies or simple classification themes, which have been incompletely implemented with little empirical testing (Holton, 1996:643). Taxonomies are difficult to validate, as they do not fully identify all constructs underlying the phenomena of interest such as the intervening variables (e.g. trainee readiness and motivation, training design, and reinforcement of in-service training). The aforementioned

models appear to assume that a group of trainees is homogeneous, which is not the case in the current context where education and language levels vary. Programme evaluation models built on the four-level Kirkpatrick model failed to provide adequate information to make decisions regarding interventions, and therefore were not suitable as diagnostic tools or for use in this study.

(iv) Goal achievement approach

The latest trend in the evaluation of educational programmes is to move away from classifications driven by the content of a domain, and to move toward a format of agreed-upon competencies (which is an outcomes-based approach) (The American Council for Graduate Medical Education, 2006). Miller's pyramid model (1990:63) proposed different levels of competencies, presented as tiers of a pyramid, as depicted in Figure 4-3 (Melnick, 2004:7).

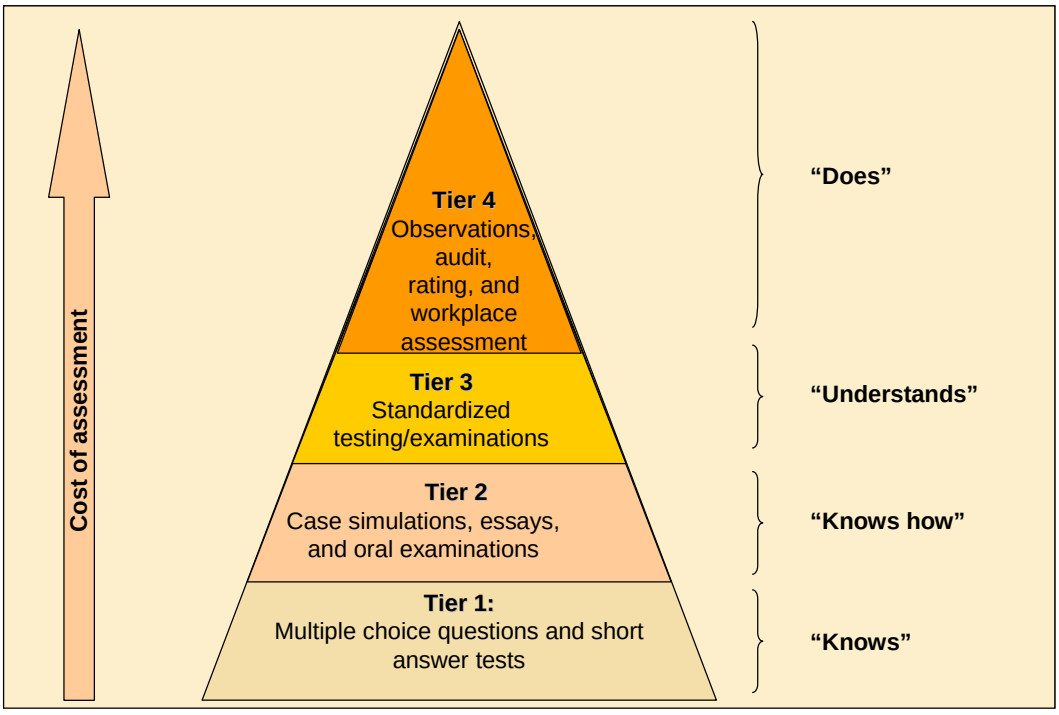

Figure 4-3: Miller's pyramid model for evaluating CPD programmes

Although helpful in describing the evaluation of the output and outcomes of the programme, it appears to ignore the importance of the variables considered as input

(e.g. the organizational culture, or motivation) and the process of training, which are required for describing the effectiveness of training. Figure 4-3 shows that the complexity of assessment increases as one ascends the tiers of the pyramid.The model shows a correlation between complexity and cost, with cost rising as the level of complexity increases. Ideally, the lowest level to provide a valid result for the intended purpose should be selected by simultaneously weighing it up against factors such as cost, efficiency, and reliability (Miller & Watts, 1990:70).

(v) Discrepancy evaluation

The approaches referred to above developed into another group of procedures which supports the 'goal-achievement' approaches (Scriven, 2003:20). This is called 'discrepancy evaluation' because it determines the discrepancy between the programme goals and the programme use (Agyris, 1978 in Patton, 2002:163). These evaluations collect data by using objective measuring instruments and hence describe inconsistencies between data and accomplishments. The main advantage of such a model is that it reduces problems to the most simplified form in order to be understood, and therefore this study adopted the model to inform stakeholders. However, information on whether an objective is met does not contribute to programme improvement, and therefore it was necessary to also consider other models for use in this study. The South African context requires special consideration because participants enter the training situation with different educational backgrounds, demographic statistics, and terms of reference.

(vi) The Logic Model approach

A similar systems approach as the CIPP model is the Logic Model, which is *"…a reasonable, defensible, and sequential order from inputs through activities (process), to outputs, outcomes, and impacts"* (Patton, 2002:163). Logic Models are particularly useful in identifying causal connections (e.g. 'if…then…' statements that

underlie decision making). Because they provide conceptual frameworks they are considered valuable tools for systems level planning and evaluation (Julian, 1997:251). Such models are most suitable for the evaluation of educational programmes (Coffman, 1999:30). The Logic Model was selected for the evaluation of this programme because of its ability to organize and condense information within a logical framework in which needs are also considered. This particular programme evaluation, however, does not exclude the anthropological models which rely on qualitative research, or any of the consumer models (Scriven, 2003:15).

(b) Anthropological models

The 'Responsive evaluation' model (Stake, 1973) emphasizes the importance of evaluators being flexible and responsive to stakeholders' issues and needs. Stake's use of the term 'preordinate evaluation' (which means the evaluation relies solely on formal plans and measurement of pre-specified programme objectives) when referring to traditional models of evaluation appears to be somewhat derogatory. Qualitative methods seem to be most suitable as they are more flexible in responding to the needs of the stakeholders. The anthropological approaches require the researcher to enter the field in order to observe and to collect additional data for the purpose of triangulation. As flexibility is the key, the various evaluation activities need not be done in a linear order. This kind of evaluation is a responsive approach as the findings are presented as narrative or case study, although they are also discussed informally with stakeholders to increase their input and participation.

(c) Consumer model

This model adopts the 'consumer approach' with Scriven (2003:15) as the primary evaluation theorist. The evaluations are mainly summative and depict the 'merit or worth' of a particular product without considering the process or the context. The

goal is to determine whether a product is acceptable or not and how well it compares to similar products. This approach cannot easily be transferred to the education context as educational programmes are complex (many elements and factors may affect them) and much more difficult to evaluate than consumer products.

This researcher's theory of evaluation was therefore not based on any particular model of evaluation, as an eclectic approach was considered to be most appropriate for the needs and requirements of the context. However, the framework of the Logic Model was used to structure this particular evaluation, as discussed in detail below.

4.2.3 The logic model

(a) Describing the term

The Logic Model is an expansion on the basic behaviouristic input-output approach (also referred to as the 'black-box approach'), where the components and functions of each are unknown (Snowman & Biehler, 1996:251). The limitations of the input-output approach created the need for considering both the *input* and the *process* so that the underlying structure, mechanisms, and dynamics of the learning process could also be included (Julian, 1997:251).

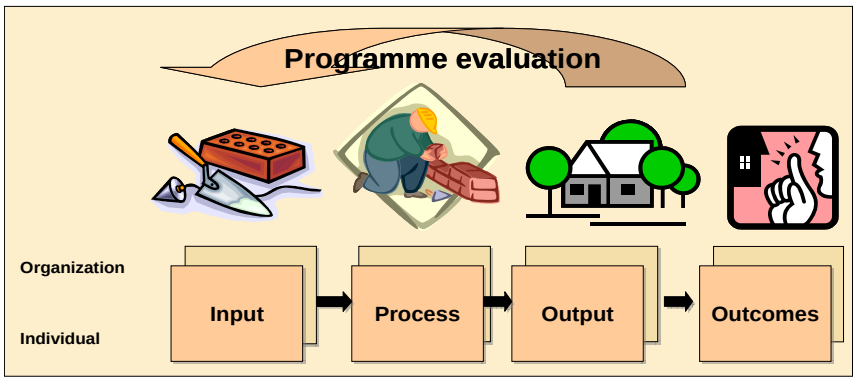

Figure 4-4: Simile of a Logic Model applied to programme evaluation

The framework created by the Logic Model supports a paradigm of human learning

proposed by cognitive psychology (Snowman & Biehler, 1996:251; Sternberg, 1999:56) and enhances the process of learning through evaluation. The Logic Model defines concepts such as components, relationships, and the environment, and is explained as follows (refer to Figure 4-4):

The Logic Model approach to programme evaluation can be explained by comparing it to the building of a house, as depicted in Figure 4-4. The goal of the family is to build a house to live in. The 'input' can be regarded as the building materials, the site, and the architectural plans as well as sufficient funds to pay for building a house (e.g. bricks, cement, sand, wood, etc.), whereas the 'process' represents the actual building of the house from the foundation up to completion.

The 'output' is the completed house that is delivered to the owners, and what they make from it. The output should, however, not be confused with the 'outcomes'; the house should become a home for the family to live in.

The outcomes are measured in terms of how the family feels about the house and whether they enjoy living in it, or how they adapt to the neighbourhood. Some external factors could potentially affect their happiness and the homeliness of the house (e.g. crime, economic situation, political environment, social/cultural context, geographic constraints, etc.), and need to be taken into consideration throughout the process.

In assessing any training programme, it is therefore necessary to take cognizance of the inputs, the outputs, how it is done (i.e. the process), and the outcomes. The evaluation of a programme can be conducted on an individual level or on an organizational level (Figure 4-4). With the current emphasis on evidence-based practice (Forbes, 2008:141; Nail-Chiwetalu & Ratner, 2006:157), the Logic Model enables the evaluator to become accountable and aids him/her in collecting,

organizing, and interpreting both qualitative and quantitative data before, during, and after training (Coffman, 1999:39). This model is a valuable tool that not only guides the evaluation processes, but also facilitates partnerships.

Since this model has been associated with a *theory of change* and *theory of action* in the past, Scriven (2003:24) considers the Logic Model not only as being effective in answering key questions, but also as being theory driven. Where Logic Models are descriptive, *theories of change* and *theories of action* are explanatory and predictive. Patton (2002:163), however, distinguishes between these three concepts in that *theory of change or theory of action* are required to specify and explain assumed, hypothesized, or tested causal linkages. Theory of change is research based and scholarly, whereas theory of action is practitioner derived and practice based. According to this delineation, the evaluation of this specific programme as formalized research therefore suggests it being a theory of change, which is informed by descriptions provided by the Logic Model.

By comparing the *espoused theory* (the official version of operation or what people say they do) with the *theory in use* (what actually happens within the programme) (Argyris, 1982 in Patton, 2002:163) of a specific programme, it is possible to determine the extent to which a specific programme meets the hypothesized and desired outcomes. This can only be done after a realistic description of the programme, for which qualitative evaluation is particularly appropriate and which makes the Logic Model (W. K. Kellogg Foundation) most useful. The Logic Model consists of a specific framework that merits discussion because it contains several constructs and variables that need to be assessed.

(b) The structural framework of the Logic Model

Yu (2006) describes the Logic Model in terms of the four levels of abstraction

presented in Table 4-1, i.e. paradigm, theory, model, and measurement. The paradigm level is viewed as the structure of the model, whereas the theory level is the implementation of a paradigm. The 'model' is the specification of theory, whilst measurement is the quantification of empirical representation. The Logic Model (refer to Table 4-1) accommodates boundaries of programme evaluation that could change over time. The education environment, however, consists of several non-quantifiable aspects that also require description. The Logic Model is ideally suited to include both quantitative and qualitative findings within its framework.

As the evaluation of a programme includes many variables between the input and outcomes, it is necessary to first clarify the various components of the Logic Model, i.e. input, process, output (short-term goals), and outcomes (long-term goals). The aforementioned models of programme evaluation identified several variables to be included in the process (Alvarez *et al.*, 2004:387; Dixon & Scott, 2003:289; Fetterman, 2002:89; Guskey & Sparks, 1991:73; Kirkpatrick, 1976 in Holton, 1996:73; Latham, Crumpler & Moss, 2005:147; Patton, 2002:10; Rae, 2002:2; Stufflebeam, 2003:31) from which several delineators (refer to Figure 4-5) are summarized within the Logic Model framework in Table 4-1.

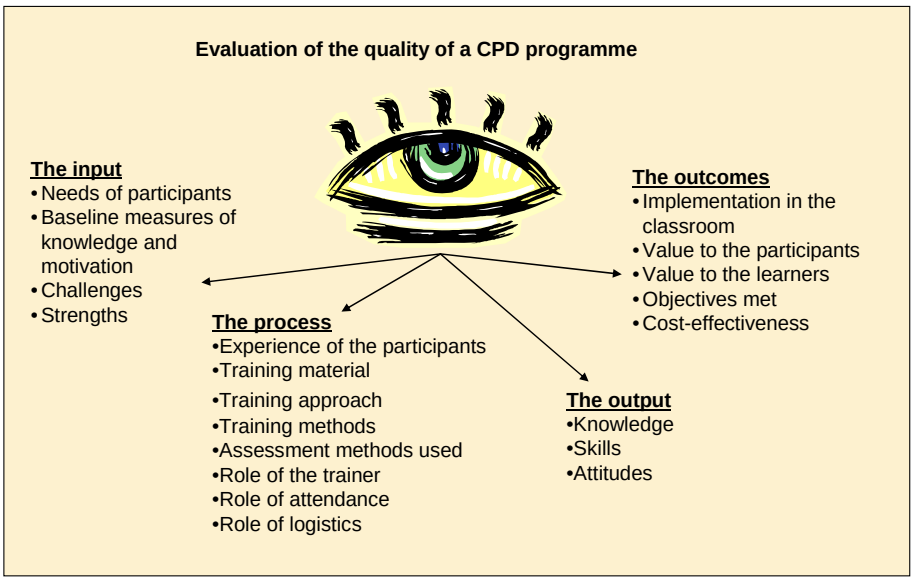

Figure 4-5: Focus areas within the Logic Model framework.

Table 4-1: The structural framework of the Logic Model

Paradigm	Input	Process/activities	Output	Outcomes
	Untrained teachers	Workshop 1 Workshop 2 Workshop 3	Benefits of programme	Changes in individuals and organization
Theory		• Listening • Language • Numeracy • Adult learning and teaching • Diversity • Learning styles • Characteristics of the learners	•Individual outcomes •Community outcomes •Systemic outcomes •Organization outcomes •Application of knowledge •Motivation •Attitudes	• Theory of change
Model (Variables)	Strengths: • Funding • GDE Support • Infrastructure Challenges • Context • Language use • Prior learning • School readiness	• Workshop material • Training approach • Training method • Assessment methods • Competence of the trainer • Factors which impacted on the programme	Changes in: • Knowledge • Skills • Motivation • Confidence	• Implementation of strategies • Benefit to the teachers • Perceived benefit to learners • Objectives met • Cost-effectiveness
Measurements (Instruments)	• Questionnaires • Focus groups	• Questionnaires • Portfolios • Focus groups • Informal information • Diary entries • Attendance registers	• Questionnaires • Portfolios • Focus groups • Research diary • Testimonials	• Focus groups • Attendance registers • Financial statements

4.2.4 Section summary

An overview of various programme evaluation models highlighted the various aspects that need to be evaluated. The Logic Model (W. K. Kellogg Foundation) appears to be most suitable to evaluate this programme because it is holistic and the components (input, process, output, and outcomes) provide a structure for planning and implementation.

4.3 Key aspects in programme evaluation

The complexity of programme evaluation requires careful planning which include considering specific prerequisites, as well as factors that can affect the outcomes.

4.3.1 Prerequisites of programme evaluation

Specific prerequisites need to be in place prior to the evaluation of the programme (refer to 0). Mervin (1992:iv) suggested that the evaluation system should be developed before the programme is implemented. It is also important that time should be allocated for a pilot programme (Agochyia, 2002:312) and that this should be considered part of the design process. The programme developer should also be cognizant of predicting factors which could potentially affect the outcomes and either plan ahead to limit their impact, or acknowledge their existence in the interpretation of results (1989, as quoted by Mervin, 1992:iv).

4.3.2 Predicting factors that can affect the outcomes

An in-depth literature review revealed several predicting factors for programme evaluation, as depicted in Table 4-2 (Salas & Cannon-Bowers, 2001:472; Shufflebeam, 2001:21; Tannenbaum, 1997:439; Warr, Allan & Birdi, 1999:371).

Table 4-2: Predicting factors in programme evaluation

Factors	Specific factor
Learning environment	- The *learning environment* can impact on motivation for learning and cause reduced self-efficacy (Mathieu, Martineau & Tannenbaum 1993 in Tannenbaum, 1997:440). Learning is facilitated when participants are aware of 'the bigger picture because it can help trainees to align their personal goals with that of the school/organization, and to generate ideas and suggestions that are organizationally relevant and which may be rewarded (Tannenbaum, 1997:439). High-performance expectations, supportive policies and practices, and tolerance of initial mistakes during the learning period also contribute to learning. A supportive environment provides individuals the opportunity to apply what they have learnt, and identifies and eliminates situational constraints to learning and performance (e.g. unclear task assignments, lack of tools and supplies, insufficient personnel, poorly skilled co-workers, and unrealistic time pressures). - The *training context* is important as it sets motivations, expectations, and attitudes for transfer. The participants' background characteristics need to be taken into account, as well as resources and administrative support (Shufflebeam, 2001:21). - Training style: Warr *et al.* (1999:371) reported that practical activities create positive results in the acquisition of procedural knowledge. This aspect is not entirely clear, as it can be due to a causal influence that has an indirect effect (e.g. the more competent trainees/teachers are prior to the training, the more likely they are to do better in the course). - The *transfer climate* in which a participant works after training predicts the extent to which the course material will be applied on the job (Tannenbaum, & Kavanagh, 1995 in Tannenbaum, 1997:347; Rouiller & Goldstein, 1993 in Warr *et al.*, 1999:372). The transfer of training is "…the extent to which knowledge, skills and change in attitude acquired in a training programme is applied, generalized, and maintained over time in the job-environment" (Salas & Cannon-Bowers, 2001:488). Furthermore, the working context could also be the cause of delayed learning (Warr *et al.*, 1999:372). - *Environmental support*: If supervisors in the work situation encourage trainees to apply the training material, it can be a predictor of training effectiveness (Tannenbaum, 1997:437). Social, peer, subordinate, and supervisor support play a central part in training transfer (Facteau et al, 1995, Tracey et al 1995 in Salas & Cannon-Bowers, 2001:489; Tannenbaum, 1997:440) and contribute to increased training effectiveness (Rouiller & Goldstein 1993 in Tannenbaum, 1997:440). - *Opportunity to apply their skills*: Trainees need the opportunity to apply their skills after training or else they loose it due to "skill decay"(Salas & Cannon-Bowers, 2001:489).
Organization and socio-political context	- The *organizational environment* determines effective training transfer (Tannenbaum, 1997:441). - *Policies and practices* could enhance continuous learning. Tannenbaum (1997:447) found that policies and practices also contribute to post-training commitment, self-efficacy and motivation, which are important for sustainability of the training. - *Factors over which one has no control*: Outcomes can be affected by factors such as the political environment, economic situation, social/cultural context, geographic constraints, and organizational capacity (Cannon-Bowers *et al.*, 1995:142; Israel, in Innovation Network).
Individual factors	*Ages of the participants:* The workforce has become older and more diverse (Salas & Cannon-Bowers, 2001:472), which requires t the age factor to be accommodated as it is known to be predictive of poorer learning performance (Kubick, 1996 in Warr *et al.*, 1999:351). More practical activities should be used to compensate. *Learning strategies:* The lack of self-regulation (the inability to maintain motivation and ward off anxiety) seems to have a negative effect on learning (Warr *et al.*, 1999:371). *Individual characteristics* partly determine participation and motivation and therefore also play a part in programme evaluation (Tannenbaum, 1997:441).

Although some factors can be purposefully manipulated to obtain better results, others cannot, and therefore need to be taken into account in the interpretation of the results to clarify the outcomes. Evaluation of educational programmes includes the assessment of output and outcomes, which is determined by two types of assessment.

4.3.3 Types of assessment

The gains made by the trainees can be assessed by either formative or summative assessments, which each should be implemented at a different time in the process of teaching and learning (Guskey & Sparks, 1991:73). *Formative assessment* refers to the assessment that takes place during the process of teaching and learning (South African Qualifications Authority, 2001:26). It identifies those areas within the entire process where training can be improved and is also indicative of the suitability of the training approach and the effectiveness of particular training methods (Guskey & Sparks, 1991:73). According to the SAQA policy document (2001:26) the formative assessment supports the process of teaching and learning and assists in the planning of future learning. It not only provides feedback to the learners on their progress, but also provides an indication of the readiness of the learners to be summatively assessed. Formative assessments usually are developmental in nature and are not awarded any credits.

The summative assessment is used to judge achievement and is performed at the end of the programme of learning (qualification, unit standard, or part qualification). It determines whether the learners are competent or not yet competent (South African Qualifications Authority, 2001:26). Ideally, these two types of assessment should be interrelated and also mutually dependent and supplementary to each other (Agochyia, 2002:311). These types of assessment are conducted at various stages

of the learning programme and each contributes particular information for different purposes. It is, however, possible to conduct a summative assessment on a continuous basis throughout the learning experience (and therefore is not confined to a written test/examination). Both formative and summative assessments allow for use of a range of assessment methods using a variety of sources (South African Qualifications Authority, 2001:27). Programme evaluation is done at various stages and phases of the educational programme.

4.3.4 Stages and phases in the evaluation of a programme

The various stages in the evaluation of an educational programme (Guskey & Sparks, 1991:73; Rae, 2002:95) are portrayed in Table 4-3, but they may not necessarily occur in neatly specified phases, nor do these phases follow each other in a sequential order as they may overlap.

Evaluation of the outcomes offers suggestions of how future programmes could be improved. The application of knowledge and skills can be determined either by observing individual teachers in their classrooms, or by obtaining information from the trainees. The first option imitates the traditional practices of the 'accountability/inspection model' (Monyatsi *et al.*, 2006:218), which teachers may tend to perceive negatively as it may remind them of inspection and control, and of being judgmental (Beerens, 2000:10).

The second option is in accordance with the professional development model (Monyatsi *et al.*, 2006:218), which refers to the effectiveness and relevance of the programme in terms of its application to the work of the participants, and therefore was deemed to be more appropriate for this study. It involves a complex analysis of key elements of the training programme, such as the work environment at the schools and an in-depth understanding of the factors that may either support or

obstruct the transfer of the training to the real-life situation. Such results are indicative of whether the training programme was well conducted and whether it was cost-effective (Rae, 2002:171).

Table 4-3: Stages in programme evaluation

Stage	Description
Pre-training programme evaluation	The pre-training evaluation provides the baseline data that are to be compared with the post-training data to demonstrate the learning that has been accumulated from training (Rae, 2002:95). This type of evaluation is relevant and valuable when programmes focus on the development of knowledge and competencies to improve performance (Agochyia, 2002:311). Such information provides the trainer with insight into the trainees' level of competence in the areas earmarked for inclusion in the training so that inputs can be properly planned. The pre-training programme evaluation identifies trainees' training needs and guides the trainer to the appropriate level of input. Useful information on the participants' backgrounds is also collected for future inferences. The preferred method of data collection in this phase is a structured questionnaire that is both practical and cost-effective.
Post-training evaluation	The post-training evaluation is the second validation (Rae, 2002:95). Reactionaries and questionnaires each have a role in the validation process - reactionaries seek information on the participants' feelings, views and opinions, whereas questionnaires provide a more objective assessment of the achieved learning. Multiple choice questionnaires do not necessarily capture the goals of the training and therefore self-assessment, peer assessment, and written essays are regarded as valuable methods of evaluation (Wilkes & Bligh, 1999:1270).
The end-of-programme evaluation	A summative report is required at the conclusion of a programme to evaluate the total impact (Guskey & Sparks, 1991:73). It provides an overall effect of the process, as well as the product, by summarizing the achievements and the limitations (Winberg, 1997:82). It judges the effectiveness of teaching (Wilkes & Bligh, 1999:1269) and therefore has an evaluative feel to it. At the end of the programme ('end-of-term'), the summative report seeks to bring together the conclusions about the values of, and lessons learned by the trainee that was evaluated. It provides information about why the programme was implemented and about its locality. The end-of-programme evaluation is regarded as the most descriptive of programme implementation (e.g. overview, programme beneficiaries, financing, governance, staff, facilities, operations) and should be directed to those who may be interested in replicating the programme. It should also include a comprehensive appraisal of the programme, of which the outcomes are of interest to all members of the audience.

The end-of-programme evaluation is concerned with the total benefits rather than the benefits of the training programme itself. Training is often measured by its activities, rather than by results (Purcell, 2000:30), and therefore requires thorough descriptions of the process ("…the impact of training can only be fully understood once it is described and judged") (Stake, 1977 in Wood, 2001). It is not always

possible to determine the cost benefits of a programme, even though cost is related to the charges for the training and therefore easy to calculate. The problem lies in judging the benefits to the organization, as this is often done through subjective measures and therefore cannot be quantified (e.g. development of interpersonal relationships) (Purcell, 2000:30). The programme evaluator is usually required to compile a final report to stakeholders by conducting an end-of-programme evaluation. Stufflebeam (2003:44) made valuable suggestions in this regard, which include the use of photographs as it makes the report more convincing by providing a testimony of the events.

Direct quotations from trainees are helpful to capture the interest of the audience, whereas an executive summary is useful for policy briefing sessions. In addition, an adequate appendix with all the evidence of the evaluation materials used for documenting and establishing credibility of the research procedures should be included. The writing of end-of-term reports requires the evaluator/researcher to be cognizant of specific limitations to the evaluation, which are discussed in the following section.

4.3.5 Potential challenges in programme evaluation

Programme evaluators need to acknowledge certain limitations when evaluating the effect of a programme to put certain outcomes into perspective. Firstly, it is often difficult to assess the extent to which the knowledge gained in the workshops is in fact applied in practice. Agochyia (2002:315) is of the opinion that it is not possible to determine whether the trainees internalize the training through continued practice. All that may become evident is that, after training, trainees go back to their classrooms more sensitized and better equipped to face the challenges of their work

and life in general. Secondly, trainers do not have control over all the factors that can affect transfer to the workplace as some of these may be beyond their control (*Ibid:* 316).

As the evaluation exercise itself (e.g. questionnaires before and after training) affects the nature of the situations to be examined, true objectivity regarding the results of training may not be possible (House, 2003:11; Stake & Thrumbull, 1982:1). It is also not possible to quantify every aspect of learning, as not all learning takes place at the conscious level. A significant amount of learning occurs at a subconscious level (Agochyia, 2002:316) and therefore cannot be assessed. Programmes are conducted in real-world settings that are influenced by several factors (e.g. attendance, motivation of trainees, diversity in language and culture, as well as varying levels of education backgrounds and qualifications). It may therefore be difficult to establish causal and correlating links in the interpretation of the evaluation results, as it cannot be assumed that high scores imply effective programmes and low scores imply poor programmes (Cannon-Bowers *et al.*, 1995:142).

In determining the outcomes of a programme it may be more useful for the evaluator to answer certain questions, as answers to these questions would provide a more holistic view of the effect of the training (e.g. “how did the participants benefit?”, “did the training achieve the objectives?”, or “did the training obtain the desired response from the group and could they implement the strategies in class”?).

4.3.6 Section summary

This section discussed the key aspects to be considered in the evaluation of a programme. The two types of assessment used to assess learning were identified as formative and summative assessments. The pre-training, post-training and end-of-programme evaluation are required to provide a comprehensive view of the

programme. In addition, attention was drawn to specific evaluation challenges (e.g. knowledge transfer and reliability) and potential pitfalls were emphasized.

4.4 Conclusion

It is important that programme evaluators are informed of local and global trends and adapt such knowledge to local contexts and needs (Bhola, 2003:389). This information can aid in building capacity and expertise in the local context, and can be transferred to education system assessment where similar skills are required (Omolewa & Kellaghan, 2003:479).

Several approaches were used in the evaluation of this particular programme: positivism (Scriven, 2003:20), the interprevist-constructivist approach (Lincoln, 2003:69), and the accountability approach. Each of these approaches in isolation could only provide a partial view of the programme's value (House, 2003:10), but when used together, a more practical perspective was obtained. Such a holistic view called for both quantitative and qualitative methods to describe the value of the programme, which concurs with international trends in programme evaluation (Creswell, 2008:1; Kellaghan *et al.*, 2003:4).

4.5 Appendix

Refer to the separate Compact Disk (CD) for contents of this appendix.

Appendix 4A *Prerequisites for effective programme evaluation*