University of Sussex
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Teacher Preparation and Continuing Professional Development in Africa (TPA)

LEARNING TO TEACH READING AND MATHEMATICS AND ITS INFLUENCE ON PRACTICE IN UGANDA

Uganda's Country Report
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Abbreviations and Acronyms

'A' Level	Advanced Level
CC	Coordinating Centre
CCT	Coordinating Centre Tutor
CPD	Continuous Professional Development
CTEP	Certificate in Teacher Education Proficiency
DES	Directorate of Education Standards
DOS	Director of Studies
DPI	Deputy Principal In-service
DPO	Deputy Principal Outreach
DTE	Department of Teacher Education
DTE	Diploma in Teacher Education
ECD	Early Childhood Education
ITE	Initial Teacher Education
KYU	Kyambogo University
LOI	Language of Instruction
MoES	Ministry of Education and Sports
NCDC	National Curriculum Development Centre
NQTs	Newly Qualified Teachers
'O' Level	Ordinary Level
PTC	Primary Teachers College
SSA	Sub-Saharan Africa
TDMS	Teacher Development and Management Services
TE	Teacher Education
UNESCO	United Nations Education Scientific and Cultural Organisation
UPE	Universal Primary Education

Chapter 1: Background and Introduction

Photo from Panos pictures

1.1 Education for All and Educational Quality: The significance of Teacher Education

Since 1990 and more especially after 2000 the goal of *Education for All* by 2015 has galvanised many countries in Sub-Sahara Africa (SSA) into confronting their historically low rates of enrolment. They have been remarkably successful in attracting many more children into schools (UNESCO 2008). However filling the classrooms is not enough; if it is to have positive social and economic consequences, education for all must involve children learning at least the basic minimum competences of literacy and numeracy that will enable them to benefit from and contribute to their society's future. Unfortunately, much evidence suggests that many who attend school are not learning very much. UNESCO (2008:2) reports a 'relatively low and unequal learning achievement in language and mathematics' in many countries especially in sub-Sahara Africa (SSA). These poor results are seen throughout basic schooling, but it is becoming increasingly clear that the first years of schooling are especially important. Children's early experiences with learning shape their attitudes and commitment to education and so, more than at any other stage, what happens in the early grades, determines their educational future. Unless they make sufficient progress at this stage they are liable either to cease coming to school entirely, relapsing into illiteracy and innumeracy, or to become the 'silently excluded' who are not able to access the increasingly demanding work of the later grades (Liddell and Rae 2001; Lewin 2009; UNESCO 2010; Glick and Sahn 2010). This is particularly true in reading and mathematics which underpin understanding across the school curriculum.

Research examining teacher quality confirms the logical conclusion that poor quality of pupils' learning correlates strongly with poor quality of teachers' teaching. Effective pupil learning and achievement is hampered by weaknesses in teachers' pedagogical content knowledge (PCK) and classroom practice (Pontefract & Hardman 2005; Akyeampong, Pryor & Ampiah 2006, Moon et al. 2005; Byamugisha & Ssenabulya, 2005 and other SAQMEC country reports). Teacher education has been identified as both part of the problem and the solution. Increase in pupil enrolment has meant a huge demand for more teachers and the priority has been to find ways of increasing the numbers appointed either by recruiting more trainees onto established courses, by creating new routes into teaching or by a combination of both strategies (UNESCO 2005). Policy and plans often assume that initial teacher education (ITE) and continuing professional development (CPD) make a difference to teachers' pedagogic knowledge and skill which in turn will be reflected in enhanced pupil learning outcomes (Dembélé and Lefoka.2007). However, in many countries in SSA there is little systematic insight into the content and process of knowledge and skill acquisition by ITE trainees and newly qualified teachers (NQTs), and even less evidence that relates inputs to outcomes in terms of improved pedagogy and greater learning achievement in mathematics and reading. Not enough is known about how teachers working in different educational environments and contexts adopt and adapt the knowledge and skills they have acquired through formal training to address the particular learning needs of young pupils in their actual schools.

Commitment to improving quality primary education in sub-Sahara Africa has focused primarily on infrastructure (e.g. classrooms, equipment, learning materials) and the supply of adequate numbers of teachers, and less on how teacher training and CPD can promote teacher competencies that meet the learning needs of pupils in real classrooms (Moon 2007; Bernard, Tiyab, &. Vianou, 2004). While there is evidence that both pre-service and on-the-job training of teachers at primary school are the key ways in which teachers learn to teach (Darling-Hammond, Wise & Klein 1999: Lewin & Stuart 2002), research indicates that induction support for the Newly Qualified Teacher

(NQT)[1] can be negligible, with a 'washout' effect occurring as a result (Lewin and Stuart, 2003). Socialization into existing school practices may quickly overwhelm the effects of training, especially in systems where seniority creates status hierarchies that promote conformity to established practices by NQTs (Westbrook et al. 2009).

The Teacher Preparation and Continuing Professional Development Project ('TPA Project'), funded by the William and Flora Hewlett Foundation, was set up to fill the gap in knowledge about how the initial and continuing education of teachers impacts on the practice of teachers through studies in six African countries. This paper reports on the research that has been carried out in Uganda. Because of the extreme importance of early reading and mathematics for future progress, it focuses on the preparation that teachers who teach in the lower primary grades receive and what support is available through CPD and other routes to teach these subjects. A central issue is whether the process of learning to teach reading and mathematics at lower primary level draws attention to, and emphasizes the kind of teaching competencies known to be important for developing lower primary school children's abilities to read and understand basic mathematical concepts. The research has built up a comprehensive picture of initial training and CPD related to reading and mathematics in the early years of primary school. It has sought to identify factors that contribute to successful practice and that lead to increased pupil learning outcomes, as well as specific barriers and constraints that impede teacher practice and pupil progression in basic numeracy and literacy. The findings are used to suggest feasible ways in which teacher preparation in Uganda might be improved.

In particular it has addressed the following research questions:

1. **How do pre-service teacher education programs prepare trainee teachers to teach reading and mathematics in the early grades?**
    a. What assumptions about learning to teach reading and mathematics can be deduced from the structure and content of the primary teacher training curriculum, and from school textbooks?
    b. How does the teacher education curriculum and their implicit and explicit theoretical base relate to the curriculum for early years in language and mathematics in schools?
2. **How do trainee teachers develop their understanding of teaching reading and mathematics to early grade students?**
    a. How do these relate to college courses and experience during a structured practicum?
3. **How do newly qualified teachers teach reading and mathematics in their first few years of teaching?**
    a. How does this practice relate to what has been taught and learnt in pre-service training?
    b. What support do they draw on in developing their practice?
    c. What is the nature of the gap between what the research literature says about teaching reading and basic mathematics in early primary schooling, and what beginning teachers actually do in their classrooms?
4. **What are the characteristics of professional development programs with a mathematics and/or reading focus that have been implemented over the past three years?**
    a. Which teachers have they been designed for, and how were these teachers selected?
5. **How do the graduates of professional development programs teach reading and mathematics to early grade students?**
    a. What changes in teacher practice can be linked to their participation in professional development programs?
6. **Which teaching competencies and skills should be incorporated into the curriculum of primary teacher education programs and which should become the preferred focus of teachers' professional development activities?**
7. **How can professional knowledge and skills in teaching reading and mathematics be effectively transferred and shared within and among primary teacher training programs and beginning teachers?**

In addressing these issues we conceptualise competence in terms of knowledge, understanding and practice. Practice is central to good teaching but successful teachers would concur with the great body of research into

[1] In the project, we use the term 'trainee' to denote those still undergoing initial training and 'newly qualified teacher' (NQT) for those in the first three years of service. 'Students' refers to those whom they are teaching in the primary/elementary schools.

teaching that good practice cannot just depend on the unreflected application of techniques. It is a complex process which requires a great deal of different knowledge. Content knowledge, that is, knowing about the subject matter to be taught, is obviously important, but teaching also requires pedagogic knowledge - knowing how to engage with learners and to manage a classroom. However as Shulman (1987) first pointed out, in order for these two kinds of knowledge to guide actual practice, a third category, pedagogical content knowledge, is crucial; this involves knowing how to represent and formulate the subject matter, in this case of early reading and mathematics, that make it comprehensible to pupils. The project has therefore investigated the different kinds of knowledge that teachers at various stages of preparation have and their understandings of how this can be applied to construct classroom practice.

1.2 Initial Teacher Training in Uganda

The initial PTC survey was conducted from mid-March to mid-May 2010 to establish the trainee numbers, entry requirements, curriculum, tutor qualifications, material resources and continuous professional development programmes involved in primary teacher training. Data was obtained from five selected primary teachers colleges by document review; focus group discussion with college tutors and trainees; key informant interviews with college staff, officials of the Ministry of Education and Sports (MoES), National Curriculum Development Centre (NCDC) and Directorate of Education Standards (DES). Informants included 5 PTC Principals; 6 PTC Deputy Principals; 2 Directors of Studies (DOS); 19 PTC tutors; 2 Assistant Commissioners at the Department of Teacher Education (TE), MoES; a Senior Education Officer at TE; an officer at UNITY; a Local Languages Specialist at NCDC, and a Senior Inspector at DES.

1.2.1 Numbers

There are 47 PTCs in Uganda, 45 of which are owned and funded by government. Most official documents cite two private colleges, which are owned by faith-based bodies (Roman Catholic Church and Church of Uganda, Protestant), but data at the Department of Teacher Education (DTE), Ministry of Education and Sports (MoES) indicates six private colleges. Twenty three of the government colleges are *core* institutions that run both pre- and in-service programmes, and 22 are *non-core*, offering only pre-service programmes. Core PTCs run outreach programmes for practicing teachers which are the core activity of the Coordinating Centres (CCs) set up under the Teacher Development Management System (TDMS). These programmes are the responsibility of the Coordinating Centre Tutors (CCTs) who are part of the college staff and are supervised directly by the Deputy Principals in charge of outreach programmes (DPOs).

1.2.2 Trainee and Tutor Qualifications

The minimum entry requirement for trainees is 'O' Level (Senior Four). The applicant should have obtained a *pass* in 6 subjects including Mathematics, English and at least two sciences, which could be physical or biological or Agriculture. Applicants can join only within 2 years of taking 'O' Level, implying the average age of 17 years for entrants. 'A' Level (Senior Six) is treated only as an *additional* qualification because this background is considered far removed from the immediate needs of the primary school. It is believed that "'A' Level leavers cannot be interested in primary teacher training, otherwise they would have applied to join college two years before, with the minimum qualification. Those who wait too long are not first choice applicants and do not make the best teachers." (Interview, Assistant Commissioner, DTE, MoES). There has been a revision in tutor qualifications from the previous basic requirement of the Diploma in Teacher Education (DTE), awarded by Kyambogo University, which holds the mandate for primary teacher education, to the Bachelor of Education. Tutors with only a DTE can still teach at the colleges but are encouraged to upgrade their qualifications.

In 2007 all tutors were required to take the CTEP (Certificate of Teacher Education Proficiency) course as a qualification. This course was designed by the Aga Khan University and funded by UNITY Project in pursuit of UNITY's objective of *Improved professional development of teachers and administrators at primary level*. CTEP was aimed at strengthening the capacity of the teacher trainers to deliver college training programmes using appropriate methods and was administered and delivered by Kyambogo University (KYU) in a cascade approach where the college principals were trained first and then required to deliver the course to the tutors, working with

KYU lecturers. Altogether, 900 tutors and principals took the course, and less than 50% of these passed the course examinations. It is not quite clear whether and when CTEP will be offered again for those who failed.

1.2.3 Training Programme

The teacher training programme is overseen by TE at the MOES which articulates the training policies, processes appointments and supervises the college administration and professional development programmes. Pre-service trainees are sponsored by Government in a two year programme with three compulsory school practice (SP) periods of 3-4 weeks each, one taken in the middle of the initial year of training, one at the end of it and the third at the end of the second year. In-service trainees pay their fees and follow the programme for three years, attending college during school holidays and doing school practice twice.

Pre-service trainees take promotional examinations administered by Kyambogo University at the end of Year One, which determine their progress to Year Two, and then a final exam at the end of Year Two. Their in-service counterparts take the promotional examinations at the end of Year Two. Any candidate who scores a mark below 40% in any subject in the promotional examinations is considered to have failed the exams and is offered an opportunity to repeat the year but has to pay his/her fees so that Government can pay for someone else. A candidate who fails more than three subjects in Year 2 must repeat all subjects and must do so in only three consecutive years. However, he/she has the option of paying only administration fees and not attending class. The grading criteria of the promotional examinations, as well as the examination content, were described by trainees in the initial survey as largely coming from outside the teaching syllabus and sometimes well beyond the content knowledge they consider appropriate at the level. The Assistant Commissioner at DTE explained that this is all to do with standards, which are a priority. Trainees graduate with the Grade III Teacher Certificate, the basic qualification for teaching at primary level.
Two years of training is felt by some informants to be inadequate for preparing new teachers. The DPO of a core college argued,

> *Two years of training is not enough. It is a lot of repeat over the knowledge content that they have learnt at school at 'O' Level. Perhaps two years would be enough if we focused on methodology.* (DPO, Interview)

which was echoed in the remarks of an official at the MoES, observing,

> *Two years is too little. If you ask me, we should add school implementation and beef up the practicum. I feel that there is very little demonstration of teaching, and this is one area of real need*. (Education official, Interview)

The concern seems to be about the insufficient amount of instructional support which is related to the TE language policy. A principal pointed out that the teacher leaves college ill equipped to deliver the school curriculum or, even, to critique it and yet it presents many issues.

1.2.4 Curriculum

A uniform curriculum is taught across the colleges. It is written by Kyambogo University which has the mandate for primary teacher education, and consists of the following subjects.

(i) Professional Studies (Psychology, Administration)
(ii) Mathematics
(iii) Language
(iv) Science
(v) Social Studies (History, Economics, Geography)
(vi) Cultural Studies (Physical Education, Religious Education, Music, Art)

While some tutors claim that theory and methodology are taught by different tutors, their colleagues say that each tutor integrates the components. Observation revealed that the latter is in fact true. A general lack of textbooks is reported although the college libraries are often stocked with materials, including many donations. The libraries have various titles in multiple copies but on the whole, the majority of text- and reference books are not directly

related to the syllabuses in the PTE curriculum although they may be useful for building trainees' general knowledge.

Language issues at the PTC are complex. The language of instruction (LoI) is English but the trainees know that they are expected to deliver the Thematic Curriculum in the area local language in rural areas and English in urban areas where there is usually a multiplicity of first languages in the classroom. Yet they are aware of the absence of textbooks and teachers' references in the local languages.

1.2.5 Intended Knowledge, Understanding, Practice (KUP)

The subject of what knowledge, understanding and practice the tutors intend to equip trainees with is understood in varied ways by the informants but the different approaches are useful for our understanding of the training context. Trainers suggest that teachers' knowledge should manifest as learned content and that it can be packaged and passed from one knower to another, discussed and shared. Language tutors' explanations of the knowledge and understanding focus on more global than specific issues that may be a little removed from the direct teaching of skills. For instance, *English and ECD*, *English and Simple Literature* and *Local Language* tutors referred to sociolinguistics and, to a smaller extent, general psycholinguistics as the intended knowledge. Unlike the language tutors, the *Maths and ECD* tutor in the initial survey referred to specific mathematical skills, demonstrating concerns for numeracy. Tutors suggested that understanding is built on, or is the next level above knowledge, underlying one's practice as the internalisation of subject knowledge and therefore the ultimate justification for action or practice. It is, they believe, one's articulation of what is involved in teaching or what is required in particular teaching circumstances. Thus, they point out, the better the teachers' understanding of theoretical and environmental issues the more sound their practice.

1.3 Research Design - Theoretical and Conceptual Framework

1.3.1 Data sets and methods

The research hinges on establishing the different knowledge, understanding and practices that are expected of teachers during their preparation and then comparing them with those that they actually exhibit at different points in their training and career. The points of comparison are summarised in Figure 1.1.

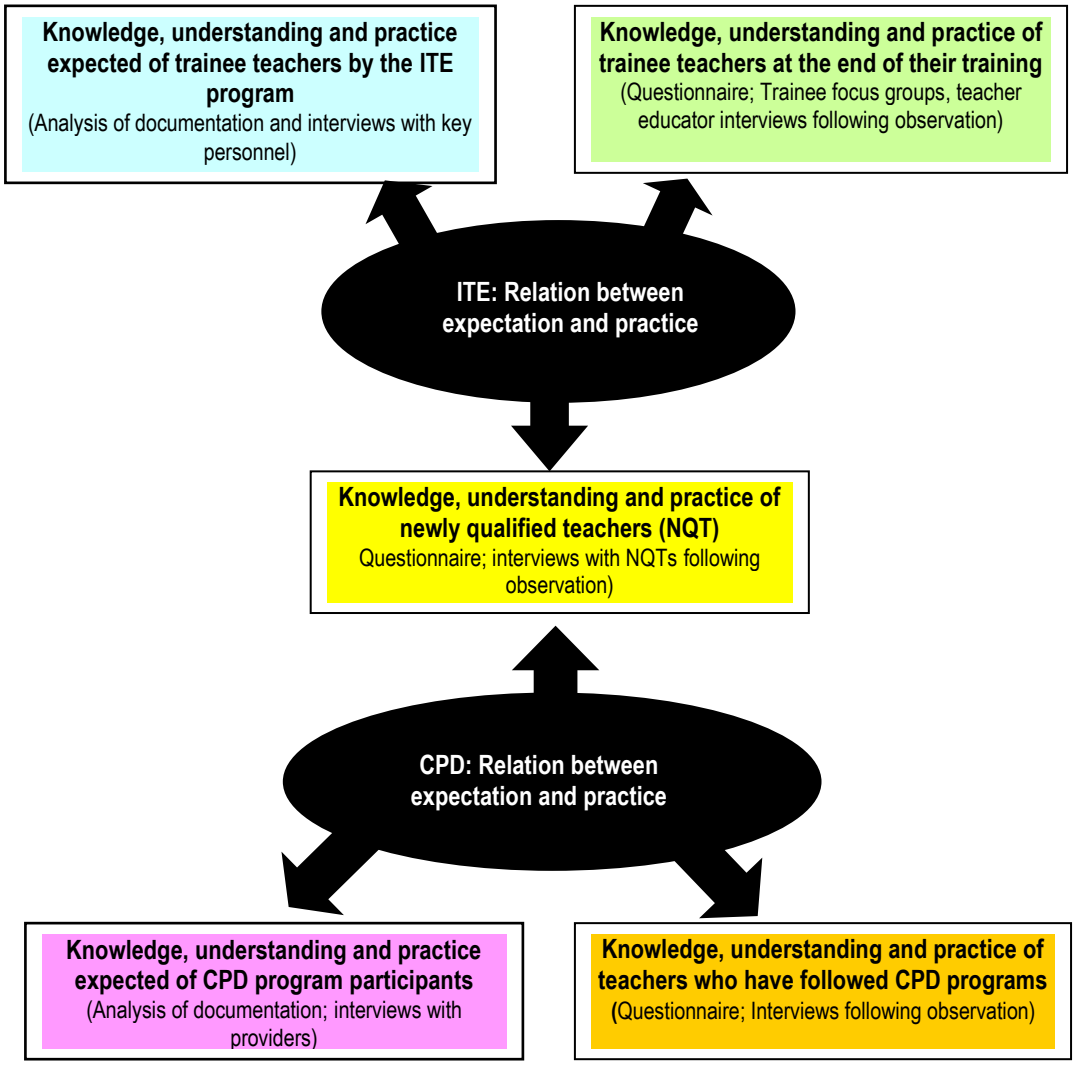
An initial line of enquiry was to establish what competences relevant to the teaching of reading and mathematics the program of initial teacher education seeks to instill in trainee teachers. This was accomplished from an analysis of documentation including the analysis program aims/objectives, expected standards and from interviews with the providers (blue rectangle in Figure 1).

The second set of data (green rectangle in Figure 1) sought to build up a picture of the knowledge, understanding and practice of actual trainee teachers at the end of their training. Both quantitative and qualitative data were used to develop this. Qualitative data derived from focus groups and interviews following observation of teaching on the ITE program. Direct inference about the training from observation is problematic and possible only through frequent and lengthy observation a scale outside the means of the project. The project therefore used observed sessions of mathematics and reading training as preliminary data for focus group discussions with a sample of trainees in each college, selected as far as possible to include a range of achievement, a balance of gender and ethnic background, in consultation with their teacher educators. Moderation of the discussion was designed to consider the extent to which what was observed reflected the training as whole, using the video and shared experience of the session to probe pedagogic content knowledge and understandings of teaching practice. A similar approach was followed in interviews with the trainers whose sessions had been observed.

The quantitative data derived from a questionnaire developed from one that had been used successfully in other work (Akyeampong 2003b) (see appendix). It was administered to a sample of trainees in four teacher training colleges including one in metropolitan Kampala; one in a Kampala suburb; and two in the rural setting, one in the eastern region and another in the western region. The four colleges were selected by the research team with the guidance offered by the Commissioner and other senior staff in the Department of Teacher Education, Ministry of Education and Sports. A key point of the guidance was the selection of colleges that had not participated in

previous key projects or interventions on teacher training or on the teaching of reading or mathematics. It was considered important to prevent the possible influence of such involvement on the findings of the TPA research. Another key consideration was the inclusion of both government-aided and private as well as core and non-core PTCs so that any specific data that might arise because of these characteristics would be accommodated. Thus the metropolitan college and the rural college in the eastern region are government-aided and core. They were larger than the other two because they are cheaper for the trainees. On the other hand, the suburban college and the rural college in the western region are both non-core although the former is privately owned and funded while the latter is government-aided. The questionnaire was based on a common set of items with small amendments to ensure that the form used appropriate terminology, following piloting in each of the six countries in the TPA project. Piloting was undertaken to establish the suitability of the language in the questionnaire items and clarity of their content. The questionnaire demanded relatively closed responses and, besides straightforward questions, included a series of scenarios that are likely to be encountered in teaching in early grades. Respondents were required to select responses to the scenarios which describe the most appropriate approach to teaching a particular concept or skill in reading and mathematics. These responses indicated the trainees' pedagogical content knowledge and likely pedagogical practice in reading and mathematics.

Figure 1.1: COMPARISONS AND TENSIONS



The task of understanding how initial training is put into operation involved collecting a data set on the knowledge, understanding and practice of newly qualified teachers (yellow rectangle in figure 1). A sample of schools was selected where teachers in the first three years of their career were working. Six schools were selected from the catchment area of each teachers' college, including government-aided and privately funded schools. In the case of one college only private schools were selected because NQTs had not accessed government schools due to the

ban on teacher recruitment. Videoed observations of lessons in reading and mathematics by the NQTs were followed by forensic interviews asking questions around details of practice, sequencing of tasks, and use of resources, progression within the lesson and onwards towards the next, and use of language of instruction as against mother tongue or local lingua franca. Again this form of interview was calculated to give a greater understanding of what teachers actually know and can do than direct inference from observation. Teachers' interviews were corroborated with informed evidence of the educational attainment of pupils from exercise books, records of assessment and where possible brief interviews with pupilss. Head teachers in all sample schools were also interviewed on the issue of NQT support and management especially as related to teaching reading and mathematics. In addition a slightly adapted version of the questionnaire used for trainees was given to NQTs.

The research design called for a similar approach to continuing professional development programs. An initial survey of what is available in Uganda was mounted (pink rectangle). Only one arrangement that can be described as a relatively unified national approach was identified, that is the CC activities which are a function of the PTCs, already described in Section 1.2 above. While every CCT is burdened to conduct professional development activities for the teachers in the CC, in reality the activities are centre specific, depending on teachers' identified needs, usually spelt out at the school or zone level. Since there is no uniformity in the CC activities across the country, the research team was unable to collect data that can be presented as the description of a CPD programme, whether on reading or mathematics. However, for purposes of comparison with the initial training of teachers, the project collected data on the knowledge, understanding and practice of individual teachers who had recently followed any CPD training (orange rectangle in Figure 1), whether at school, inter-school, zone or national level. This data was collected by exactly the same procedure of lesson observation, interview and questionnaire as for the NQTs. The details are presented as CPD data.

1.3.2 Summary of Data Collected

The project therefore collected overall a large set of both qualitative and quantitative data as outlined in Table 1.

Table 1.1: Data Type, Sources and Modes of Collection

Data set	Uganda
ITE in action Teacher Training Colleges Regions:	4 including 1 private Central, Western and Eastern
College schemes of work	All relevant schemes for language
Tutor observations and interviews	11 Reading tutors
Questionnaires completed by trainee teachers at the end of their training	500
Trainee focus groups	9 groups of 8 trainees
NQTs in action Number of schools visited to observe NQTs and Experienced teachers	24 schools 18 Private 6 UPE government schools
Questionnaires completed	43
Observations and forensic interviews	14
CPDs in action Questionnaire with experienced teachers	 52
Observations and forensic interviews	8

1.3.3 Challenges and Limitations

The process of fieldwork faced several challenges. Some related to sampling, some to logistics and others to communication. The research team had to devise measures and strategies to counter these challenges in order for the research to follow the project design as closely as was possible in the circumstances.

In real world settings it is not always possible to construct ideal samples where variables are controlled. For example respondents identified as NQTs may also have followed CPD programs. However, the methods used in

the project enabled us to identify such cases and therefore ask where the individual's knowledge, understanding and practices were learnt. This made it possible to attribute the data accurately to ITE or CDP. Besides, identifying NQTs for the sample was problematic since college graduates have not been able to join the teaching force in government-aided schools due to the government ban on recruitment. Therefore in respect to two colleges – one government and another privately owned, all the NQTs identified were in private schools. Owing to the ban, it was not possible to observe strictly the original requirement of selecting NQTs with a teaching experience of only one to three years. In the circumstances, the team found the Snowball sampling technique viable and extended the upper limit to five years for this category in order to obtain the required sample size. The challenge of sampling was further complicated by the unforeseen self-transfer of teachers in private schools, which was due, on average, to dissatisfaction with the terms and conditions in the schools. In three NQT cases it was not possible to have the originally selected teachers over the two school terms during which the team collected data since the three had moved on to other schools outside the project area. Three new individuals were then selected to provide the necessary data, which required more visits than had been planned in the design.

Another challenge involved the college and school schedules which did not allow easy data collection within the time planned in the project design, especially since examinations could not be shifted. The research team responded by adjusting the data collection plans to fit them around the school and college activities. For example, instead of collecting data in three days in each school or a week in each college, the team used as many days as were required to obtain all the data needed while avoiding interruption of the school and college activities. Therefore the team spent more days in the field, collecting data, than had been planned in the project design.

A third challenge was the low spoken English language proficiency of some teacher trainees, which hindered communication in the questionnaire survey and the interviews following lesson observation. Having recognised the trainees' speaking competences during the pilot phase, the research team undertook to simplify the language of interviews and questionnaire administration, accommodating trainees' use of the local language when it occurred.

1.3.4 Data Analysis

Analysis of the different data sets represented by the colored rectangles in Figure 1 enabled the project to address the research questions. Analysis involved building up a detailed description of the knowledge, understandings and practices of teachers during the different phases of preparation and using these as a basis for comparing practice in the field with what is intended. Besides, data was compared and evaluated against research-based knowledge on effective primary reading and math instruction.

The qualitative data of interviews and focus groups were transcribed and imported into the Nvivo 8 qualitative data analysis software along with other appropriate texts such as summaries of observations. Data were coded and sorted into using a system of hierarchical categories, most centrally those of knowledge, understanding and practice. This enabled patterns to be identified and queries to be run.

Quantitative data were analyzed using STATA software. This enabled the project to work with a large data set and to provide relevant tables and graphs. It was then possible to make relevant interpretations from descriptive statistical methods with some use of inferential statistics such as the calculation of Pearson's Chi^2 to test for independence.

1.4 Outline of Report

This report is organised in four chapters. The foregoing background chapter dwells on the literature of teacher preparation quality which highlights international concerns about quality in teaching and learning in view of its centrality in the education for all campaign. It points out the concern about gaps in learning effectiveness, which are appreciated in the context of gaps in understanding of the knowledge and skills competences that teacher training programmes equip teachers with. These details are followed by the eight research questions that guided the research activities in the field. The later part of this chapter is dedicated to a review of the initial teacher preparation programme (Grade III) in Uganda. Based on interviews and documentary review, this part details the enrolment policy, tutor qualifications and training curriculum. Chapter 2 is a description of the teacher preparation practices in Uganda's primary teachers colleges, based on a documentary review of the reading and mathematics syllabuses and their philosophical assumptions and how these may influence the teacher training outcomes.

The international literature on quality in teacher education and the description of initial teacher preparation policy and practice in Uganda provide a backdrop for the analysis of teachers' knowledge, practice and understanding that follows in Chapter 3 and Chapter 4. Chapter 3 and Chapter 4 deal with learning how to teach reading and mathematics respectively. Each chapter contains four major sections that present comparative analyses of the actual competences of tutors, trainees, NQTs and CPDs. The tutors' knowledge, practice and understanding are analysed first and against this background those of trainees are analysed to provide insights into how the trainers' profiles and their performance might influence the trainees' knowledge, practice and understanding. This comparison sets the stage for the analysis of the NQTs' competences to determine how they may be influenced by the college training and what sources of support they actually draw on in teaching reading and mathematics. The fourth major section of each chapter is an analysis of the competences of CPDs and their sources of influence in teaching reading and mathematics.

Chapter 2: College and School Reading and Mathematics Curricula

In this chapter the data analysis attempts to answer the first research question on pre-service teacher preparation. PTC and school curricula, textbooks and assessment practices for language and mathematics were analysed to arrive at an understanding of the intentions for preparing early grade teachers of reading and mathematics during pre-service teacher education programmes and the expectations that schools may have of teachers. This document review focused on determining the interrelations between syllabus aims and objectives, content and expected outcomes. Data thus obtained was valuable for comparison against what NQTs and CPDs actually do in the classroom.

2.1 The PTC Curriculum and its Theoretical Underpinnings

With the PTE curriculum undergoing revision, the tutors have awareness of both old (1994 for Maths and 1995 for English) and new curricula. Some have in their possession and are using the old as well as drafts of the new subject syllabuses and say that they take from each syllabus what they recognise to be valuable.

2.1.1 Language and Mathematics Syllabuses

Both the old and new PTE language syllabuses are essentially syllabuses for teaching English. They support the preparation of the trainee for teaching English at primary school with a view to integrating the language with literature. On paper both syllabuses cater for equipping the trainee with both the content of English and the content of language teaching methodology. Founded upon the Teacher Development and Management Systems (TDMS) efforts for strengthening education delivery in primary school, the 1995 syllabus specifies the target learners to include both the pre-service trainee and the in-service trainee. Bias for teaching English is illustrated in the description and selected content of the 1995 syllabus. Arguing that the suggested syllabus content "is based on the skills and knowledge required of good primary teachers" (Ministry of Education and Sports, 1995; p.1), the authors point out that the syllabus is aimed "at enabling PTC trainees to make an improvement in communication in English Language". The abilities referred to include oral and written skills and knowledge of the grammar of English. For instance, the authors say that the target abilities include "the ability to express themselves in correct, clear and precise oral and written English with a simple range of vocabulary and sentence structures" (p.1).

Likewise the 2009 draft syllabus emphasises the improvement of teachers trainees' own language skills. This emphasis is evidently based on the "general outcry … that the education system is producing citizens with poor communication abilities and that practicing teachers fail to express themselves effectively both in speech and writing" (English Syllabus, p.2). Apparently the need to improve teachers' communication abilities is the driving force behind the revision of the language syllabuses. The authors argue,

> *Since teachers are the learners' models and they lay the foundation for the pupil's career path, it is obligatory for them to be exemplary models in English Language usage. If primary school teachers' own language skills are poor, they cannot teach English effectively. This has led to the revising of the PTE English Language and Literature syllabus*. (English Syllabus, p.2)

Analysis shows that the intention of the 1995 syllabus and the draft 2009 syllabus was to invest in developing trainees' knowledge, pedagogical content knowledge and practice. These targets are outlined below.

The 1995 syllabus expresses expectations for trainees' development of the productive skills of English without much reference to the receptive skills. However, three of the eleven syllabus objectives (See objectives 3, 4 and 6 in Appendix 1) do contain reference to reading, although it is general since reading is cited only as one language skill among others. Although no justification is hinted on for neglecting reading, it is possible that the authors believed that the productive skills (speaking and writing) are easier to monitor and observe than the receptive (listening and reading). On the other hand, there may have been no awareness of the importance of reading and listening. It is significant that the skills that trainees would acquire and use in reading and writing effectively (Objective 3) at this level would be far different from those required by their potential learners in primary school. For instance, the trainees would, ideally, need to master academic reading and writing skills whereas the primary school pupil needs more basic decoding and comprehension skills. While *functional and creative writing skills supported by wide and selective reading* (Objective 4) may be necessary in the primary school, no suggestion is made anywhere of any appropriate foundation on which these would be based. It is not clear how the pupils might be able to read widely and selectively before they have been enabled to read in the first place. The various approaches, methods and techniques of teaching the four basic language skills, including reading (Objective 6), are not cited. The analysis therefore raises the following questions.

Which specific approaches, methods and techniques are being addressed?
What reading skills should teachers teach in primary school?
How will trainees know what underlying theory informs the teaching of reading?
What is the evident philosophy of how children should learn to read?

Given the shift from the subject to the thematic approach in the lower primary school curriculum, we would expect a provision to reflect the primary school reality. There is none, however, since the PTE curriculum review has not catered for this detail. Analysis of the 1995 syllabus content reveals devotion of time to knowledge (10 units out of 16) development at the expense of pedagogical content knowledge (six units out of 16). Out of the 16 units three are dedicated to reading with one, Topic 5 *Basic Principles of Teaching Reading*, dedicated to teaching beginners. Provision for teaching reading is limited and only a third of the time allocated for this (Topic 5) is devoted to teaching beginning readers. However, the selection of content for this unit seems appropriate. Topic 5 caters for teaching about pre-reading readiness, major approaches to teaching reading, types of reading, choice of reading materials and progressive development of the learner's independent reading. It lists the major approaches to include *syllabic*, *phonic*, w*hole word*, s*entence whole*, *Look and Say*, and eclectic. There is an assumption that the child learns to read by decoding print, for example recognising the parts that make up words (implying the phonic and syllabic approaches above), recognising blends that form words (whole word), recognising the sense in words joined to form whole units (sentence whole).

The syllabus content selection suggests comparable attention being given to the development of trainees' theoretical disciplinary knowledge and pedagogical content knowledge at the expense of practice. It bears evidence of little care for equipping the trainee with the practical skills especially as they might be developed through practice. Content presentation of details shows that provision for *development* of practice is made only in two units: micro teaching activities and the production of materials being suggested for the unit *Basic Principles of Teaching Reading* while the unit *Principles and Practices of Teaching English* will presumably offer practice in the preparation of schemes of work and lesson plans.

It would seem, then, that the *good primary teacher* targeted by the 1995 PTE Language syllabus would present the following profile:

speaks and writes correct English
speaks and writes clearly
speaks and writes precisely
demonstrates knowledge of a simple range of English vocabulary

demonstrates knowledge of a simple range of English structures
is knowledgeable about the basic approaches, methods and techniques of teaching English
demonstrates the basic approaches, methods and techniques of teaching English
demonstrates ability to interpret the primary syllabus

Since the syllabus was adopted in 1995 and primary education reform has since ushered in the Thematic Curriculum, the assumptions of the syllabus have been overtaken by events. If the tutors had supplementary resources that provided some guidance on how to adopt the syllabus to the current situation in lower primary school, their search for value in this syllabus would yield much credit. But there are no such resources. A question arises regarding how this gap may be compensated for.

Tutors' reflection on what they do, how they do it and why they do it that way might bring them to focus on the gap between the perceived needs of trainees and primary school learners and, on the other, the real needs as they are known by the different stakeholders. While it is true that the CTEP course of 2008 was popular for having equipped tutors with skills of reflective inquiry, and they presumably can make choices based on their understanding of what is good, they still need the guidance of a syllabus. And what is lacking now is a syllabus that speaks to the reality of the thematic approach in the lower grades of primary school.

Like their Language counterparts, Mathematics tutors use the old (1994) syllabus. It is described as an integrated syllabus because it "combines both the curriculum and the examination specifications for the primary teachers' course". It is designed to equip the trainee with content and methods, emphasising understanding of the mathematical concepts and discouraging cramming. The authors emphasise practical work as both learning practice and methodology. The Mathematics syllabus illustrates intentions for equipping the trainee with knowledge, pedagogical content knowledge and practice for teaching mathematics. The approach to preparing trainees to teach mathematics is different from that illustrated in the case of English or language. The Mathematics syllabus bears a bias for practice which seems to be not only the context but also the basis of learning the target mathematical concepts. This is illustrated in the expressed objectives of the syllabus (Appendix 2). The objectives strongly suggest that the mathematics syllabus intends to support experiential rather than theoretical learning, as a source of knowledge and understanding of concepts, although the aims of the various units in the syllabus and the presentation of the selected teaching content do not consistently reflect this emphasis. While the learning of theoretical knowledge is catered for, plenty of practical work is strongly implied in *designing*, *making*, *matching*, *ordering*, *counting conversion*, *use of*, *preparation*, *construction* and other phrases that denote action. However the unit content does not offer details on the means by which the trainees should be taught the skills. Only in Topic 10 do the authors spell out activities that will be used to build the specified skills, catering for (i) oral and written work, (ii) tests and (iii) practical demonstration of acquired skills. The content tends to reflect more concern for the development of trainees' knowledge of the subject. In summary the Mathematics syllabus suggests that the trainer targets the following primary teacher profile.

possess in-depth understanding of the mathematics concepts
demonstrates both theoretical and experiential learning of the mathematics concepts
demonstrates knowledge of approaches and methods of teaching mathematics concepts
demonstrates skills of ordering, organising, designing, constructing and using objects as knowledge as well as method
demonstrates ability to exploit environment as learning context and as teaching method

ITE assessment practices privilege academic knowledge over pedagogical content knowledge and school practice, with topics learnt at secondary school being repeated at the PTC and emphasised in the examinations although the examinations test both content knowledge and methodology. The imbalance in favour of content knowledge in their training as teachers is illustrated, for instance, in the trainees' observation during a focus group discussion:

> *(We are) overloaded with 'O' Level work: instead of preparing us by exposure to the work required for teaching primary schools, we are required to learn /go back to the work of 'O' level on top of the primary work. So we find we can't even get enough training for the primary education. This pushes us very far back in our profession. Yes, as a result, it is very difficult to do the work. Science was taking us - that*

Physics and Biology! Like in science they brought us extraction of iron. Even in P.7 it is not there. (Trainee Focus Group)

The examinations administered by Kyambogo University are content based and require the candidate's recall of subject knowledge in large measure in one section and, to a smaller extent, some application of this knowledge in another section. Failing by a small margin means repeating the entire year, which can be disastrous for economically deprived trainees and lead to dropout. Even once in school, this threat appears real, as one tutor illustrates:

The moderators/external supervisors are so tough, sometimes they do not even answer the pupils when they greet them, they are known for drastically changing the results to fail students. (Tutor)

2.1.2 Implicit Theoretical Positions

Reading

Given its objectives and the aims of the various content units, the Language syllabus seems to be based on the integrated approach to language teaching, representing an effort to integrate the structural and the communicative approaches in the objectives and the aims of the various units. However, the heavy bias on theory in the curriculum content is bound to support prescriptive presentation in the classroom, with the tutor handing out knowledge about, say, language and language learning and teaching. An individual tutor may remedy this if he/she works from a reflective approach, facilitating the trainees' interaction with one another and their environment as well as an understanding of relationships between their experience and larger ideas (Henderson & Gornik, 2007; Schon, 1983; Rodgers, 2002; Dewey1910/1997). Besides, the syllabus does not contain guidance on reading content and pedagogical approaches to teaching reading. It does not, for example, contain details of the psychology of reading that underlie phonological awareness and graphic knowledge, grammatical knowledge and the recognition of textual organisation. Thus the syllabus does not provide for preparing trainees to teach skills for word, sentence and text level processing. This implies a significant gap in teacher preparation for teaching early grade reading. For Stanovitch (1986) asserts that early phonological awareness, for instance, sets a sure pace for beginner readers to break the code, facilitating their concentration on meaning and overall achievement of reading effectiveness.

Phonemic, phonological and alphabetical skills are listed in Early Childhood Education, but not in detail in for lower primary, thus leaving the teaching of them open to ambiguity. The teaching of reading in Local Languages (LL) is another gap but, as one PTC principal explained: *We assume that language tutors have undergone training in teaching reading in the respective language, although here the LL tutor teaches reading in English as well*. Another gap here is reading rate and fluency and, related to this, how to teach readers to make sense of whole texts longer than a short sentence.

Mathematics

The Mathematics syllabus, on the other hand, seems more inclined towards the constructivist approach to learning, both in its objectives and the aims of specific units. Providing opportunity for trainees to learn from doing, and constantly referring to the transfer of skills and problem-solving in the day-to-day context, it would promote discovery learning (Bruner, 1960; Piaget, Driscoll, 1994) and demonstrate the social value of knowledge (Vygotsky, 1978). The document, in fact, shows a selection of learning theories (based on Ausbel, Bruner, Dienes, Gagne, Piaget and Skemp) in Topic 4, which the trainees will be exposed to in preparation for teaching mathematics. Understanding of these theories in the context of the prioritisation of practice would presuppose tutors' emphasis of practical approaches and exercises in the classroom.

Within this cramped structure, academic knowledge is privileged or core and applied knowledge is marginalised (Darling-Hammond). Rather than adults training for a profession, trainees appear to be repeating their secondary education, living in hostels, wearing uniforms and attending assemblies. As one Ugandan Principal put it: *You cannot train the teacher to do so much in just two years!* This dual purpose ITE shapes the reading curriculum and its interpretation by tutors, beginning a domino effect as trainees go to teach reading in Ugandan primary classrooms.

2.2 The School Reading and Mathematics Curriculum

This PTC Curriculum looks thin in comparison with the new primary topic-based Thematic Curriculum for Primary 1 to 3, printed in 11 local languages and designed to be taught through an integration of skills using participatory methods and grounded in the daily lives of the village or town (Letshabo, 2002; Altinyelken, 2010). The design of the curriculum responded to proposals rotating around

(i) the need to focus on rapid development of literacy, numeracy and life skills at lower primary;
(ii) the holistic treatment of concepts in a thematic approach that emphasises their immediate relevance to the learner, and
(iii) the presentation of learning experiences through the media, especially languages in which the learners were already proficient.

(p.4, The National Primary School Curriculum for Uganda Primary 1)

The Thematic Curriculum promises focus on developing in the learner the skills that would enable them to find, use and share information, primarily through speaking, listening, reading and writing. The considerations underlying it are evidently in line with one of Uganda's national aims of education, i.e.

> *To eradicate illiteracy and equip the individuals with basic skills and knowledge to exploit the environment for self-development as well as national development; for better health, nutrition and family life and the capacity for continued learning.*
>
> (p.6, The National Primary School Curriculum for Uganda Primary 1)

Although it does not state the means by which acquisition would be ensured, the first objective of primary education seems to emphasise the above national aim, specifying the intention

> *To enable individuals to acquire functional, permanent and developmental literacy, numeracy and communication skills in English, Kiswahili and, at least, one Ugandan language.* (p.6, The National Primary School Curriculum for Uganda Primary 1)

This objective would presuppose provisions for individuals' development of literacy skills in English, Kiswahili and Ugandan languages even this early in primary school. The Thematic Curriculum would therefore be expected to cater for teaching reading and mathematics in "Ugandan languages" (familiarity and proficiency) as the LOI and teaching reading in English as preparation for the transition to upper primary. Based on the aims of education, the Thematic Curriculum highlights learning outcomes which specify the abilities that learners are expected to demonstrate as a result of having developed specific competences. Overall the expressed learning outcomes of the curriculum are

(i) basic literacy, mathematics and life skills as well as values in a first language or familiar language at a level that will enable the child to mature and be prepared for further learning
(ii) sufficient skills in English to act as basis for developing English as the medium of instruction in the upper primary cycle
(iii) an appreciation of their culture and the roles they can play in society.
(p.7, The National Primary School Curriculum for Uganda Primary 1)

Thus it emphasises continuous assessment from a diagnostic and remedial approach for the purpose of identifying and responding to children's learning problems. The following analysis of the primary school curriculum focuses on the provisions for teaching reading and mathematics and the specification of learning outcomes.

All statements of the reading abilities that should be developed in the three lower grades are made under the *aspect* shown as *Literacy Competences*. The literacy competences are separated into three categories including listening and speaking, reading/tactile and writing/brailling. At the lowest grade level, Primary 1, pre-reading competences are specified for each sub-theme under a theme, in relation with pre-writing competences and with regard to the LOI which is the mother tongue or area local language. Besides, non-medium (e.g. English) competences are specified for each sub-theme, and they include some for vocabulary and language structures. Through Theme 1 to 6 of the Primary 1 curriculum the specifications for literacy competences are all for pre-reading. They include, for instance, *recitation of rhymes*, *comparison of pictures*, *drawing and matching items*, *fitting jigsaws*, *recognising pictures*, *identifying 3 vowel letters within context of known words, reading 2 syllable words*, *reading 2 syllable words with double vowels* and *reading at least 4 words*, among others. The

specifications imply an intention to recycle the competences since little progression is provided for within the same stage: basically the same competences being targeted from Theme 1 to Theme 6. There is a vague reference to sound in the specification for reading, say, *double vowels* and *syllables*.
Much as some of the above competences are sometimes cited within Units 7 to, say, 13, the latter units add more competences including higher level ones and cater for reading, which is presumably more advanced than pre-reading. In these units the specified reading competences include *drawing pictures of family members*, *matching pictures to words*, *reading simple sentences*, *reading short sentences using link words*, *reading a family tree*, *reading and recognising possessive adjectives with nouns*, *reading polite notices*, *forming words out of cut-out letters*, *reading words and sentences relating to transport* and more. Fewer reading competences are specified for Primary 2 including some that are specified for Primary 1 as well as some more advanced competences such as *reading sentences and a simple story*, *reading short simple stories*, *reading road symbols*, *sequencing words into sentences*, *sequencing sentences into a story*, *reading posters*, *reading short dialogues* and *completing stories*. Further progression is illustrated in the specifications for Primary 3. The listing is broader and includes some of the competences specified for Primary 1 and 2 as well as study skills that relate to the content of what might be taught as Social Studies, English and Science in the upper primary curriculum. Teachers are expected to develop in children competences such as *reading the names of the sub-county/division, parishes and neighboring sub-counties*; *reading sentences*; *reading the map and pictures of school*; *reading names of physical features*; *identifying more capital letters*; *reading a short text on roles of leaders*; *reading short paragraphs and answering questions*; *reading texts on different challenges*, *and reading names of diseases spread by vectors*.

This sense of incidental reading assumes ready access to reading materials rather than showing how teachers can make and use their own, but does give strategies appropriate for large classes in case studies at the end. In this way, the model of reading in the Ugandan primary curriculum appears to give children the best chance of learning to read according to the literature.

Similar to the arrangement for literacy, mathematics competences are stated for the three grade levels. But unlike the literacy competences, the mathematics competences are not categorised into pre- and other levels although a progression from pre-academic to academic levels is apparent. In Primary 1 teachers are expected to start with the development of elementary competences such as *sorting*, *comparing*, *matching* and *counting one to five* using tangible things such as is catered for in Theme 1. Immediately, even within the same theme, progression is catered for so that children are taken on to sorting but work with tangible things and aspects of *shape*, *size* and *color* that they can depend on to learn to differentiate objects. Through the later themes they go on to working with number, which can be abstract, through *recognising and writing number symbols*, *filling in missing numbers up to 5*, *telling time of the day using natural indicators*, *adding sum less than 40 vertically*, and encounter more challenging expectations like *measuring height using non-standard units*, *identifying two halves that make a whole* and *interpreting information on pictographs*.

2.3 Summary

The specification of literacy competences in the Thematic Curriculum caters for some progression from one grade level to another, with an implied expectation for learners to be able to transfer reading competences to learning experiences in subject areas. For all the three lower grades, the reading competences are related to writing competences and the teaching of reading and writing is planned for the *Literacy Hour* in the activities called *Literacy I and Literacy II*. However, some competences are not specific and exact and often sound more like learning activities that teachers should organise in the teaching of reading. Some, on the other hand, are so specific and exact and relate to skills. Although progression is catered for across the three grade levels, it is difficult to see any reflection of connections from the lower level abilities of sound and word recognition and tackling of sentence grammar to the higher level processing abilities relating to discerning meaning from whole text. This is in spite of the clear statement of competences such as *reading whole words* and *reading sentences*.

While specifications at the lowest grade level are categorised as *pre-reading*, they do not promise the development of those basic reading skills identified in the literature. It is difficult to recognise provision for the pre-reading skills that Chabbott (2006) for instance lists, such as phonemic awareness, phonological awareness, print awareness and alphabetical knowledge. There is an apparent assumption that children will have come to school from a nursery schooling background and will have developed phonemic and phonological awareness and alphabetical knowledge, thus being ready to read with automaticity (Stanovich, 1986). The inclusion of storytelling in later

specifications of competences may cater for development of text comprehension if effective methods are selected and used (Bentolila and Germain, 2005). However, the possibility of such selection and use cannot be taken for granted since the curriculum document does not make explicit mention of comprehension. In any case the teachers may not be expected to relate story telling with development of comprehension or to relate oral work directly with printed text comprehension. The gap in the school curriculum is comparable to that in the college language syllabus. While the college syllabus dwells on language teaching without providing specifically for developing trainees' content knowledge of reading in the aspects identified in the research literature, the Thematic Curriculum provides for the teaching of pre-reading skills without specifying those low-level and high-level process reading skills that the literature says would lead to reading effectiveness.

The mathematics competences in the Thematic Curriculum are expressed in much the same manner as the teaching content in the PTE mathematics syllabus and textbooks. Besides, the specified mathematics competences easily stand for the content of mathematics, unlike the reading competences which stand for what is done in teaching reading. The specification of mathematics competences is bound to make it easier for teachers to interpret the mathematics curriculum than it is for them to interpret the reading curriculum. The Thematic Curriculum may therefore facilitate the teaching of mathematics better than it does the teaching of reading.

Perhaps the most outstanding gap between the college ITE curriculum and the primary school curriculum is in their focus. While the college curriculum focuses on content topics and teaching objectives, the Thematic Curriculum focuses on learning achievement, spelling out not objectives but learning competences. The former therefore is subject-centred while the latter is learner-centred. Effectively taught the ITE curriculum is bound to yield teachers who are knowledgeable about what language is and how it should be taught. It is not quite likely to equip teacher trainees with the content of teaching reading or the skills of teaching it. On the other hand effective delivery of the primary curriculum requires teachers with knowledge of what pupils need to demonstrate for reading ability, even though there are some gaps, as well as the skills for equipping individual pupils with those competences.

Chapter 3: Learning to Teach Reading

3.1 Insights into Teacher Educators' Knowledge, Pedagogical Content Knowledge, Understanding and Practice

In this section observation and interview data is analysed for indications of tutors' knowledge, understanding and practice in the preparation of teachers for teaching lower grade reading. First, the sampled tutors' characteristics are analysed to provide a context for critiquing their subject knowledge, pedagogical content knowledge and understanding about teaching reading. This description is followed by an analysis of the tutors' demonstrated knowledge and skills, based on what they said about the curricula and about teaching reading and what they did in the classroom. The analysis becomes a reference point in the analysis of trainees' knowledge and understanding in Section 3.2 in determining how the trainers have influenced the trainees.

3.1.1 Tutors' identity

Out of the 21 PTC classroom sessions observed, taught by 16 tutors, nine were language sessions. The language sessions have been included in the data of reading since this is the context in which instruction on reading was offered. The tutors' length of teaching experience varied, with one out of 16 falling in the 2-5 years bracket and 12 in the ten years + bracket. Eight tutors possessed bachelor's degrees, the current basic academic qualification for tutors; three have the previous minimum requirement – the Diploma in Teacher Education; one holds a masters, and another a Ph.D. These characteristics are summarised in Table … below. They indicate that the majority of tutors qualify to teach at the PTC and that the majority have been in the profession a long time.

Table 3.1: Tutor Characteristics

Qualification	Specialisation	Teaching experience (years)	Gender
Diploma in Teacher Education	Mathematics	3	Male
Diploma in Teacher Education	Mathematics	12	Male
Diploma in Teacher Education	Mathematics	13	Male
Bachelor of Education	Mathematics	10	Male
Bachelor of Education, PGDE	Language	10+	Male
Bachelor of Education	Mathematics	10+	Male
Bachelor of Education	Language	10+	Female
Bachelor of Education	Language	10+	Female
Bachelor of Education	Mathematics	10+	Female
Bachelor of Education	Mathematics	10+	Male
Bachelor of Education	Language	27	Female
Bachelor of Education	Language	10+	Female
Bachelor of Education	Language	23	Male
Master of Education	Language	17	Female
Master of Education	Mathematics	28	Male
	Mathematics	22	Male

In the data analysis the tutors are identified by six letter-and-digit codes in which the first two letters represent the identity of an individual college, thus KB, KG, KN and KY for the four colleges. The letter 'T' denotes 'tutor' and 'R' in Chapter 3 represents identification of a reading/language tutor while 'M' in Chapter 4 represents a mathematics tutor. The two digit number at the end is reference to the place in the sequence of cases entered in NVIVO as lesson observation and interview. KBTR31, for instance, was a reading tutor observed teaching reading and thereafter interviewed. The case was entered as the 31st in NVIVO.

3.1.2 Tutors' Knowledge of Reading

Although the majority of tutors have taught for more than ten years, the delivery of the ITE language curriculum demonstrates variable knowledge of reading as a discipline. Their knowledge differs both in breadth and depth of content.

Three tutors including KBTR31, KBTR04 and KYTR16 delivered sessions dwelling on knowledge of definitions, theories of reading and principles of improvisation while KGTR14 defined teachers' knowledge of the language structures as a prerequisite to reading. They seemed to appreciate the syllabus at face value and work from a prescriptive approach. On the other hand, KYTR03, KNTR17, KNTR18 and KGTR15 attempted to allow trainees to think and bring into the training space some of their experience and observations as a means to knowledge development. These seemed to appreciate the syllabus as a guide and to think beyond the ideas in the document. Altogether, the approach by this category seems to conform to the constructivist view of learning described by Vygotsky (1978), Bruner (1960) and Matthews. It illustrates what Schon (1983) and Henderson and Gornik (2007) advocate for professionals, that is reflective inquiry.

One category of tutors seemed knowledgeable about what children need to be able to do in order to read effectively. They were able to articulate some concepts of reading and principles of teaching it and they made reference to the importance of recognising letter shapes and representations, and of learning to read sounds and words at the very basic level. These tutors seemed to be aware of reading needs such as those recognised by Stanovich (1986) and Chabbott (2006) in their recommendations for developing alphabetical, phonological and phonemic abilities. They talked about reading from a more technical approach. For instance, KNTR17 said that teachers

> *… should guide their pupils in forming, recognising the shapes of letters, and the role each letter plays in a word*.

She made reference to common misconceptions about reading, which lead to phonemic difficulties such as may be recognised in reading beans/peas. A colleague, KNTR18 talked about children's ability in the same aspects, specifying the following

> *… should be able to identify the letters, syllables, words in the context of sentences*
> *… should have some mechanics of reading, for example, punctuation*
> *… naming and interpreting symbols, graphic symbols to come up with meaning*

In describing children's misconceptions about reading, she made reference to difficulties concerning elementary aspects, explaining,

> *They find it hard to identify letters that are almost similar e.g. g/p, d/b, t/f, n/m*
> *Capital letters and lower letters confuse the pupils. … difficult to identify them they need constant help.*
> *The way the words are spelt is different from the way they are said, for example, 'a' in 'Mary' ….*

A counterpart KGTR15 reported about key concepts in teaching reading:

> *Early readers need to be trained in systematic reading; they can start with letters, words, pictures, then later for upper classes stories could be introduced*.

These tutors cited the need for use of phonics, the syllabic method, Look and Say, and the whole word and whole sentence approach.

Different from this set is the category of poor language tutors whose sessions and interview responses illustrate knowledge of theories of reading and dependence on what teachers actually do in class rather than what children should be enabled to do. These tutors emphasised not children's ability to read at the elementary level of sound and word but the reading activities that should be facilitated by teachers to enable children to read. Their clearly global approach focuses more on the teacher and less on the learner. Among these are KBTR31 who dwelt on

definitions of reading, displaying one in Brumfit (1985), emphasising some "points to note when preparing to teach reading", and the need to understand that reading and writing should be seen as inseparable. She occupied most of the session time with discussion of what she called "developing oral and observation and reading skills" and part of it with group work for developing reading materials based on pictures of objects, advertisements of different products and services, short sentences about events, rhymes both in English and local language, tongue twisters, riddles, short stories and simple nursery songs. Similarly KYTR03 emphasised knowledge of the needs of pre-readers and the activities required for developing pre-reading skills while his colleague KYTR16 dwelt on knowledge of improvisation for teaching reading and made no reference to concepts of reading or target reading skills. These three cases are poor for their failure to illustrate the reading competences that should be developed in the child.

A different kind of knowledge is reflected in KGTR14's description of teachers' requisite knowledge of reading. Responding to the interview question "What kind of knowledge does a newly qualified teacher of reading need?" he enumerated:

> *Teachers should master grammar/structure.*
> *They should be conversant with parts of speech.*
> *They should have awareness of figures of speech/imagery.*
> *They should develop appropriate teaching techniques.*

The reference to mastery of language structures and awareness of pragmatics suggests more advanced levels of reading, well beyond the lower grades, pointing to a reader's ability to make meaning based on their mastery of the structural elements of text. The details could also represent emphasis on the grammar of a language, without regard for reading skills, which potentially results from language teacher training that emphasises content of language per se without regard for reading skill.

Tutors' knowledge of reading was therefore varied, often limited and sometimes erratic. It is not clear why there were such pronounced differences in the tutors' knowledge of reading. However, their reports of sources of knowledge about reading do offer hints. KYTR30 suggested that there is no support for learning about reading at the college, saying "*Learning about how to teach early reading is completed in schools not PTCs, through experience, through CPD and through other teachers. Little really is learnt at PTCs"*.

Much as there are CPD opportunities for tutors, with Kyambogo University and Uganda Martyrs University, Nkozi offering training, as KGTR15 reported, these opportunities are varied. The content and delivery too are different. The variation in tutors' knowledge of the subject matches that in their knowledge of the college and primary curricula. Asked how she interprets the TE curriculum in daily practice, KBTR31 explained that it requires so much that the tutors cannot possibly do, given the realities of numbers and material shortages at the colleges:

> *Yeah, you wish to do so much that you cannot, therefore, it seems that we are dealing with universal teacher education – no materials, large numbers, students can't go and do research as required, and you therefore resort to lecture mode.*

Deeper and more specific knowledge on pedagogical issues is exhibited in KNTR17's description of the primary curriculum which she says is relevant because it addresses different learning levels, operationalising the principle of "known to unknown" and allows for pupils' use of local examples through its link with the environment. The depth of KNTR17 is perhaps more particularly demonstrated by the comment that the curriculum presents potential challenges with regard to the requirement for translation to local languages, especially given the difficulties involved in finding uniform words since even in one language there may be different dialects. In comparison one Language tutor's views of the primary curriculum spread across content, pedagogy and implications for professionalism. In describing the primary curriculum for reading KNTR18 said that it is clearly spelt out, with reading and writing combined in one lesson and provisions for developing all the four language skills, and for pupils to know what they are reading since the curriculum relates to the local environment. KNTR18 lamented that the requirements for improvisation are not always met, for although reading in lower primary requires a lot of preparation and materials, some teachers simply introduce the word without associating it with pictures or symbols.

Vague awareness is also illustrated in KGTR14's language session with the tutor advising trainees to be careful when pronouncing letters in primary classrooms and demonstrating the steps that teachers might follow in setting

up a reading corner. The tutor mentioned primary school methods in passing in the same way that KGTR15 made references to the linkages between the content and primary school expectations. These vague and general references contrast with more specific awareness levels of the linkages. KNTR17's delivery was driven by the P1 curriculum, in spite of her awareness that the ITE curriculum has some gaps and is undergoing revision to match it to the Thematic Curriculum. She guided the class to imagine they were P1; facilitated group work; guided a class discussion of suitable teaching materials for P1 and how best to give praise and to choose pupils to illustrate, and often livened the class by use of song. Likewise, KBTR31's reflections on linkages were at the level of pedagogy. She explained,

> *I think there is a relationship between the teacher education curriculum and the Thematic Curriculum for teaching reading. The college curriculum addresses the realities of primary reading classrooms and the teaching of English as a second language. We use the same methods at the college as those advocated in the Thematic Curriculum such as syllabic method; whole sentences; whole word; incidental reading, which emphasises making cards, charts, books, using real objects etc.*

While the linkages between the curricula are at both the content and methodology levels, tutors articulate more detail about the latter than they do about the former. There seems to be a general perception that teaching is about the methods of delivery, for content was rarely referred to. This implies an outcome of teachers who emphasise methods at the expense of content.

Teachers' pedagogical content knowledge, though difficult to test and measure, seems easier to link to pupilts' reading ability than is their knowledge of reading. Carlisle, Correnti et al (2009) suggest that teachers' content knowledge about reading is not necessarily linked with their teaching practices and therefore might not explain pupils' improvement in reading. It seems that the tutors' PCK is led by their perception of what teaching is about. The emphasis that they placed on pedagogy when articulating their knowledge of the curriculum is reflected in their PCK. In this area too there are variations among the tutors', for their PCK is different. The analysis here shows the variation to occur within and between groups of tutors as well as at individual level.

In a few instances, weaker PCK was demonstrated by tutors who either did not articulate their pedagogical content knowledge with specific regard to reading, or made very vague reference to reading. Asked about how he equips trainees with knowledge, understanding and practices, KGTR15 enumerated various ways:

> *We teach them different approaches.*
> *We teach them how to improvise.*
> *They are guided according to the curriculum.*
> *They are made aware of the changes in the education system, e.g. the Thematic Curriculum.*

KGTR15's response suggests a general knowledge about teaching approaches and methods that can be applied in various subject areas. It implies the tutor's lack of regard for specific attention to the nature of reading as a skill. The weak PCK is illustrated also by some detail in KNTR17's responses regarding the aims of her lesson:

> *to prepare the teacher trainees to teach reading from P1 to P3 during teaching practice*
> *give methods of teaching reading and writing*
> *to tell the trainees more about lesson planning*
> *to tell them more about the use of teaching aids*

The above aims are not specific to the methods of teaching reading, whether at the college or in the lower primary grades. They therefore suggest the tutor's general PCK and lack of regard for specific methods of teaching reading. These responses are comparable to one by KGTR14 who explained that the purpose of her lesson was "to survey some aspects of reading, for example articulation in reading". They demonstrate a limited and inaccurate view of reading aspects which lies in trying to teach pronunciation as an aspect of reading. The teacher's explanation that she did not use group work because she "did not have enough materials to go round" suggests lack of specific knowledge of methodological detail for teaching reading skills.

Stronger PCK is indicated in evidence of shared beliefs and knowledge about approaches to and methods of teaching reading. Some tutors believed that certain methods are suitable to lower primary classes, and they referred to the difference between grade levels, offering some specific detail. KGTR15 recommended the approach of starting with pictures, letters and words at the lower level and then introducing stories in upper classes. She cited phonics, alphabetic method and the syllabic method for lower primary. Her colleague KNTR18

cited the alphabetic method, the phonic and syllabic methods, Look and Say, the eclectic method and the whole word and whole sentence method, explaining that the eclectic method combines all other methods and that the teacher should vary the methods.

Other data illustrates tutors' ability to match method to reading ability. KNTR17, for instance, pointed out in a class discussion on a P1 lesson that pupils need to learn the shapes of the different words that name animals in the home. She added that they need to read the words with fluency.

Tutors' PCK, like their content knowledge, is varied. Clear distinctions are observable between two general categories of tutors. On the one hand are the good tutors who know that in teaching reading children should be taught skills and graduated from recognising pictures to decoding print to understanding whole text. On the other are the poor tutors whose theory of teaching reading emphasises general methods of teaching with clear focus on activity but without any specific reference to reading as a set of skills.

3.1.3 Tutors' Practice

All tutors used English in the classroom. The LOI applied even to the teaching of reading although once the trainees qualify, they may have to use the area language of the locality where they are deployed as teachers. When trainees asked JBNTR17 "Are we supposed to teach in English or Lumasaba? Or do we translate the lesson and teach it again in Lumasaba?" the tutor insisted that they must "use Lumasaba entirely" and not translate since this may result in two lessons. And yet the reading lesson was taught in English, with little acknowledgement of the differences between the two languages in terms of approaches to reading. MORE
Some tutors could articulate the aim of their lessons and others could not. In instances of the former articulation tended to limit the aim to immediate performance outcomes, regardless of the selected topic and content. When asked about the aim of his session GGATR15 said,

> *At the end of the lesson students were to show an understanding of how to teach controlled composition in primary schools in relation to the primary syllabus. Sentence patterns and structure should be the same.*

The above has parallels in KNTR17's articulation of the aims of her lesson, that is,

> *to prepare the teacher trainees to teach reading from P1 to P3 during school practice, … tell the trainees more about lesson planning, … tell them more about the use of teaching aids.*

KNTR17 started her lesson with a brief definition of reading and then literally turned the session into a P.1 class. Imagining they were P.1 pupils, the class practised the sounds made by animals. Then the tutor led the class discussion of how teachers could teach the topic.

There was a conscious effort by tutors to reflect the primary classroom in the PTC lecture room, with encouragement for the trainees to consider the primary learner's level. Tutors required trainees to focus on the pupil in every detail of the lesson: language of instruction, appropriate methods and appropriate learning activity. However, while this focus was sharp in the lesson introduction it was not always quite recurrent in the content progression. Tutors progressed variously, the good ones concentrating on the primary pupil and poor ones limiting attention to facts. Where the focus was the primary pupil, there was a tendency for group work, with the tutor encouraging trainees to explain their discoveries. KBTR31's and KYTR30's lessons were in this category. Where the focus was on facts, the tendency was use of question and answer techniques in a lecture mode dominated by teacher talk. The lesson content was not always aligned to the definition in the introductory steps either. KYTR16's lesson was in this category.

Tutors' assessment practice too varied. There were two major categories of practice: one involving assessing trainees on the content of the session, usually at the end of the session if not during the session, and the other involving assessing them on content that is detached from the session. It is not always clear what leads the assessment or how the tutors use the indications obtained on assessment, in spite of the tutors' explanations. Trainees did a class exercise at the end of KGTR14's session in the same way as they did at the end of KGTR15's class. Asked how the exercise related to composition writing, which the lesson had been about, KGTR15 explained that the exercise was "to test whether the students can observe the grammatical sentence". This is

difficult to understand with regard to the topic of *measurement in the learning environment*. In her interview, KBTR31 said that the group work that trainees did in her class had been an assessment activity. She argued,

> *But I think that students understood this aim, seeing from the evidence of their engagement and production. I took it out of the curriculum – the topic is Teaching Reading in Primary Schools. I planned so that they learn the use of various starters – rhymes, story, impromptu speeches etc.*

KBTR31 also demonstrated the practice of assessment at the beginning of the lesson, on content completely different from the current lesson content. She started her session with a spelling test for which she had selected 10 "commonly mis-spelt words" from *The Students' Companion*. She did not demonstrate any link between this spelling test and the activity in which trainees were supposed to develop materials for teaching reading.

Practice was also characterised by use of various sources of content and teaching media. The chalk board was used by most tutors as the basic medium for illustrating the content of sessions although the extent and style of use varied from one tutor to another. Immediately she entered the classroom KBTR31 asked if anyone had a piece of chalk, and went on to present a definition of *reading* and uses of reading, which details she carried in a chart that she displayed at the front of the room. She did not carry the source of her definition. Like her, KGTR15 used the chalkboard and no other teaching aid. In contrast KGTR14 wrote systematically on the chalk board, with notes that were organised and easy to read and internalise. He also used a large story book to illustrate how reading can be done in groups, and had a textbook that he referred to from time to time for facts. KGTR15 dictated from the tutor's copy of a textbook he had carried to class but KNTR17 brought to the classroom a range of print materials that she displayed – textbooks; flash cards with names of animals, cut out of manila sheets; a big chart with pictures of animals – cat, cow, sheep and others; small cards with letters for children to build words, and, in addition, blank card paper and markers. Besides, she distributed copies of the Thematic Curriculum. She explained why she did not write on the board: "I wrote everything on newsprint and manila. This was a demonstration lesson and in the actual P1 not much is done on the blackboard". It is likely that in spite of the constant reminder about the methods appropriate to lower primary, tutors present varied practices and are bound to cause varied practices by the teachers they send into schools.

3.1.4 Summary

The data of trainers suggests two broad categories of tutors. The first set, which can be labelled 'good', focus on the learner and are knowledgeable about what children need to be able to do in order to read effectively. They cite the need for use of phonics, the syllabic method, Look and Say, and the whole word and whole sentence approaches. They describe as basic essentials such reading abilities as sound recognition, letter recognition, recognition of letter shapes and representations. To them these abilities are fundamental in developing the skills of reading sounds and words. These tutors are aware of the principles of teaching reading and demonstrate ability to use appropriate methods for young learners.

Quite opposite to their colleagues, the second set of tutors focus more on the teacher. They illustrate knowledge of theories of reading and dependence on what teachers actually do in class rather than what children should be enabled to do. They lack knowledge of the reading content required in lower grades and are unable to specify the methods of teaching reading at this level. Thus their classroom delivery focused not so much on reading as on general instructional detail. It is also significant that several tutors place the reading and comprehension of stories among the needs of upper primary, indicating that this is beyond the needs of lower primary pupils. Tutors' PCK is varied, with some bringing pre-reading skills into their teaching while many do not. All talk about and teach the same synthetic approaches as in the TTC curriculum. However, some tutors consider the reading of short stories to be the provenance of upper primary. Few tutors specifically talk about the role of comprehension in learning to read. Only one tutor talked about the difficulties of using LL in the teaching of reading. There is an implicit assumption, among the tutors, that the details of learning how to teach early reading will take place in schools.

None of the nine tutors discussed the difficulties of teaching reading to very young children in resource-poor multilingual classes of over 100. Specific linguistic knowledge of the differences between English and Bantu languages and the consequent different approaches needed to learn to read were not strongly demonstrated or discussed by tutors. This knowledge and practice gap has massive implications for the way in trainees from the

PTCs know, understand and teach early reading once out in schools. Simulating the primary school classroom was not followed by a specific discussion on how trainees could adapt approaches tested out in large classes.

3.2 Patterns in Trainee's Knowledge, Pedagogical Content Knowledge and Understanding

Trainees' data is analysed in this section for insights into their knowledge on reading as a discipline and how children should be taught in order for them to learn to read effectively. Details about the trainees are presented as focus group discussion or trainee questionnaire survey data. The descriptive questionnaire survey data is presented in percentages while the qualitative data of focus group discussion is indicated as verbal explanations, and the two types of data are presented as complementary in pursuit of depth of analysis. Focus group data is shown to originate from sources identified by seven letter-and-digit codes associated with the colleges. TFGKB01 thus identifies data from a trainee focus group (TFG) at a college coded KB and makes reference to the first entry (01) of such data in NVIVO.

3.2.1 Trainees' Characteristics

Half the trainees in the sample of 500 were from one central PTC and 60% were under 20 years of age, implying they were following the pre-service training programme. Nearly 94% had completed Senior 4 and 6% had attained up to Senior 6. A significantly large majority of 92.01% of the trainees reported having no teaching experience previous to joining teacher training. Only 7.99% had some experience, implying they were on the in-service programme; 9% had between 1 and 3 years of teaching experience, and 4% had been on CPD courses somewhere. While 55.47% strongly disagreed that they would prefer to be training for another career, over 50% reported that they would prefer to teach upper primary. Ambivalence about career choice is corroborated by the following response:

> *Teaching is not just [a] choice. But we are now converted. It is 'love what you have – a bird at hand is worth two in the bush'. A majority is hoping to change from teaching to say, journalism, business and upgrade*. (TFGKB05)

The trainees' feelings about teaching in general may be echoed in their self-assessment regarding teaching reading. For instance, in spite of their lack of teaching experience before joining the training programme, 38.65% reported that they rated their capability for teaching reading very high while 53.26% said it was high and only 7.42% described their capability as low. An interesting 0.67% assessed their capability as very low. A similar pattern is recognisable among the trainees who reported having some teaching experience of teaching at lower primary. 23.08% of these described their capability as very high and 58.97% as high while only 17.95 reported a low capability and none said they possessed a very low capability. Interestingly the responses of trainees in the two rural colleges about their ability and confidence to teach reading and mathematics contributed significantly to trainees' rating of their competences as *very high*.

Table 3.2: Trainees' Perceived Ability to Teach Reading

Ability to teach reading	No experience of LP teaching		Some experience of LP teaching		Total	
	Freq.	%	Freq.	%	Freq.	%
Very High	172	38.65	9	23.08	184	37.17
High	237	53.26	23	58.97	268	54.14
Low	33	7.42	7	17.95	40	8.08
Very Low	3	0.67	0	0.00	3	0.61
Total	445	100.0	39	100.0	495	100.0

The indications in Table 3.2 would imply trainees' preparedness for the requirements of teaching reading in primary school. After all they are matched to the trainees' self-assessment of their confidence to teach reading in lower primary (Table 3.2). Although most had no previous teaching experience, 39.01% reported a very high assessment of their confidence while 55.38% said their confidence was high and only 5.38% reported low confidence and a very small percentage of 0.22% described their confidence as very low. On the other hand,

28.95% of those with some teaching experience assessed their confidence as very high and 55.26% as high and 15.79% reported low confidence, with none at all describing their confidence as very low.

Table3.3: Perceived Confidence to Teach Reading

Confidence to teach reading at lower primary	No experience of LP teaching		Some experience of LP teaching		Total	
	Freq.	%	Freq.	%	Freq.	%
Very High	174	39.01	11	28.95	187	37.78
High	247	55.38	21	55.26	277	55.96
Low	24	5.38	6	15.79	30	6.06
Very Low	1	0.22	0	0.00	1	0.20
Total	446	100.0	38	100.0	495	100.0

The data of trainees' high rating of their confidence and capability would imply effective ITE training for teaching reading. This implication gives special significance to the survey data of reading content, which is analysed in the next sub-section.

3.2.2 Trainees' Knowledge of Reading

Overall, it seems that trainees have a fair knowledge of the skills required in beginning reading, which encompass both word based and comprehension skills, at least in theory from this questionnaire. For instance, asked what makes a good teacher of reading, more trainees, including those with teaching experience and those without, agreed with the suggested contributory factors. While 44% of trainees without experience agreed and 38.59% strongly agreed that telling lots of stories and linking them to text makes a good teacher, only 14.12% disagreed and 3.29 strongly disagreed with this qualification (Table 3.4). Among their experienced counterparts 48.65% agreed and 35.14% strongly agreed while only 16 % disagreed and none reported strong disagreement. Similar responses were returned regarding the teacher giving a range of strategies to make sense of words, with 45.84% of trainees who had no experience agreeing and 27.55% strongly agreeing that a good teacher of reading gets children to read for meaning at the word level while 21.14% disagreed and only 5.23% strongly disagreed. As many as 45.71% of those with experience agreed with this and 25.71% strongly agreed while 20% disagreed and 8.57% strongly disagreed. The responses would suggest that trainees' knowledge about teaching reading is influenced partly by the PTE curriculum content since the language syllabus does list some major approaches to teaching reading, including whole word and whole sentence.

Table 3.4: What Makes a Good Teacher of Reading

	Percentage			
	Strongly Agree	*Agree*	*Disagree*	*Strongly disagree*
(a) Being a good reader themselves in the language	44.28	35.38	15.04	5.30
(b) Telling lots of stories and linking them to text	38.48	44.40	14.16	2.96
(c) Getting children to memorize words and sentences	30.17	45.99	18.99	4.85
(d) Giving a range of strategies to make sense of words	27.41	45.82	20.99	5.57
(e) Reading aloud in the classroom	46.72	36.15	10.99	6.13

However the trainees also demonstrated some weak knowledge of reading. For instance, their responses illustrated agreement with use of rote as a strategy which, although useful for learning some things, this may not be useful in teaching reading. And yet the responses of trainees with some teaching experience stand out for agreement (51.35%) and strong agreement (32.43%) with getting children to memorise words and sentences. Their strong affirmation clearly contrasts with the interestingly low values for disagreement (10.81%) and strong disagreement (5.41%). It is not easy to attribute these responses particularly to the college training, since no instances of this approach to teaching reading were observed, but it is significant that the cited strategies are

commonly used in the primary classroom, as is illustrated in the next section by the case of NQTs teaching Literacy I or reading. Since the respondents were in their second year of training and had interacted with the reality of classroom teaching during school practice, it is possible that the reading practices in school had influenced their knowledge of reading. Besides, they were products of the same primary school system and may have formed some permanent impressions of what reading is based on the way they were taught reading.

The survey data indicates that trainees cite the syllabic approach as the best and most familiar for teaching reading, at 59.16%, and word level skills are reportedly the easiest to teach, while comprehension of whole texts and their meaning and recognising the meaning of words from their context are the most difficult to teach, with or without teaching experience. This detail bears a link to the ITE curriculum, suggesting the extent to which citation of the whole word approach in the language syllabus and the exclusion of comprehension may influence emphasis on the word in training and consequently shape the trainees' perceptions of reading.

Table 3.5: Ease or Difficulty of Teaching Various Skills

Skills	*Very Difficult*	*Difficult*	*Easy*	*Very Easy*	*Not suitable for grade*
(a) Finding meaning from a word's place in the sentence	11.73	29.01	42.59	11.11	5.56
(b) Joining sounds together to make syllables	3.10	18.60	49.59	27.07	1.65
(c) Linking stories, actions and pictures with writing.	3.06	16.53	46.94	29. 80	3.47
(d) Punctuation and capital letters	4.54	19.18	40.21	27.22	8.87
(e) Reading aloud at sufficient speed to make sense of the writing	4.77	18.67	42.32	28.42	5.81
(f) Recognizing different parts of a word	7.71	28.13	41.04	18.33	4.79
(g) Teaching letter sounds	2.85	11.61	48.88	34.62	2.04
(h) The way a story is put together	6.82	30.99	38.64	15.91	7.64
(i) Understanding the overall meaning of a story, poem or other piece of writing	10.49	26.34	35.39	15.02	12.76

A familiar pattern emerges of trainees' understanding of how children should learn to read. They evidently perceive this to involve progressing young children from concrete examples in letter sounds/synthetic phonics, done with the whole class, to syllables to whole words and sentences, and employing individual or group work and exercises. Repetition and drilling are seen as viable strategies. Stories, songs and rhymes are used to teach words and vocabulary but not for story structure, genre or comprehension. However, text level skills for reading for meaning, including story structure and genre, are the hardest for trainees to teach and have the highest responses for 'not suitable at this grade'. Every focus group mentioned the same core approaches cited in the survey: alphabetic**,** phonic, syllabic, whole word, whole sentence, Look and Say and 'eclectic' taught through themes familiar to pupils such as 'Our Home', 'Our Environment', 'Living Together' (TFGKN06).

Trainees' pedagogical content knowledge was reflected in their beliefs and understanding of reading and reading instruction, and the primary reading curriculum, shown in the data of focus group interviews and the survey. Some other data sources include the PTE language curriculum and research about effective reading instruction in primary school. In the concluding part of the section comparisons are made regarding the consistency between trainee views and the primary reading curriculum.

Overall, it seems that trainees have a fair knowledge of the skills required in beginning reading, which encompass both word based and comprehension skills, at least in theory from this questionnaire. The syllabic approach is seen as the best and most familiar method at 59.16% and word level skills the easiest to teach. However, the qualitative data indicates that some tutors do not know enough about phonics to teach it well, a detail corroborated by the survey indication that the majority of trainees (52.4%) misdiagnosed pupils' grapheme misidentification as phonological rather than as visual inability. Reading lessons progress from letter names and sounds, to words and

then whole texts, moving from the familiar and concrete through individual and whole class work and lastly group work. Text-led activities were ranked highest among *'not useful activities' at 4.01%* and 3.76% respectively when trainees were asked which activities they found useful for teaching children reading at the lower grade level. However, teaching children to read a short story with understanding appeared to draw out appropriate comprehension methods from respondents, such as explanations to the class of what is happening in the story as they teach and using pictures in a sequence.

A variety of general methods was cited by all trainees, including group and pair work, discussions, use of pictures and instructional materials, avoiding drawing upon too many examples and avoiding dictation. These reflect their training. The qualitative data showed convergences with the survey data on the need for a variety of methods in reading including pre-reading skills. For instance,

> *… every approach can be applied although you are teaching something different. There is no real big difference because you can use a number of approaches for the same thing and just separate the way you are using them so that the children learn the different points well, just as one teaching approach/technique can be used in different subjects*. (TFGKB02)

This mixed approach correlates with recommendations in the thematic curriculum training materials which state:

> *While it is not possible to teach reading using one single method, it is useful to think about how children learn to read and the different methods that teachers use. It should be noted that MOES does not support one approach [in reading] rather than another*. (NCDC, 2009: p.26)

It was also apparent that despite the survey data indicating that trainees found teaching text level reading and story structure the most difficult, some trainees understood the need for using real texts for encouraging reading for meaning. For instance, in two different discussions:

> *You can't work without poems, plays, because children need to read and understand them and then you ask them to role play in order for them to understand the meaning of those words* (TFGKB02).

and

> *Yes, we should use different materials to enhance reading at different stages ….* (TFGKB03).

This finding is encouraging in light of the recommendation in the Thematic Curriculum. The teacher is advised, "As children move from P1 into P2 and P3 they need to spend more time reading texts" (NCDC, 2009: p.33). And the expectation is corroborated in the literature that indicates the importance of teaching comprehension of longer texts, even in the early grades, particularly for building fluency and reading rate (NICHD, 2000; Commeyras & Inyega, 2005; Chabbott, 2006).

Some outstanding language issues too were noted in the research. The RTI International country study on Early Grade Reading in Uganda found that *even a low level of oral reading fluency in mother tongue can be linked to comprehension* (Piper, 2010: p.4). It is therefore imperative that trainees speak the local language fluently and know how to teach reading in that language. Teachers themselves not fluent in the LL will hinder children from acquiring early reading skills.

The survey data indicates 15 different mother tongues that the trainees were trained to teach reading in including French, English and Kiswahili. However, a majority of 64.80% were most confident in teaching reading in English while 67% stated that they expected to teach in English, with 12.42% citing local language and the remainder indicating the spread of specific local languages. These expectations by trainees are at odds with the EGRA snapshot findings in Central and Northern regions of 71.1% frequency in use of mother tongue – a confirmation of the positive effect of the Thematic Curriculum. It reflects not only the complexity of the multilingual nature of Ugandan schools but also trainees' awareness of the variations in the local language medium policy and differences between government schools and private schools. A sharp instance of the trainees' position is seen in the trainees' feedback:

> *We have to follow the Thematic Curriculum. Some schools are following this – use of local language, others are not. Government schools are strictly following the curriculum but private schools insist on English as medium, although they teach the Thematic Curriculum*. (TFGKB03)

A teacher explained that the college provided special training in the thematic curriculum, saying "All Bagisu [a local language] trainees received special training – they were placed (for school practice) in lower classes where they were expected to teach using local language. Data from a college principal and tutors suggested that this practice was not uniform, with as assumption that local language tutors would know how to teach reading in that language, despite little evidence of any specific CPD or knowledge of this. Tutors discussed the syllabic approach as one among many approaches, although few specifically pointed out why this approach was more appropriate for Bantu languages. Indeed, teaching reading of English appeared to be the dominant mode. There was only one observation demonstrating explicit use of LL in the teaching of reading. As the thematic curriculum is relatively recent, tutors themselves may not have experience of teaching reading in LL. Trainees' comments on the use of LL applied to generic issues around translation rather than on teaching of reading.

When asked if they anticipated facing challenges if they have to use another language besides English, one trainee focus group at the college in the Eastern region and near the Kenyan border pointed out the significance of the regional and urban/rural contexts but they felt this was unproblematic. They explained:

> *This will depend on the region where one finds work: for example, in the urban areas English is used. We are aware that in rural areas, the language in which we are being trained cannot be used as the LOI because of the Thematic Curriculum. Therefore, we are prepared to face this challenge.* (TFGKG01)

and

> *Those of us from Kenya will have to switch to Kiswahili; learners in the rural areas can understand Kiswahili. So, it won't be a problem.* (TFGKG01)

Translating the curriculum into LL, even in cases where it might be assumed familiar, and teaching this with a lack of reference materials in LL was, however, viewed as problematic with trainees at two other colleges. It made them reluctant to move to different regions.

The trainees' perceptions about the place of language match another key finding in this study. EGRA Uganda showed that the abrupt change to English as the LOI from P4 has consequences for the successful learning of the main concepts in both reading and maths in the first three years. There are difficulties in grasping the intellectual content of the curriculum from P4, especially when the curriculum alters from a coherent thematic curriculum to a far more academic one (Piper, 2010; Casmir et al., 2011).

Clearly, more training is needed to ground teachers in the transition curriculum, theory around bilingual language acquisition and pedagogic strategies to support pupils in P3 and P4 to access the curriculum through English as the LOI. The study of English as a subject in the early years bears further research as it has such implications for learning in P.4 onwards, and for progression to secondary school (Kyeyune, 2003; Kyeyune, 2010).

3.2.3 Trainees' Understanding

Survey and focus group discussion data bears useful indications of the trainees' understanding of issues surrounding the language education policy, the school conditions in which they are likely to work and the sources that they should depend on for support. In this section some details of these perceptions are presented and these are relevant to both mathematics and reading.

Critiquing their sources of support, trainees made reference to tutors, the training curriculum and the library. They identified some tutors as ignorant about the realities of the primary context, while observing that other tutors successfully integrate theory and practice. This description is notable in a response to the question of whether they recognise any relationship between the ITE curriculum and the primary curriculum:

> *Yes, there is a relationship, because some tutors bring the actual content that will be taught in the school, e.g. in Maths - first year, sets, which will be taught in a particular class in primary school. (*TFGKBO2)

The gap between theory and practice is also bridged through various means: during teaching practice or while working as unqualified teachers during college holidays; interaction with external facilitators or resource people from the Ministry of Education and Sports, as well as parents and friends who are or were teachers themselves; peer teaching and sharing of schemes of work; their own independent study using text books, teachers' guides and curriculum documents found in the college library. Experienced teachers were the most influential on their

understanding and practice – a finding echoed by NQTs and more experienced teachers themselves who said that 'working with other teachers' was the most influential (see section below on NQTs).. Through these sources, trainees have a good understanding of school contexts and expectations. They explained,

> *We are expected to spend a day, get topics from class teachers of the classes we are going to teach, from P.1 to P.5; history of the school, school profile, the teaching staff size, number of students, PLE performance in past years; school map, future prospects.* (TFGKB02)

Their understanding of the importance of interaction with teaching professionals is further illustrated in trainees' emphatic statement of their wishes for such interaction, such as in:

> *We need more visits. We should have talks by those who chose teaching and are still there and those who chose it but have gone to do other things and those who didn't choose it but have stayed there*. (TFGKB02)

and

> *It is important to have advice from people who can tell us what to expect as teachers.* (TFGKY07)

Trainees are aware of the poor physical conditions of the school buildings and showed insight into the problems faced by schools with a mixed catchment area that affected social relations amongst the children and subsequently their learning. Unsurprisingly, two overriding concerns of the trainees are managing large UPE classes of 200 pupils with the impossibility of providing individual instruction or differentiation or assessment and the short time of 30 minutes allocated to each subject lesson (TFGKN08, TFGKB01). Neither reading nor maths tutors specifically discussed the appropriate pedagogical content knowledge needed for teaching reading or maths in large classes. Whether more experienced teachers filled in this gap and are therefore influential is not easy to correlate. This remains the biggest gap in the study.

Overall, trainees were unanimous in acknowledging the positive influence that college and tutors have on their professional development, making them confident, and inspiring them to imitate their methods in the field. Interestingly, some said "will make it even better than [our] tutors". (TFGKY09). Others explained how their perceptions of teaching and of their own potential had been shifted:

> *We are encouraged - we thought that teaching is a very difficult thing but now we think it is doable. It has shown us our potential. Tutors have given us professional skills that we are going to use to be good in future. Tutors have taught us how to teach a particular class. This year has been a year! We have even learnt how to write schemes of work. This shows that you are a professional teacher, not someone from the village pretending to be a teacher.* TFGKB02

Trainees in Uganda were positive about teaching practice and the majority pointed to the great influence of the experienced teachers whom they met. But they were negative about its brevity and they felt that with many trainees sent to one local school to save on travel and accommodation expenses, there was little opportunity for extended practice. Indeed some trainees said that they had never actually taught a reading lesson or observed one in the lower primary.

However, based on the foregoing details on trainees' knowledge of reading as a discipline, their pedagogical content knowledge and understanding of their context, the 'story' of their practice may be understood in the abstract – from what NQTs do in their observed practice.

3.2.4 Summary

It is evident from the data of this section that trainees learn about how to teach reading from a few sources. The sources include the college ITE curriculum; the tutors' interpretation of the curriculum and their practices in delivering it; interaction with the primary curriculum including experience of delivering it while on practicum and critiquing it with the support of experienced teachers, and interaction with other teaching professionals. There are three central gaps here. Reading is conceptualised as word level decoding without an equal emphasis on word meaning, leading to fluency and comprehension. The three periods of practicum, including the first in the middle of the first year of training, remain outside trainee experience, and were not specifically alluded to as being central to their experience of learning to become reading teachers. Tutors did not discuss their role as supervisors nor

indicate what use they made of trainee's increasing experience once back in the college, and thus the absence of a reflective mode of training in which trainer and trainee could discuss the realities of the large, resource-poor and multilingual primary classroom and the challenges in applying any reading methods learnt at college. Besides, the college does not draw on the wisdom of experienced teachers in the locality to discuss the realities of teaching reading in primary schools. Thus theory and practice continue on two separate tracks. The issue of local languages remains peripheral to the teaching of early reading, with few trainees feeling confident in using LL in the teaching of reading and some believing strongly that they will teach reading in English basically because college training exposes them only to this medium whereas the language education policy requires use of LL in the three lower grades.

3.3 Insights into NQTs' Knowledge, Pedagogical Content Knowledge, Understanding and Practice

In this section the knowledge, understanding and classroom practice of newly qualified teachers is analysed using data from the questionnaire survey. Respondents were trained from a total of 29 different PTCs with more gender parity. Similar to what was done for the trainees, by analysing their knowledge of the PTE curriculum and the conditions in the schools where they would teach, NQTs' relation of the PTE curriculum and the Thematic Curriculum is included in the analysis. Such detail is considered significant as teachers' evaluation of their training and as a part of the explanation for their practice.

3.3.1 NQTs' characteristics

The description here includes both mathematics and reading NQTs although the subsequent analysis details issues regarding NQTs teaching reading. NQTs in the study included all teachers who had taught for three years or less. Although the original design had required one to two years for this category, the range was expanded since there were fewer NQTs than desired for the sample, due to the slow recruitment. The survey shows an estimation of 52 NQTs (52.74%) out of a total of 95 teachers in the survey, based on the time that teachers indicated they had spent teaching the classes they were teaching at the time of the study.

This estimation is matched by the indication that of the 95 teachers who participated in the study, 52 (55.32%) had not attended any CPD in teaching reading or mathematics. The teachers' reported qualifications (Table 3.6) indicate that out of the 93 who stated their qualifications a large majority of 70.67% had a Grade 3 Teachers Certificate, which is the minimum requirement for this level, and 4% of them had upgraded to diploma (Grade 5) level.

Table 3.6: Teachers' Qualifications

Qualification	Frequency	Percentage
Bachelor of Education	4	4.30
Certificate (not specified)	1	1.08
Diploma (not specified)	5	5.37
Diploma in Primary Education	2	2.15
Early Childhood Education	1	1.08
Grade 3	62	66.67
Grade 3 and Grade 5	4	4.30
Grade 5	14	15.05
Total	**93**	**100**

The data of teachers' teaching experience (Table 3.7) suggests that some NQTs in the sample had had a longer classroom experience than others although there were more NQTs (26.32%) in the 1-3 year range. This statistic may not be very decided with regard to what we should expect the teachers' practice and understanding. However, it needs to be compared to the data of trainees which suggested fairly good knowledge of reading and useful pedagogical content knowledge as well as understanding of the conditions in which they would teach. It needs also to be appreciated in light of the NQTs' perceptions of their capabilities and confidence.

Table 3.7: Teachers' Teaching Experience by years

Range of time teaching that class	Frequency	Percentage
1 year or less	25	26.32
2 years	15	15.79
3 years	12	12.63
4 or 5 years	15	15.79
More than 5 years	28	29.47
Total	**95**	**100**

Like the trainees, a significant majority of Uganda teachers in the study sample believed themselves to have great capability for teaching reading in the lower grades (Table 3.8) with 20.21% describing their capability as very high and 65.96% as high, with only 12.77% saying it is low and a mere 1.06% rating themselves very low.

Table 3.8: Teachers' Perceived Capability and Confidence to Teach Reading in Lower Primary

	Capability to teach lower primary maths		Confidence to teach lower primary maths		Ability to teach reading at lower primary		Confidence to teach reading at lower primary	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Very High	18	19.57	33	35.87	19	20.21	30	32.61
High	65	70.65	52	56.52	62	65.96	49	53.26
Low	8	8.7	6	6.52	12	12.77	12	13.04
Very Low	1	1.09	1	1.09	1	1.06	1	1.09
Total	**92**	**100**	**92**	**100**	**94**	**100**	**92**	**100**

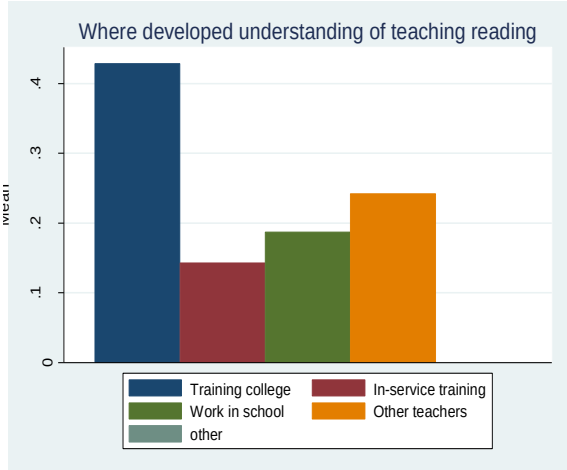
Similar to their high self-assessment on capability the teachers' rating of their confidence for teaching reading in lower grades was considerably high. The majority 53.26% rated themselves confident and 32.61% considered themselves very confident while only 13.04% considered their confidence low and a mere 1.09% thought it was very low. Whereas the high ratings on capability and confidence may imply effective teaching of reading, lesson observation data and teachers' responses in interviews show a different reality. The following sub-section explores this ability and attempts to explain its origin.

3.3.2 NQTs' Knowledge of Reading

NQT teachers are identified by a code similar to the one assigned to tutors. For instance, in NQTKNR11 KN is the code name of the college in whose catchment area this particular teacher's school is located. 'R' identifies the individual as a reading because s/he ws observed teaching reading even if his/her regular practice is teaching mathematics and reading. The number 11 represents the place of the case among the NQT cases entered in NVIVO.

The 14 NQTs observed teaching early reading seemed to be familiar with general requirements in the lower grade curriculum. NQTKYR11 pointed out that the thematic curriculum emphasises the environment that the children interact with, explaining "In my lesson, the environment used was the car. The thematic curriculum emphasises learning starting from what children know". The Thematic Curriculum is only one of the various sources of NQTs' knowledge, and the teachers explain that they interacted with it first at college in preparation for practicum and then in schools after they became teachers. Combined data from both NQTs and Experienced teachers demonstrates that while college training remains the most significant source of knowledge about teaching reading, working with other teachers is highly significant. When combined with work in schools and CPD (Figure 3.1) this becomes more significant than college training at 57.15 percent. This contextualises the role of initial training: ITE only prepares reading teachers generally and, as one tutor, quoted earlier, pointed out, learning to teach reading is completed in schools. This begs the question of what the two years of their training in the PTC is *for* and how it might better equip trainees and NQTs to teach early reading.

Figure 3.1: NQTs' Sources of Knowledge on Teaching Reading



Yet it seems that while college training builds the NQTs' awareness of the primary curriculum and its general requirements for use of mother tongue, it does not necessarily expose them to precisely what is needed to teach early literacy. Asked whether the college taught trainees to teach literacy, NQTKGR26 replied, "The college introduced us to Literacy in our last year, when we were remaining with only one term – this was a very busy term. So, we did not do much." NQTKBR12 illustrated the gap in similar terms, saying "Here I teach reading. At college we have been teaching sound. We are trying it now". This seems to confirm that college focused on only teaching strategies needed for initial decoding rather than a more comprehensive understanding of 'reading'. It is significant that NQTKBR12 felt that college had not equipped her appropriately for teaching reading. Asked in an interview if she had any more comments on the way that college prepared her for teaching, she said,

> *Behaviour is emphasised, based on religion. Tutors are good but give you course outline and you do the rest. We taught ourselves. Tutors did only 20%. I learnt to do things on my own.*

These sentiments on having to teach oneself how to teach reading are echoed in her counterpart's interview response on the areas that college training should address before trainees go out to teach in schools. Criticising their preparation for teaching reading, NQTKYR20 said,

> *At college you get a lecture on methods of teaching reading. This is theoretical. We do not practice the methods before we draw schemes of work which are approved. At school you have to make a lesson plan, you use knowledge from the college – learn as you practice. For example group work – all we learnt was advantages and disadvantages; no content. The syllabus is shallow and yet the exam requires depth.*

Counterparts shared this view of the gaps in reading content knowledge. For instance, NQTKYRM36 expressed a lack of knowledge of phonics while illustrating awareness that this was not only a good approach but also one recommended by senior colleagues. NQTKBR12 pointed out in an interview that she never learnt how to teach reading at college. Asked how she coped with any demands, she explained,

> *I got here and I was told by the authority to teach reading. I said I do not know how to teach reading. "We shall help you and also you do research", said the headmaster. I am now copying what other teachers do, and also do research on reading*.

In their local context, the following seem very significant: the teacher's interpretation of the Thematic Curriculum; the support they get for implementing it and the extent of their reliance on it. In spite of all having learnt from the college, accurately, that the primary curriculum requires them to teach in the local area language, the teachers' role in the classroom varied as did the content of their lessons. Although there was a general tendency to use text level approaches, as opposed to the more word level approaches of the PTC, the specific content varied from class to class and from individual to individual.

There was isolated evidence of the knowledge of sounds as reading content. For instance NQTKNR25 knew that if she had a class with learners exhibiting different levels of reading ability she would "have to go to the very beginning and teach sounds". Dependence on syllables is seen, for instance, in NQTKYRM35's lesson in P.2 which was duplicated in NQTKYRM36's lesson in P.1. Introducing syllables, NQTKYR35 used song to engage

pupils in activity relating to the theme of accidents in the home. She then wrote words on the board, which she broke down into syllables and selected individuals in turn to read sets of these, with the whole class repeating the syllables after them. She followed this step with sentences that she guided the class to repeat after selected individuals before copying them into their exercise books.

ma	me	mi	mo	mu
Maama aine omusho.			(Mother has a knife.)	
ta	te	ti	to	tu
Taata aine omuhoro.				
ba	be	bi	bo	bu
Abaana baine egirita.			(The children have a razor blade.)	
ka	ke	ki	ko	ku
Kaaka aine eicumu.			(Grandfather has a spear.)	

The children read in chorus, first following the arrangement of the lines of syllables and the sentences systematically as the teacher pointed from one to the next in sequence and then randomly as teacher pointed to this one or that one without any identifiable order. The method is good facilitating learner engagement in building words and sentences using syllables but it was used in a weak version since reading was choral.

But NQTKYRM36 did not do anywhere as well when she taught the same theme. She wrote the lesson topic on the board, had the children sing a song on vowel sounds and read the lesson topic on the board before role playing accidents. However, she spent too much time showing examples of dangerous objects and too little on reading the syllables *ma me mi mo mu* which she wrote on the board together with some words containing these syllables. The children were not given any opportunity to experience the more challenging task of building syllables and words. However, she was attempting to make the connection for the children between the meaning of the word and its structure. As this example illustrates, not all NQTs found teaching reading easy. And the explanation may be found in NQTKBR12's remarks about their training. She argued that colleges did not train teachers to teach reading. She was not alone in this category, pointing to the role of schools in modelling newly qualified teachers. The account suggests that NQTs learn to teach reading from the more experienced teachers and implies that the differences in the capacity of individual experienced teachers and their schools will result in variations between what the NQTs learn.

Dependence on the Thematic Curriculum's representation of content complicates the evident lack of reading knowledge. This is illustrated, for instance, in the reading content of Literacy I (Reading) represented in NQTKYR38's, NQTKGR27's, NQTKNR22's and NQTKYR11's lessons, based on the curriculum. The first fn these is reproduced here in some detail. In NQTKYR38's weak lesson, she set out to teach reading under the theme *Ebintu Ebikutwara Obukooko Oburikureeta Endwara* (Runyankore for *Vectors*). After writing the theme on the chalkboard, she read it aloud a few times with instructions to the class to repeat after her.

Teacher (flashing a card): All of you say, *ekiyenje* (cockroach)
Class (Repeating loudly in unison): *Ekiyenje*.
Teacher: Again.
Class: *Ekiyenje*.
Teacher: Again.
Class: *Ekiyenje*.
Teacher: Group A, alone. *Ekiyenje*.
Group A: *Ekiyenje*.
Teacher: Group B, alone. *Ekiyenje*.
Group B: *Ekiyenje*.
The teacher requires up to Group D to repeat the word, which they do, and afterwards asks the whole class to repeat it after her.
Teacher: Good. *Mweterere omungaro* (Clap for yourselves).
With the teacher reading first and having the class and then smaller groups and lastly the whole class again, they perform similar steps for the words *ekiju* (tsetse fly) and *enshohera* (house fly). This brings them to the end of Literacy I for that day and the class moves on to Literacy II, which is writing. In the latter

part of the lesson, the teacher writes a letter pattern with 's' on the chalkboard and has a few pupils copy it before the individuals write the same pattern in their exercise books.

Asked about the source of this approach to teaching reading, the teacher said that "the Thematic Curriculum emphasises the use of flash cards". She may have taught some vocabulary of vectors, evidently because the Thematic Curriculum specifies those words under the theme *Diseases in Our Homes*. Although the curriculum specifies the ability to read *whole words*, and the college curriculum included discussion of *whole word* as method, NQTKYR38's interpretation was for a requirement to present these words as vocabulary items. The college curriculum did not equip the trainee with the content and skills for developing the word level reading skills, and the teacher evidently had no support for interpreting the Thematic Curriculum. There is evident confusion around approaches. The word level approach would be appropriate for the teaching of vocabulary, gradually building up to reading the whole word or reading the word in context rather than in a decontextualised, isolated way through choral repetition without meaning.

Like some counterparts NQTKYR11 taught a reading lesson using visual materials but focused on the structure "This/It is + a + ….". Introducing her lesson with a song about a car, sung by the whole class, she then turned to a flip chart which became the centre of activity for practice of "This is a car", "It is a car". In explaining her purpose she focused on method although none of the methods she cited – demonstration, explanation, guided discovery – featured in the lesson. Teachers seem to find confidence in the college training about some general methods of teaching and to believe that the requirements for teaching reading is to have pupils repeat vocabulary and structures. Crucially, however, attaching meaning and purpose to the reading of these words remains undeveloped and untheorised. Consequently both approaches to reading – synthetic build up or whole word – are empty exercises for the children.

The data thus suggests that although NQTs identify college training as the source of their knowledge of reading, and they draw on this knowledge in teaching, it is not the sole influence on their teaching. Their knowledge is shaped partly by exposure to the content of the Thematic Curriculum. Besides it is influenced by the demands expressed at the school where they teach together with the support they may be given by colleagues for meeting these demands. The variety of sources of influence means varied approaches to teaching as well as varied reading content.

3.3.3 NQTs' Practice of Reading

Interpreting the curriculum

This section focuses on how NQTs in their different schools teach reading. It contains details of how they are guided to interpret 'reading' in the thematic curriculum and what methods they use to implement the curriculum in the classroom. Data is analysed also to show the learning activities that teachers use and the materials that they employ.

NQTs' practices for teaching reading varied according to their individual contexts as we can see from the three examples above. Although aware of the requirements of the Thematic Curriculum, they did not always stick to these. Rather, they used a blend of the national curriculum and what may be called the school curriculum. For example, explaining what curriculum he followed in teaching reading, NQTKNR25 said, "We use the thematic curriculum and add on the special school programme for reading and handwriting". According to him, having both Literacy I, which the curriculum specifies, and reading on the school timetable was necessary because Literacy I covered less than was necessary for teaching reading.

> *The school has a special programme for reading for all classes from 7.30 to 8.30 am Monday through Friday. In upper classes learners read stories and answer comprehension questions and in lower classes pupils learn sounds, words and read some short stories. We also often read to pupils.*

The above approach was not unique to his school. NQTKNR22 reported that her school adjusted content according to need. Explaining the teaching of Literacy I, she said,

> *The school analysed the Thematic Curriculum and identified related areas in the new curriculum and the old one, then came up with Literacy A which merges the two curricula. The timetable has separate reading lessons for all classes. Pupils are put in groups according to their need and ability.*

In some schools, teachers exploited the library hour to allow pupils free time for silent reading or reading together although it was difficult for them to manage the activity and ensure that everybody was on task. And the evidence suggests that school practice often separates out the technical learning of sounds, letters, words and sentences from the reading of longer continuous texts read in library lessons. NQTKNR25 in a rural school explained that the school had an arrangement for reading as well as Literacy 1, saying that the focus at lower primary was teaching sounds, words and short stories.

Besides, schools organise the timetable not according to the recommendations in the thematic curriculum but with regard to their preferred emphasis. NQTKGR24 explained the considerations behind the timetable in her school:

> *The school pays special attention to reading. Literacy covers content in the thematic curriculum. Reading lessons teach sounds and other reading skills; the library hour is for actual reading of story books.*

The teaching practices evidently depend on the teachers' perception of *reading*, which is sometimes different from their perception of literacy, and their interpretation of the Thematic Curriculum. In this case the two are taught separately by different teachers. For instance, in explaining why there was little reading in her Literacy I lesson, NQTKGR26's response was

> *This school decided to give reading and writing more time. So the thematic content is taught as literacy by one teacher. Then reading is taught as a separate subject. This way the Thematic Curriculum content for literacy is satisfied as well as giving emphasis to real reading and actual writing. I am only responsible for literacy and writing. Someone else teaches reading.*

The decision was explained also with reference to what is regarded as very general guidance in the curriculum, to which teachers respond by seeking the support for enriching the content. NQTKGR26 said that the curriculum is not accompanied by any textbook with all the content of the curriculum, and teachers need to find this elsewhere.

> *…. In the former school it was up to the teacher to determine what content to cover but here it is team work and interaction with other schools like Greenhill Academy, Budo Junior and Gayaza Junior to determine …. This has been very helpful to me because I have learnt new things.*

NQTKYRM35 made reference to team work in planning reading. She illustrated this support with her explanation of how she and colleagues sat together and studied the curriculum and shared their interpretation of it. She had particular responsibility for guiding colleagues on teaching reading. Altogether those NQTs in schools where peer mentoring was encouraged and facilitated demonstrated better skills and higher levels of confidence for teaching reading than did their counterparts in other schools who relied on their college training. The importance of experienced teachers in the development of NQTs' practice in the teaching of early reading is significant in these contexts.

It seems therefore that NQTs' choices in the classroom are influenced not solely by the teachers' perception of what reading is, which is itself founded in the college training and the guidance in school, but also by their understanding of the reading needs of the learners. And the learners' needs are determined and catered for in the light of teachers' interpretation of the curriculum. Teachers' interpretation is evidently narrow and results in the inadvertent separation of decoding from practicing comprehension and reading of actual texts in the form of short stories.

Evidence suggests that both English and the local language are often used in the teaching of reading, the latter for content and instructions, and the former for clarifying points to the learners. NQTKGR26 who taught in an urban school explained that English is used by the teachers as well as the learners throughout the lesson and the children are quite fluent in the language. This was true also for lessons in Kampala suburbs where the teachers used only English for all the functions of the lesson and the practice was common in urban schools where classes were multilingual. On the other hand teachers in rural schools followed the policy requirements in the curriculum, commonly using local language throughout their lessons. This is in spite of teachers' awareness of the difficulty of using local language as a medium of instruction since they had no support for this application whether during the college training or in their practice in the school.

NQTs' use of teaching materials varied a lot. NQTKGR27 in a Kampala suburb used a variety of aids: charts, pictures, real objects, nature corner and empty grocery cans. Whereas the teacher had no printed material, he had the pupils write in their exercise books and then read what they had written. His colleague in the same locality, NQTKGR26 had a bag, a belt, a shoe and a drum and used the chalk board extensively but had no text material whatsoever and the pupils did not write anywhere. Another urban colleague NQTKBR02 presented only charts drawn on manila paper and no real objects. Similarly NQTKNR22 had a chart with pictures and very clear neat writing, and a set of colourful flash cards. He also used the chalk board extensively, writing a neat hand with clear large letters. Yet his colleague NQTKNR23 in the same local setting spent a lot of time drawing pictures on the chalkboard. Asked whether it would not have helped to have all the pictures drawn on a sheet ahead of the lesson, she replied:

> *Yes, but there is no manila. We have no manila or sugar paper. Besides, I can't spend my time working on a chart that will be torn down the same day because we do not have windows.*

NQTKYR11 in another rural school used only a flip chart with the picture of a car and explained later that the school suffered a scarcity of material resources and she had to improvise.

While scarcity of resources was not uncommon, it is evident that some NQTs in impoverished settings recognised the need for an extra effort to improvise. This is very clear in the case of NQTKYR02 who, when asked whether she was comfortable teaching in that particular rural school, replied that she was, although there was a scarcity of resources. Asked what she did about the scarcity, she talked about her improvisation of materials and wide reading of books on teaching reading. Nevertheless, observation data recorded no presence of any impressive wall displays, in spite of NQTs' awareness that displays are useful for motivating learners. Where there were displays they were put to very little use, if any, by the teacher.

The above suggests that in teaching reading NQTs do not rely entirely on their college training. Some appreciate the shortages in their environment and exploit these as an opportunity for creativity while others simply accept the shortage as the working conditions in their schools. This separates the good resourceful teachers from the poor redundant ones.

3.3.4 Understanding

NQTs' understanding was as varied as their practice, with the variation supporting the observation that the school environment and policies, in addition to college training, determine teachers' choices. There are about three broad categories of teachers with regard to understanding: the teachers whose teaching choices find justification in their college training; those who explain their actions with reference to the curriculum, and others whose explanations of their choices is the school's preferences and practices. Thee three categories are described below.

College training seems to be the easiest though not the sole answer to the question of source of method. Having taught a lesson in a classroom with bare walls, when NQTKYR20 was asked to talk about her methods and explain their origin, she cited guided discussion, demonstration, question-and-answer and group work, and said that these had been taught at college. NQTKYR11's explanation of the purpose of the lesson which dwelt on "This is a car" focused on justification of her teaching methods – demonstration, explanation and observation. The teacher explained, "The methods relate to what I learnt at college". However, reporting scarcity of resources as a challenge and going on to explain how she coped with it, she cited improvisation, reading textbooks and interaction with colleagues, thus illustrating some dependence on networks and personal resources including creativity. Dependence on this dual source is exemplified also in the remarks of NQTKGR24 who cited the college training and teaching experience as the basis of monitoring learners' progress in her lesson.

In some cases, teachers' conduct of their lessons or their interview responses illustrated that their interpretation of the curriculum was a key influence on their selection of content. NQTKGR27's and NQTKNR22's reading lessons, described in the previous sub-section, show this. NQTKYRM36 based her decisions on the curriculum specification of ideas for learning aids and what to sing when introducing a theme/sub-theme or reinforcing content learning. Explaining how she determined what to teach and its sequence, NQTKYRM35 said that she taught

> *… according to the curriculum. I follow the curriculum. It's in the office. We go there and use it. …. For example I go there and see what we are supposed to do. Then I prepare. And after I have prepared I give*

to my colleagues to tell me whether they agree. If they agree we take it to the DOS and headmaster. Then we all get copies to use in our classes.

NQTKYRM35's case suggests that colleagues' support is a strong influence on teaching since teachers consult on the guidance they recognise in the curriculum. Similarly NQTKBR12's remark about coping with the demands of reading by copying what other teachers do illustrates her understanding of the wealth of colleagues' practice as a source of guidance.

Other indications focused on factors in the school experience as sources of influence on their teaching. For instance NQTKYR20 referred to the practices at school: "For knowledge, no, I need more. I understand the bit I know and have adopted methods from experienced teachers." NQTKNR25 explained, "We use the Thematic Curriculum and add on the special school programme for reading and handwriting". The same sentiments have been illustrated in NQTKNR22's, NQTKGR24's and NQTKGR26's cases, already cited in the foregoing sub-section on practice.

NQTs' understanding illustrates their capacity to appreciate the school environment and adopt some new knowledge and skills, say from colleagues and supervisors, in order to enrich the competences they acquired from college training. Reflection on college preparation and actual practice in schools in fact prompted NQTs to query the training on methods of teaching reading. NQTKBR12, NQTKYR20, for instance said that more attention should be given to the methods of teaching reading. This may also be indirectly echoed in NQTKYRM36's observations that "… there is little time in the PTC" and that "the experience that one gains through … teaching in school is more useful than the PTC experience". Altogether, the NQTs' understanding of teaching reading only starts with the college training. It seems to develop with teaching practice and their critique of the school and teaching environment.

3.3.5 Summary of NQT data and comparison between intended competences and espoused competences

The data suggests that NQTs knowledge, practice and understanding are often variable and that they are comparable to those of the college tutors. While some NQTs have some knowledge about the content of teaching reading that is appropriate to the lower grades, their content coverage is inadequate and does not address the range of desired skills. They place greater focus on technical decoding skills rather than combining these with word meaning, fluency, comprehension and the reading of longer texts. This inconsistence is due, evidently, to the lack of care for reading content in the college training. Other NQTs lack the prerequisite knowledge and so do not present reading content in their lessons. They focus on methodological detail explaining, for instance, that they teach reading by guided discovery, explanation and demonstration. These inadequacies in the NQTs' competences are comparable to the gaps in the syllabus. The syllabus objectives emphasise knowledge of English as a language system and the content pays very limited attention to the content of teaching reading while it illustrates concern for methods. Further the data indicates that some NQTs depend on their college training to make decisions about methods of teaching reading while their peers look beyond their training to learn from the experienced teachers in their schools and to make an attempt at curriculum interpretation. Whatever the source of influence, because of their lack of knowledge of reading, NQTs generally often fail to expose the children to the challenges of learning to read, say, at the word and whole text level thus holding them back in their development of reading skills. The Uganda EGRA 2010 results show alarmingly low levels of oral reading fluency and comprehension in the first three years of schooling - the highest reading comprehension score gained in P.2 being 8.9% of a short five line story, with some increase in P.3 to 25.5% of a short five line story. The findings on NQTs in this research of teacher preparation for teaching reading go some way in explaining why children in Uganda's primary schools are not reading.

3.4 Insights into Experienced Teachers' Knowledge, Pedagogical Content Knowledge and Understanding

Data of how Experienced teachers – those more experienced teachers who have undergone some form of professional development training - teach reading should be appreciated in light of their teaching experience especially the details of what sort of training they had had after their initial teacher preparation. Also significant in this context are the self-ratings of their capability and confidence to teach reading. Although these ratings are not

disaggregated between NQTs and CPDs, the indication of high or very high capability and confidence by the majority of teachers, even if not as high as the trainees', presupposes knowledgeable teachers and good classroom performance. It in turn makes questions of their sources of knowledge and skills significant for this analysis. Since the Experienced teachers had more than three years' experience, and even their newly qualified counterparts indicated that support from colleagues at the school level had a significant influence on their teaching, it may be legitimate to assume that in-service training is a fundamental influence on the content knowledge, PCK and practice of the Experienced teachers.

A glance at the statistics of all the teachers' responses to the questionnaire item "What in-service training programme relevant to reading and mathematics in the early grades have you attended in the last three years?" finds another possible explanation for the teachers' perceived capability and confidence. A significantly large number of 45.26% teachers in the study indicated that they had had in-service training in teaching reading and mathematics in the early grades. Yet, accompanying verbal detail of the type of training (Table3.9.) suggests that only a small percentage of 13.13% of all the 38 teachers who described their training had had any in-service training specifically targeting the teaching of these subjects, most of them evidently at the school (internal) level. The vast majority of 60.49% had had in-service training for delivering the Thematic Curriculum, suggesting their orientation to or coaching in its philosophical approach, but probably also often including early reading and maths. Some 2.63% had training in assessment and a similar number had been trained on HIV/AIDS stigma while 5.26% had had training in school improvement that was offered by the project Enhancing Universal Primary Education in Kampala under the Aga Khan Education Services. Many cited internal school seminars without any specification of topic or content.

Table 3.9: Type of In-service Training Attended by Teachers

Training	Freq	%	Cum	Training	Freq	%	Cum
ADRA in Kabale for two years	1	2.63	2.63	Thematic Curriculum programme for four days	2	5.26	47.37
Aga Khan Education Service School Improvement	1	2.63	5.26	Thematic Curriculum programme for four	1	2.63	50.00
Assessing for primary school for six days	1	2.63	7.89	Thematic Curriculum programme for one week	2	5.26	55.26
Enhancement of Universal Primary Education	1	2.63	10.53	Thematic Curriculum seminar for one week	1	2.63	57.89
Internal seminar on maths and internal seminar on reading	1	2.63	13.16	Thematic for one year	1	2.63	60.53
Internal seminar on maths for one day	1	2.63	15.79	Thematic programme for one week	3	7.89	68.42
Learning in front method of teaching reading	1	2.63	18.42	Thematic programme for one week and internal seminar	1	2.63	71.05
Mathematics for three days	1	2.63	21.05	Thematic Curriculum programme for two weeks	3	7.89	78.95
Pre-service programme for two years	1	2.63	23.68	Thematic training course for two weeks	1	2.63	81.58
Primary Three Thematic Curriculum programme	1	2.63	26.32	Thematic training for a week, internal seminar	1	2.63	84.21
Refresher course at Kyamate CC for two weeks	1	2.63	28.95	Thematic workshop for primary three for	1	2.63	86.84
School based in maths and school based in reading	1	2.63	31.58	Transitional curriculum training for P.4	1	2.63	89.47
Stigma on AIDS for one week	1	2.63	34.21	UPHOLD for two months	1	2.63	92.11
Teaching Thematic Curriculum in lower primary	1	2.63	36.84	Workshop based on Thematic for one day	1	2.63	94.74
Thematic Curriculum for one year	1	2.63	39.47	Workshop for one day	2	5.26	100
Thematic Curriculum for two weeks	1	2.63	42.11	**Total**	**38**	**100.00**	

The statistics could suggest that if Experienced teachers' teaching of reading differed at all from what was demonstrated by the NQTs, CPD training would contribute little to this difference. However, analysis of their interview data suggests that the Experienced teachers thought much of their in-service training as a factor of teaching reading, among others. This and other data is analysed here to determine what influences Experienced teachers' teaching of reading. It is not, however, possible, as indicated above, to make direct correlations between one specific CPD programme and impact on the teaching of early reading.

3.4.1 Experienced' Teachers' Knowledge of Reading

In this research Experienced teachers seemed to be generally knowledgeable about the content of teaching reading, although their knowledge varied between levels. Some taught the very basic sound or letter skills and some the word skills while others taught the more global processing skills. Their knowledge was evidently based on various sources including interpretation of the Thematic Curriculum, college training and in-service training. There is evidence of some good teachers with knowledge of reading content including phonics, alphabetical skills and comprehension. In this category CPDKBR33, CPDKNR28, CPDKNR06, for instance, taught sounds while CPDKBR49 and CPDKYR48 taught comprehension.

In a class activity for P.3 CPDKBR33 taught children to sound the letters *d* and *g* and then assessed them using an exercise for reading some words with these sounds. Working with a similar philosophy and using the whole word approach, CPDKGR08 had her class reading words with sounds that she later said the class had learnt before. Asked what she thought was the best sequence for teaching beginning readers, she explained that the teacher should deal with "alphabetical letters first, then sounds, then words, and finally sentences". The teacher explained that her lesson content was based on the curriculum and what the school knew to be best for the children. Teaching her P.1 class to blend *b* and *r*, CPDKNR06 took the children through an activity for reading from the chalk board the words in a random manner.

broth	*bran*	*bring*
broke	*brand*	*bricks*

Asked whether the children knew their meanings, she asserted that they did, and could read them well, since the words were common vocabulary items in their environment. On the question of her source of content she cited " … a book called *Sound and Read – Book 1*" (apparently in the *Ladybird* series). Her school's choice was to teach sounds before children were exposed to whole words. In a mother tongue medium lesson under the theme *Ebyengyenda* (Means of Transport) CPDKYR48 taught Literacy I using the syllabic approach. After she had listed all the children's examples of means of transport on the chalk board, she then called up individuals in turn to spell them aloud by syllable (okugaturura ebigambo) and as each child did this, the teacher wrote the syllables on the board.

e-mo-to-ka	emotoka (car)			pii-ki	piki (motor cycle)
e-gaa-ri	egaari (bicycle)		loo-le	loole (lorry)	

She then had the children read the syllables and the whole word in each case, in chorus, before they copied them into their books. Her content was taken from the Thematic Curriculum, which recommends the syllabic approach. CPDKBR49's comprehension lesson in P.3, in which the class read a story on the chalk board and answered questions about it, was similar to what CPDKYR51 did in her P.2 class. The latter started with a spelling exercise featuring 11 words that would appear in the story,

banana fibre	polythene	rubber	tying	round

Later the teacher wrote the story of ten lines on the chalk board for the children to read, followed by some comprehension questions for them to answer. The class then marked the comprehension exercise by exchanging books. These instances exemplify fair knowledge of the content of teaching reading – sounds, blends, whole word and whole text - and the techniques by which the teacher may equip the children with the required skills.

On the other hand are the cases of some CPDs without the desired knowledge of reading who, instead, dwell on language structure and writing ability or confuse alphabetical knowledge and phonological knowledge. Following the curriculum, CPDKNR21 taught a Literacy I lesson through the following steps.

> T. writes the instruction « Choose the correct word from the brackets to complete the sentence » on the chalk board, reads the instructions for children, asks a few individuals to read it aloud for the class.

T. gives examples of sentences with gaps to fill, leads the children in selecting the correct words to fill the gaps. This takes about 15 minutes.
T. writes out an exercise on the chalk board for the class to attempt. She repeats the instructions a few times.
The class has less than ten minutes to complete the exercise. Some ask for the instructions to be repeated.

Although she explained that she had taught a reading lesson, the purpose of the lesson was "to make pupils understand the correct use of tenses and to select the correct words from the brackets to fill in the gaps". Apparently, the teacher does not differentiate reading and language structure. CPDKYR33's supposed lesson of phonics in P.3 illustrates confusion of sound and letter approaches. She set out to teach sound *e* and approved all the children's examples in

elephant example emphasis elegant angel able

Yet when she gave additional examples from her preparation materials, she wrote

bee knee keep feed reed
feel peel wheel weed peel

and when she asked the class to contribute some more, they then gave words with similar spelling, such as

steel eel fees

In the interview, when her attention was drawn to the difference between the children's first list and hers, she realised she had substituted letter *e* for sound /I/. CPDKNR21's and CPDKYR33's lessons exemplify lack of knowledge of how to teach reading. In fact sounds seem to pose the greatest challenge in the area of reading knowledge in spite of teachers readily citing phonics as one of the approaches/methods in teaching reading. While CPDKNR06 said that ' … the easier methods to use are phonics, word whole, look and say and question and answer ', CPDKNR05 illustrated the real gap in knowledge in

> *The biggest challenge is teaching sounds. Pupils take so long to join the sounds. For example, cat they say ka/a/at. The children end up reading the silent letters as well because they want to read all the sounds, for example r in burn. Helping them to catch up is time consuming.*

Sounds are evidently unfamiliar as reading content, often neglected or, as seen in the case of CPDKYR33's lesson, outright erratically taught. And the neglect starts from college. Although CPDKYR33's had taught for 13 years, she mixed up alphabetical and phonological content, and her explanation was that her college training did not include instruction in phonics. Her claim is supported by CPDKGR10's comment that reading was taught only at Grade III level and only in the first year, implying that the portion was inadequate. When asked if there were any areas that she wished the college to strengthen in training primary teachers, CPDKGR10 said, "The college should give thorough training in teaching sounds".

That the knowledge gap is pronounced especially with regard to the content of basic reading skills, including sounds, is further illustrated by CPDKIRM45 who said,

> *The tutors often sent us to the library to do research. Although the library had some materials, some topics like the phonics you can't interpret it easily. … I want to teach it. I think it is good … but I don't know how to teach it. It is expecting too much* of a *Senior Four leaver to go to the library and search for relevant information without guidance and initiation in basic library skills.*

A counterpart CPDKGR08 expressed the challenge in terms that reflected the mix-up in CPDKYR33's lesson, saying that there was

> *... a problem in teaching sounds, especially differentiating names of letters and their sounds in English. For such words I teach them as complete words through look and say method and tell them to learn them that way until in upper classes*.

On the other hand word level ability is evidently more important to teachers and easier for them to teach, to the extent that 36.54% of Experienced teachers strongly agreed that a good teacher of reading is one who gives a range of strategies to make sense of words.

It is also significant that among the Experienced teachers there was evidence of overdue emphasis on methods of teaching reading without much regard for content issues. When asked to describe the challenges involved in teaching reading, CPDKYR04 and CPDKBR50 dwelt on methodological detail and made no reference whatsoever to how children should demonstrate reading ability. CPDKBR50 said the challenge was teaching large classes because then "groups are ignored" and the teacher "cannot control" the learners.

Altogether the Experienced teachers felt that the college training did not prepare them adequately for what they are expected to do in the classroom as far as content and methods are concerned, although some count on their training for a source of teaching methods and approaches. Many reported that there is minimal training on how to teach reading. It would seem therefore that Experienced teachers of reading depended on sources other than their college training for support in teaching, one such source of support being the Thematic Curriculum.

Although the curriculum had been implemented for only three years by the time of this study, most of the Experienced teachers were well acquainted with it and able to articulate with confidence the sequence of topics to be covered under a theme although their explanations of content detail were sometimes vague. They attributed their knowledge of the curriculum to the one week training that teachers had had on the delivery of the curriculum. Demonstrating an appreciation of the value of the curriculum for teaching reading, CPDKBR34 explained that it offered support for teaching reading as a literacy skill although it has to be supplemented.

> *… the curriculum (thematic) is useful to an extent but we have to supplement it with, for example, 'What am I?', 'Moses and His Friends', 'My Home', 'Peter, Jane and Dora', and others (readers). It is appropriate, but teachers should be creative and supplement it in order to teach well. They should not take the curriculum for granted…. Sometimes we teach without clear understanding of the competences and life skills.*

CPDKYR41 spoke in appreciation of the thematic approach to delivery which included recycling words, "Teaching themes so far has helped – it makes it easier for you and the children; words are repeated in all learning areas". However, even the curriculum was not enough for additional support since it evidently offered less that some teachers would consider adequate. One teacher pointed out that the new curriculum does not cater adequately for the more basic requirements of reading:

> *Each school has its own [curriculum]. Now the 'policy' in the Thematic Curriculum is (teaching the) whole word. That is quite difficult; it assumes that the child has had a lot of exposure to print. But that is what teachers are supposed to teach.*

Therefore teachers look beyond their training and the curriculum policy to training for continuous professional development as a source of knowledge. According to the teachers in this study, attendance of CPD activities has reinforced the concepts and skills they were introduced to in the initial training, thereby building their confidence. However, teachers pointed out that opportunities for professional training sometimes introduce totally new content for which modifications are necessary to adapt the ideas to the classroom reality. CPDKNR05 said that in CPD programmes at the school level she was introduced to concepts that she had not encountered in her initial preparation, which were strange to the children too, especially reading sounds and blending them to form word segments and whole words. Sharing these sentiments, CPDKNR09 talked about the new concept of teaching sounds which had initially been as strange to her as it had to the children who were not interested when she wanted them to repeat sounds after her. On her part CPDKGR10 testified that the two refresher courses she had attended, organised by the school, had equipped her with specific skills of teaching reading, such as teaching sounds. Her supervisors had recognised these skills as assets. She explained,

> *I had very little knowledge of (sounds) from my college experience. The refresher courses helped a lot. That is why I was given the responsibility of coaching students that needed remedial work in reading in my former school.*

Similarly, CPDKNR06 said that although in the initial preparation programme she had been taught some methods of teaching reading, it is only through CPD that she had been able to acquire the skills and confidence to put these in practice. She said that CPD programmes within her school had built her ability to teach the whole word and whole sentence; use group work and discussion, the look and say method, dramatisation, and role play; recite

rhymes, and use the question and answer technique. She acknowledged assistance from senior colleagues for teaching her the correct pronunciation of many English words. She concluded:

> *By the time I started to teach, I did not know how to teach reading and I had fear and no interest. The seminars have enabled me to teach reading and learners understand easily. I can say that I am good at teaching reading.*

CPDKNR09, who had twice attended training on the Thematic Curriculum and participated in internal workshops on teaching reading and writing, described the confidence she felt for teaching letters and sounds, which was due mainly to internal workshops at her school facilitated by her experienced colleagues. Her counterpart CPDKGR08 said that attending CPD training had exposed her to new concepts such as teaching sounds, which had not been part of the college training. She, however, had had to adapt the details of the CPD content in many ways before she could actually use it in the classroom. These references to the value of CPDs are easily echoed in the teachers' responses to the questionnaire survey item about the reading skills that they find easy or difficult to teach. In this particular item 51.92% of the CPDs as compared to 65.12% NQTs and 46.00% trainees said they found it easy to link stories, actions and pictures with writing. And in describing the content of CPD training the teachers dwelt a lot on using story, song and dramatisation and role play in the classroom.

Much as the above testimonies indicate the importance of CPD programmes for enhancing teachers' knowledge, skills and confidence, it is worth noting that only 38 of the 43 teachers who indicated attendance of CPD prgrammes were able to specify the type of training they had attended. Besides, some teachers with many years of teaching had not attended any CPD programme and some had not upgraded their qualification since they took their initial training which was, for some, more than ten years before this study took place. This implies that some teachers have depended on their initial training, however inadequate it may seem to be, besides their accumulated experience. It is significant that Experienced teachers who report their cultivation of confidence based on exposure to new content and methods refer mostly to internal seminars facilitated by the experienced teachers on the school staff. One teacher in the study CPDKBM31 reported having been called upon from time to time to share her knowledge in school-based CPD programmes.

3.4.2 Experienced Teachers' Practice

Generally, Experienced teachers were able to explain for teaching reading although their lessons did not always bear evidence of this knowledge. Besides, a lot of the time the explanations dwelt heavily on methods and showed little consideration for content. CPDKYR04 said that she employed explanation, observation, question and answer, discussion and group methods, although she added that demonstration, guided discussion, look and say and peer teaching require a lot of time for preparation and are suited to small classes. It was no wonder therefore that her P.2 reading lesson did not reflect such richness of method. Asked about how she taught reading, CPDKNR06 said that she found it easy to use phonics, whole word, look and say, and question and answer.

Experienced teachers with better knowledge of methods of teaching reading articulated what they believed to be the "appropriate" sequencing of content and methods to use in teaching reading to beginners. For example CPDKGR10 said that beginners should start with the letters of the alphabet, then the letter sounds followed by syllables and whole words and then joining words to form simple sentences. Explaining how she ensured progression in learning, a counterpart CPDKBR34 dwelt on building parts and wholes from sounds in local language and English:

> *I start with sounds, then join them to vowels for blending in P1. We then go on to vowels and syllables. So we can have* a, e, i, o, u *then* ba, be, bi, bo, bu, *then* ta, te, ti, to, tu. *But this one encourages cram work, so the children might just join vowels to all other consonants and you think they are learning. So it must be larger than just a consonant plus a vowel. So when you start with c, g, l, t, m, we go on to* ca, ga, la, ta, ma *and then* cat, lap, tap, mat. *Step by step, with vowel* a, *and then vowel* e.

CPDKNR21 explained that in teaching reading, all the content areas are important but there is need for the teacher to be systematic. She suggested starting with sounds, then going on to syllables, and then words, and lastly sentences, adding that teachers should use pictures to reflect reality as a technique for facilitating better reading.
The weaker Experienced teachers talked much about methods. CPDKNR06 cited the methods she usually used in her classes - phonics, whole word and whole sentence - pointing out that the specific content of a particular lesson in the Thematic Curriculum ultimately determines one's method. Others in this category suggested use of real

objects to introduce new words, arguing that this should hasten learners' building of the desired skills. They did not say, however, which skills.

On the whole, the teachers' articulation on methods suggests that in spite of any reported gaps in the initial training, their teaching experience and CPD training have built the teachers' confidence and developed their pedagogical content knowledge. It is important to note, however, that a category of teachers did not practice what they knew in theory. The teachers' explanations with regard to environment suggest that in spite of their PCK, the school environment has an influence on teachers' choices in practice. The rest of the data here is on Experienced teachers' classroom practice.

Experienced teachers' practice can be described under three broad categories, based on their competences. We consider the ideal combination of competences to include knowledge of the appropriate content of reading, possession of the PCK that underlies effective application of the skills and mastery of the requisite pedagogical skills. One category of Experienced teachers, easily the best among this group, evidently possess PCK of reading and are able to apply it effectively. A second category is of teachers with such PCK whose practice, however, does not match the reflected theoretical knowledge. In the third category are those Experienced teachers who demonstrate commendable pedagogical skills but limited PCK. The following analysis attempts details of the above categorisation by way of Experienced teachers' implementation of the curriculum, use of language and teaching aids and their assessment practices.

Observation showed that on the whole teachers implemented the primary curriculum by using the stipulated thematic approach. In interviews, as the analysis in foregoing sub-sections illustrates, some teachers said that they followed the curriculum as stipulated while others said that they modified it according to the school requirements which were based on pupils' needs. Modification usually involved merging aspects of the new theme-based literacy oriented curriculum and the old subject-based content curriculum.

While the policy stipulates use of local area language or, in the urban schools, English the actual classroom practice for teaching reading in the curriculum is often determined by the school management and usually as influenced by the parents' wishes. Thus CPDKNR28 in a private rural school used English although she sometimes asked pupils to contribute the local names of some materials or gave some herself. This code-switching was, according to the teacher, meant to facilitate participation by all. Like her, CPDKYR51 in a private school used English because "the parents prefer English so that their children can compete with Kampala schools". In contrast CPDKYR48 in a government-aided (commonly called "UPE") rural school used Runyankore because "the policy says use local language". On the other hand teachers in urban schools use, almost exclusively, English in line with the curriculum's assumption that the urban school has a multilingual pupil population. CPDKGR10 in an urban school used English in the reading lesson as did CPDKGR08 who explained that "this is an urban and boarding school. We have learners from different backgrounds". CPDKBR34, CPDKBR49 and CPDKBR50 too used English because they were in urban schools. But CPDKBR34 had an additional reason for using English. While it is true that her school in Kampala was populated by children of several nationalities including Ugandan, Ethiopian, Sudanese and Congolese, she confessed, "I use English because I was trained to teach only in English".

Lesson observation taught us that the choice to teach reading in the English medium sometimes came even when teachers and most of the learners come from the same language background. English is chosen even when the learners have very little previous exposure to the language outside the classroom and the teachers are not very fluent in it. Yet this choice meant significant diversion from the curriculum, for it resulted in teaching reading content in English although the curriculum specified reading competences for both mother tongue (medium) in Literacy I and Literacy II and English (non-medium). Thus, while some teachers observed that the curriculum neglected reading in English, the teachers who taught reading in this medium demonstrated neglect of the mother-tongue competences.

Experienced teachers demonstrated confidence and knowledge in their use of a variety of teaching aids. The chalk board was the most commonly used aid, with most teachers writing clearly and systematically on it. They also used flash cards when teaching syllables and words. Many classrooms were print-rich with walls and corners displaying various teacher-made reading materials and, in a few instances, imported or locally purchased materials. However, some teachers did not exploit this rich classroom environment. On the other hand some

teachers carried too many materials for the single (30 minute) lesson, which may signal lack of judgement about use of time. In relation to this evidently poor planning, some materials that teachers carried to class added no considerable value to the lesson being taught. By the school environment, the teachers' choices for practice make their understanding of issues significant. Experienced teacher's understanding of reading is the content of the next sub-section.

3.4.3 Experienced Teachers' Understanding

While it is true that Experienced teachers use largely the same methods as the NQTs, the Experienced teachers seem better able than their NQT counterparts to articulate their reasons for drawing on particular methods. Asked why she used repetition, loud reading and rote, CPDKNR21 said that she found the methods effective "… because the majority of the pupils get the exercise correct". She continued to single out repetition and loud reading for making learning enjoyable. Another teacher CPDKGR10 argued that teaching reading in English and the local language requires two different approaches, since the sounds are different, and suggested that in lower primary, the two should be taught by different teachers to avoid confusing the pupils. According to her, pupils would make better reading progress if they learnt reading in their mother tongue first. Besides, he felt, "… since reading and writing go together, one teacher should teach both". These and such other insights suggest that the teacher understands the subject well enough to explain choices of methods and suggest approaches to better results. Similar understanding is illustrated in CPDKGR08's theory about early reading. She argued that children learn reading best if they first learn the letters of the alphabet and their sounds, adding that it would be better if they were taught those in the mother tongue first before English was introduced.

The Experienced teachers' understanding may, sometimes, evidently be based on personal reflection, as CPDKBR49's, CPDKYR51's and CPDKBM04's cases illustrate. Asked how she knew that her methods were effective, CPDKBR49 explained.

> *Pupils understand easily when I motivate them with songs and organise plays, which of course they know. I vary my methods of teaching while in class and I engage the pupils even when outside the class, with activities in a joking manner but in so doing they learn something, at least every day, before going back home.*

Although CPDKBM04 was not observed teaching reading, he talked about his experience of teaching reading, in addition to mathematics, articulating the factors possibly responsible for children's misconceptions when they are learning to read. According to him, "(misunderstanding) is due to special needs or inappropriate methods, e.g. abstract teaching without objects, or problems of pronunciation, or delays in stages of development". His response suggests that the reflection is also linked to knowledge of theories.

Good Experienced teachers are able to confidently differentiate the reading content to be covered at different grade levels. For example, when asked if she would teach storytelling to a higher level, CPDKBR33 said, "In P.4 I would teach comprehension because the level of learners is different. The older learners can read for themselves without much discussion. And that is what we should teach them." This suggests that teachers agree that comprehension is the reserve of upper primary. Another teacher CPDKBR34 said she would teach the same topic to two different levels but use different methods which are appropriate for achieving a specified goal. She gave reasons for the choice:

> *I would use grouping in large classes and where materials are inadequate. That is useful. Then there is dramatisation and look and say. And there's story-telling, which develops listening skills. I taught story-telling in this particular lesson because of the new words, and used pictures of children in the school and home environment.*

Good teachers also reflect on the challenges they meet in teaching reading, making reference to both content and method in reasonable measure. Two teachers described challenges relating to the policy of automatic promotion which allowed children to proceed to the next level irrespective of their performance. One cited examples of children who cannot read the alphabet but have to move on to higher classes where they encounter reading difficulties. According to this teacher, the challenge is greater in large classes where support for individuals is quite impossible. Her colleague CPDKGR10 said that she found it problematic providing remedial reading work for older children who were supposed to be in upper classes but had not mastered the basic skills of reading. Other good

teachers said that they had difficulties teaching English sounds and, particularly, differentiating the names of letters from their sounds. CPDKGR10's sentiment in this regard was evidently based on reflection on the value of the initial training at college which he said did not provide thorough training in teaching sounds. The lack of textbooks based on the new curriculum, which causes a feeling of deprivation among the teachers, means that in spite of the literacy targets children's exposure to literacy sources are limited. The same goes for the inadequate non-textbook materials, which complicates the lack of opportunities for reading.

Unlike the good teachers, the poorer Experienced teachers dwell so much on methods, without reference to content. To many of them a major challenge was large class size, especially in government-aided schools but also in some private schools, in classes of 50-80 pupils. Teachers in this category reported that they tried to include all learners in the classroom activities but management of large classes was often a hurdle. Another major challenge was applying the policy of local language as medium, especially in the absence of textbooks, since the Thematic Curriculum does not come with any provisions. The teachers were dissatisfied that training for implementation of the Thematic Curriculum is always conducted in English but they are expected to teach in the local language. This poses challenges especially when they have to "translate an English version (of the scheme) into the local language". According to CPDKYR48,

> *…the problem of translation is major because all the books we have are in English and we have to translate when we are scheming. And you find that you are not well fluent in that language but you are forced to teach in that language.*

The sentiments on the demand for translation into and delivery in a local language that teachers feel they are not fluent in have significant implications for teachers' confidence and practice. They point to queries on teaching and learning effectiveness.

These insights into CPD's understanding of reading are significant for our understanding of the context of practice. They are useful guides to unstated reasons for the gaps in teaching reading. In conjunction with the confessed and demonstrated knowledge and PCK of tutors, trainees, NQTs and CPDs, they offer possible explanation for the teachers' preference for the researchers in this study to observe them teaching mathematics rather than reading. It is evident that CPDs felt greater confidence for teaching maths than for teaching reading. The challenge explains the trainees' quantitative ratings of their capability and confidence for teaching lower primary mathematics and reading. While 37.17% trainees rated their capability for teaching reading very high and 54.14% indicated it was high, only 37.78% rated their confidence very high; a comparable 55.96% rated their confidence high. In contrast the figure of 55.28% trainees who reported very high confidence for teaching lower primary maths was much higher than that of 32.93% who rated their capability very high.

The above challenges notwithstanding, teaching experience and the training in school based and out-of-school CPD programmes evidently have a positive impact on teachers' knowledge and skills and on their quality of teaching. On the whole programmes that are incorporated in the school's action plan and those that are regularly conducted, at school or other local level, seem to have the greatest positive influence on teachers' performance for teaching reading. However, even experienced teachers strongly suggest that initial teacher preparation, taught adequately, has far greater impact than CPD programs, and can target that critical mass crucial for any lasting and significant change.

3.5 Summary of linkages between trainers', trainees', NQTs' and experienced teachers' knowledge, understanding and Practice

The PTE curriculum emphasises the teaching of English as a subject and focuses on teaching the content of English and equipping trainees with the skills of teaching the language. It dwells on trainees' correct use of English; teachers' acquisition and teaching of effective reading and writing skills; practice of appropriate methods and techniques, and practice of improvisation skills. It does not illustrate specific concern for reading as a skill. In particular, the 1995 PTE syllabus for English with Literature does not provide for trainees' learning of the methods of teaching reading in the lower grades. The draft English Syllabus of December 2009, which some trainers perceive as a potential remedy, would not cater for filling the apparent gaps since it is designed for upper primary where a subject curriculum is followed. College principals and tutors report that teaching reading is a function of training in ECD (Early Childhood Development) and English but the actual training practice does not cater for exposure to methodologies of teaching specific early reading skills, whether in LL or in English. These curriculum

gaps explain the observed practice of lack of college instruction in the content of methods of teaching reading in lower grades with reference to phonemic, phonological and alphabetical skills. On the other hand the thematic curriculum implemented in primary school requires skills for teaching sounds, whole words, vocabulary and sentences and short stories. It thus easily illustrates to new teachers the knowledge and skills gaps that they leave college with. The discrepancy between the PTE and primary curriculum explains the challenges that teachers' encounter in the requirements of the thematic curriculum for teaching sounds and syllables while it justifies their limiting of the teaching of comprehension to upper primary classes.

It seems that in spite of the limitations in the college curriculum, NQTs possess variable knowledge of reading and skills for teaching it. The poorer teachers, who evidently rely heavily on the college training and the Thematic Curriculum, present limited knowledge of content and methods and demonstrate inadequacies in their attempts to develop reading abilities in children. They often teach language or reading as an activity rather than reading as a skill. On the other hand, the NQTs who have enjoyed exposure to extra demands by their schools, or have actively critiqued their teaching environment, demonstrate better knowledge and skills competences and are evidently more confident in their understanding of reading. They attempt to teach reading as a skill and to equip the learners with skills and abilities featuring some basic lower level skills and some more advanced higher level processing skills. Likewise the good CPDs, depending especially on their exposure through CPD programmes and the confidence cultivated through longer teaching experience, demonstrate better knowledge of reading content, which includes both the lower level and higher level processing abilities. They teach using better methods and express greater confidence than their poorer counterparts. In their dependence on the inadequate college training and the Thematic Curriculum, poorer CPDs have limited knowledge of reading content and PCK. They thus limit their teaching of reading to language content confuse phonological and alphabetical knowledge.

Chapter 4: Learning to Teach Mathematics

4.1 Summary of College Level Data of Knowledge, Understanding and Practice

To find out how teachers learn to teach mathematics and how their training influences their teaching the research team focused on teaching at the college and in selected schools. College tutors were observed in class and interviewed to obtain data on the knowledge they equip trainees with, their practices and understanding of mathematics and how it should be taught. Trainees contributed data about their knowledge of mathematics and their understanding of its teaching by completing a questionnaire, as did NQTs and CPDs, as well as responding to group interview items. This chapter presents the findings.

4.1.1 Tutors' Knowledge of Mathematics

The analysis in this sub-section is based mainly on the data of lesson observation of mathematics sessions in the four colleges and the tutor interviews that followed them. Observation and interview data is supplemented by the data of trainees' focus group discussion to capture the perspective of the tutors' most immediate evaluator – the trainee.

Altogether 12 mathematics sessions were seen in all the four colleges. The tutors report possession of some knowledge of mathematics, which they say they pass on to trainees. Like their counterparts' knowledge on reading, tutors' knowledge of teaching mathematics to children varies in amount and detail from one to another and notably comes from various sources.

Tutors' knowledge of mathematics can be mapped on a sort of continuum from a spoken awareness of their situation to demonstrable knowledge of mathematics curricula and specific concepts. Poorer tutors spoke of their teaching of mathematics without the specific detail that may relate to conceptual knowledge. Responding to the question of whether he had theoretical knowledge about early reading and mathematics, KNTM17 illustrated how he is self-taught and how this has resulted in limited knowledge. He said,

> *I have no specific training in teaching maths to children in early grades. The little knowledge I have I have acquired it through reading books and charts. After reading the books and then materials, I now understand what children need to know*.

Some other tutors' responses about the type of knowledge that they try to equip trainees with indicates possession of generalised mathematics content knowledge. They also illustrate emphasis of pedagogy and neglect of content. KYTM15 in the rural setting remarked that in preparing trainees for teaching numbers he gives them "knowledge that helps teachers, that is, teach them to change abstract to reality". His urban counterpart, KGTM13 said "I encourage trainees to use primary textbooks, especially those of lower classes, to be able to grasp the mathematics concepts from the foundation". The responses raise the suspicion that lacking specific knowledge and unable to teach from a systematic and careful content knowledge approach, the poorer tutors teach mechanically from textbooks and cannot articulate the knowledge they teach.

In the same category, reflecting poor content knowledge, are tutors whose awareness is general, limited to a sense of there being a mathematics syllabus for initial teacher preparation. Asked what he focuses on in teaching mathematics, KYTM15 reported, "I focus on content coverage which trainees could not do at the start. I teach

according to the syllabus". This statement is too general to suggest any knowledge of mathematics concepts especially since, on average, everyone would teach according to a syllabus. However, it is useful for suggesting awareness of the presence or availability of a mathematics syllabus.

But the good tutors demonstrate knowledge of mathematics through their able description and critique of the curriculum in some useful detail. For instance KBTM20, who was also the principal of a college, remarked,

> *The Thematic Curriculum is sometimes inappropriate. It bundles things without much principle or reflection of concepts. Often the lesson does not reflect any introduction of concepts or their development, e.g. counting 1-900, just counting. What concept is represented?*

The principal's remarks suggest that he perceives mathematics as vehicle for teaching concepts. They show his dissatisfaction that the children are sometimes required to perform supposed learning activities that do not develop any conceptual knowledge.

Awareness of the various content of the ITE curriculum, as demonstrated in KNTM17's remarks that trainee teachers "… have difficulties with geometry, probability and bearings", illustrates ability to isolate the content areas. Further, the tutor's ideas illustrate awareness of linkages between ITE and primary curricula, judging by his insistence in the interview that the trainees should solve the mathematical problems presented in the session otherwise they would not be allowed to teach P5 and P6. In the interview, he indicated that teachers tend to avoid the challenging content, and on school practice the majority of trainees want the easier option of teaching "lower primary where maths is very simple, for example 3+1". KNTM17 also observed that "The PTC programme does not help someone to upgrade. There is not any new maths content added except the methods. Even the 'O'-Level maths is more challenging". Likewise KGTM12 usefully demonstrated knowledge of mathematics concepts and how they should be taught. To illustrate how sets are formed, he called trainees acting as pupils to the front and, grouping them according to height, assigned them to different sets. He pronounced this a possible technique in a primary classroom. He constantly reminded the class that the topic of sets cut across the entire school mathematics curriculum and so they should learn subsets carefully. He also repeatedly cautioned them,

> *Do not to cross out members in a set (1, 4, 5, 10, 12) because it will confuse the pupils; they will consider what you have crossed out as an element or member of the set. This will confuse the pupils.*

The ability to interpret the ITE curriculum is evident in KGTM13's session on *Subsets* and suggests grounding in the content. The tutor introduced the content and illustrated with examples, after which trainees were engaged in illustrating their understanding in examples on the chalk board before they attempted numbers assigned for them to work out in note books. He explained in the interview that the topic has parallels in the primary curriculum because children are taught *Sets* from P1 right across the levels although he pointed out in the interview that "… the PTC curriculum is above the primary curriculum in terms of content and methods" and "… requires a higher level of understanding". The awareness of content linkages between the two curricula was illustrated through tutors' delivery in some of the sessions. KGTM12 and KGTM13 in one urban college and KYTM32, KYTM34 and KIYTM15 in one rural college made emphatic remarks on methods and the topics they taught are reflected in the primary curriculum. KGTM13's session topic is recognisable on page 87 of the *MK Mathematics* textbook for Primary Six, although the remarks made about application were quite general and could apply to other subjects. It should be said that the tutors in this research had the tendency to place method above content. KGTM12 put it clearly when he said that equipping trainees with knowledge, understanding and practice is a continuous process and the trainees need the skills and approaches more than they need the content.

KYTM32, also documented as KYTM34 in another instance, illustrated curricula linkages when he taught *Sorting.* His tutor talk was full of clauses like, "Imagine you are a P1 pupil", "Remember this P1 child doesn't have ….", "What things might the P1 child use to sort the bottle tops?" His selected topic and the techniques he dwelt on for teaching *Sorting* are related to what one might observe in the primary classroom when a teacher is teaching *Sets.*
The above data is evidence of the tutors' varying levels of mathematics knowledge, which is comparable to their knowledge of reading. Their knowledge is limited to certain aspects, in the same ways that their reading counterparts' knowledge is. The data shows that tutors' knowledge of mathematics easily characterises them into the categories of good and poor mathematics tutors and raises research interest in their own training. Besides it raises curiosity about their beliefs about what teaching the subject entails and therefore about the knowledge competences they may build in teacher trainees.

CPD is a possible source of mathematics knowledge and the data illustrates the possibility that it comes with varied opportunities as well as levels of exposure for the tutors. For instance, KNTM17, KGTM12 and KYTM32 testified to having had no CPD training while KYTM15 and KGTM13 cited participation in CPD for mathematics and continuous assessment, albeit without any details about the training content and mode of delivery. The indications render significant the tutors' knowledge of the curriculum they teach, and that which the trainees will teach in primary school. Knowledge of these curricula is useful for determining the context of tutors' interpretation of mathematics concepts and the requirements for teaching these in lower grades.

4.1.2 Tutors' Practice

Good tutors simulate the learning needs of primary pupils or, at least, the methods and techniques that the trainees could use once they take on the role of teacher. Although the details may be somewhat wanting, the attempt by some tutors to insist that the trainees remember the age and abilities of children in primary school is evidence of their deliberate focus on the learner. In a session on *Sorting and Organising* KYTM33 clearly reminded the trainees of the importance of telling the pupils the lesson topic.

> *Imagine you are in P1, in a maths lesson. Introduce the lesson by saying, "Today we are going to learn …. in Runyankore. Go on to a song about 'okubara' and use the language they know because this is a new concept. Therefore the way you teach them is the way they will learn the concept. Remember topic emphasis:* ***Sorting and Identifying Groups****. Remember pupils don't know why they are at school. You, the teacher, know and their retention depends on you*.

However, in this particular case the focus on methodology at the expense of the content of teaching sorting and organising made it a weak version of simulation.

KGTM12 illustrated how the trainees could teach using the integrated approach. In his session discussion and the class exercise took more time than any other activity. He explained during the interview that the purpose of the discussion was to guide the trainees to discover new ideas and add these to what they already knew, thus his encouragement for them to use the discovery method in their own classes. Likewise KGTM13 made the trainees work out a lot of examples on the chalk board and facilitated an interactive atmosphere in which he gave instructions and guided the trainees to work briefly in groups at certain points. KNTM16's and KBTM14's sessions were not different from those of their colleagues: they too used a lot of the time to explain content. KNTM16 explaining the concept 1, 2, 3 and how the trainee should teach mathematics using these elements. KIBTM14 built his session around mathematical problems posted around the class for the trainees to solve. He used the question-answer techniques to lead the class in a discussion of the challenges of learning sets, place value, number and others. During the class exercise, he moved around checking the students' books.

Much as their cases may illustrate good practice in demonstrating methods and techniques, KGTM12, KGTM13, KNTM16, also exemplify the relationship between trainer and trainee. The trainer often treated the latter as children and placed them quite strictly in the *receiver* role. At this point reference should be made to the practice, described by the trainees', of tutors sending them to the library to find information about the concepts – numerals, sets, multiplication, fractions and others – that would be taught in primary school and in accordance with the primary curriculum. Whereas the tutors might cultivate library research skills among the trainees and, whereas the focus on the primary curriculum would furnish trainees' orientation to it, the trainees felt that the tutors were passing their teaching responsibility on to the trainees. Some trainees, talking in TFGKB04 described the practice as tutors doing 20% teaching and trainees doing 80% research or self-teaching. Trainees felt that research was good but that in these circumstances it was overdone. However, the trainees in this particular focus group had concessions for the college principal who, although he used the practice of research like his colleagues, treated the trainees' findings as lesson content in leading them to discuss the implied challenges and what resources they might need to tackle these challenges.

4.2 Insights into Trainees' Knowledge, Understanding and Practice

4.2.1 Trainees' sources of knowledge in teaching mathematics

Much of the trainees' knowledge came directly from their tutors. This was mentioned during the focus groups in all the TTCs. The trainees who took part in the focus group discussions spoke more highly of the mathematics' tutors than of their reading counterparts. Maths' tutors were perceived to be more effective in their teaching and trainees felt that they were learning a lot from them. "*Some of the tutors have inspired us; for example, the mathematics tutor. We have a lot we shall copy and imitate from such tutors when we go to the field "*(Focus group, TTC1). "*We have acquired from them methods of how to teach; we have also learned how to teach from the way they teach*" (Focus group, TTC1). "T*hey are real role models for us*" (Focus group, TTC3).

Worryingly, in one TTC, trainees implied that the tutors were nearly the only source of knowledge they used while at TTC. When asked what their sources of knowledge about teaching were, trainees from TTC 2 said: "*Our tutors, from college. We haven't read anywhere, … no …not read any book or literature although they are available in the library, because we don't know the titles… no one tells us*" (Focus group, TTC2). This statement may reflect a lack of initiative from these particular trainees; nonetheless, books, textbooks, teachers' guides and copies of the national curriculum were difficult to access for our respondents from less resourced TTCs and although trainees from two TTCs mentioned them as a source of knowledge, evidence suggest that some trainees may not have been exposed to curricula, text books and teachers' guides sufficiently to gain from them all the knowledge they need to teach in primary schools.

Trainees from TTC4 emphasised the role of the interactions they have with each other's and the knowledge gained from their colleagues and friends. This feeling was also shared in TTC1. Another source frequently mentioned is experienced teachers; some trainees consult them during holidays of when they are in schools. Other sources include parents, resource persons from the Ministry of Education and other visitors to the TTC and finally, trainees' own experience of primary and secondary school education. "Our own schooling, e.g. we used to go on field trips, we had group work, we were required to observe and report; and we were rewarded as good learners." (Focus group, TTC2)

4.2.2 Trainees' mathematical knowledge and understanding

According to the syllabus, the knowledge base required from trainees in order to teach mathematics is relatively big. When asked about the key concepts in early grades mathematics, the focus group's respondents from TTC2 mentioned a large number of topics. They said that addition, subtraction, multiplication, division and knowing numbers' names were the most important content. Sets, statistics, measures and shapes were also mentioned. This tells us that the maths syllabus matched the ambitious primary curriculum but it also reveals that trainees from that particular focus group were confusing 'mathematical concepts' and 'topics'. The mathematical content knowledge covered in TTCs, however, goes far beyond the content of the primary math curriculum. Views about this varied. Some trainees said they felt confident teaching even O' level in mathematics because they have been given enough skills and content. These trainees assert that it is easier to teach in secondary school now than primary school because the pupils "are normally attentive in class". Others' however felt that they should spend more time learning how to teach and that they were mainly repeating what they had already learned in secondary school.

> Trainee 1:[We are] overloaded with 'O' Level work: instead of preparing us by exposure to the work required for teaching primary schools, we are required to learn /go back to the work of 'O' level on top of the primary work. So we find we can't even get enough training for the primary education. This pushes us very far back in our profession." Trainee 2: Yes, as a result, it is very difficult to do the work. Science was taking us - that Physics and Biology! Like in science they brought us extraction of iron. Even in P.7 it is not there. Trainee 3: It's too much… we need more on teaching. (Focus group, TTC2)

Research on teaching suggests that subject-matter knowledge is important up to a point and that taking more courses in mathematics is not linearly related to teaching quality for maths teachers (Darling-Hammond et al., 1999). Ball (2000) insists that knowing 'big ideas' of the discipline is not enough. While our review of the curriculum shows that primary mathematics content knowledge is covered in the TTCs, the question of whether

trainees' understanding of the key mathematical concepts is deep enough to teach them to small children meaningfully deserves attention.

Trainees in Uganda perceive themselves to be capable and confident to teach early maths. During the focus group that followed the maths lesson in TTC2, trainee 1 said: "We are encouraged - we thought that teaching is a very difficult thing but now we think it is doable." And trainee 2 added: "It has shown us our potential." When asked if they felt ready to go out to teach, trainees from TTC 4 said: "Yes; we have gained some experience through school attachment. We have also gained confidence from talking on assembly, discussions, and microteaching. These platforms help to relieve some of the anxieties." However, when asked whether their training helped them to face the challenges they are likely to meet in the school they said "Yes and no, in some areas we are well prepared but in the thematic curriculum we still have some concerns" (focus group, TTC4). "This year has been a year! We have even learnt how to write schemes of work. This shows that you are a professional teacher, not someone from the village pretending to be a teacher" (Focus with trainees, TTC2).

This perception of their capability and confidence to teach lower primary maths was high. As illustrated in table 4.1 and on figures 4.1 and 4.2. 93.5% of the respondents considered their capability to teach lower primary maths high or very high. A lower proportion (58,53%), but still a majority of trainees, reported being very highly or highly confident to teach lower primary maths. There were slight variations between TTCs, but when the categories "very high" and "high" are added together, these differences are insignificant.

Table 4.1: Perceived capability and confidence to teach lower primary mathematics

	Capability to teach lower primary maths		Confidence to teach lower primary maths	
	Freq.	%	Freq.	%
Very High	162	32.93	272	55.28
High	298	60.57	16	3.25
Low	26	5.28	200	40.65
Very Low	6	1.22	4	0.81
Total	492*	100.0	492	100.0

Figure 4.1

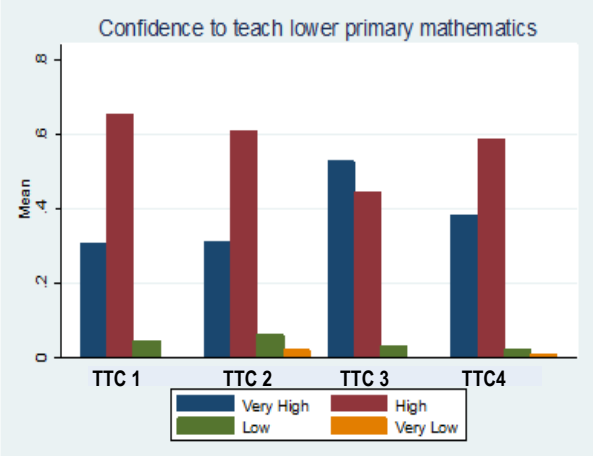
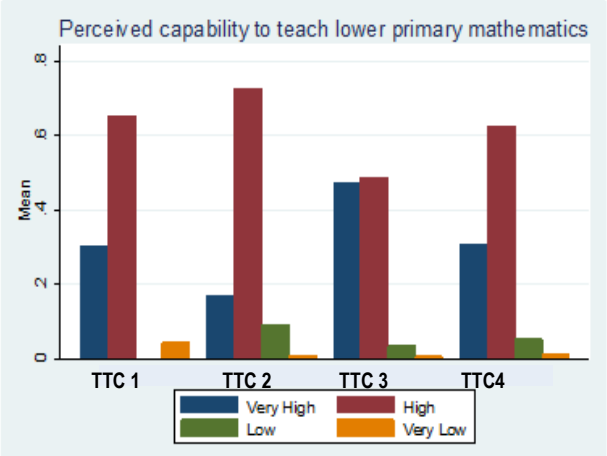


Figure 4.2



Unfortunately, trainees' perception of their capability to teach maths appears to be over rated. Data from the questionnaire reveals that in many cases, respondents' knowledge was not always at a sufficient level to teach this content. For example, 50 trainees (10 percent of our sample) considered that 3/5 was a bigger fraction than 3/4 and even amongst those who gave the right answer; some were not able to explain how they knew. As table 4.2 and figure 4.3 show, trainees consider many maths topics to be easy to teach. They reported the meaning of numbers and counting as very easy to teach, followed by place value, multiplication, division and adding. Estimating and measuring length, volume and weight were reported as most difficult with 16 percent considering

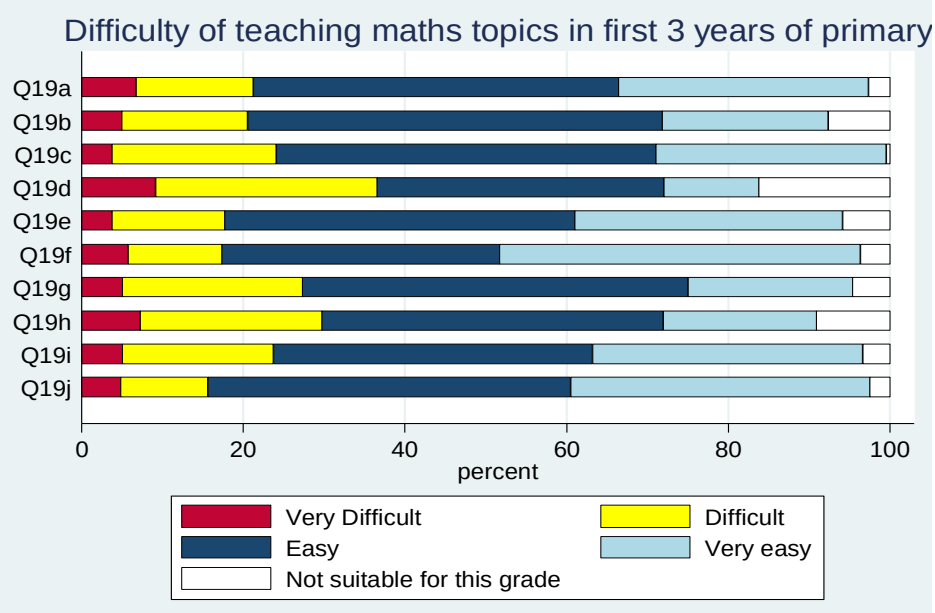
this topic not suitable for the grade. A quick look at the white sections of the bars on figure 4.3 reveals that even topics that are central to lower grade mathematics, such as the concept of numbers and place value, were perceived as 'not suitable' by some respondents, indicating gaps in knowledge of the primary curriculum.

There are at least three ways of interpreting the responses to this question. First, the little exposure that trainees have to lower primary classroom may affect their perception of what small children can do leading them to under estimate the challenges that teaching basic math concepts entail. Secondly, the apparent ease of teaching these topics emerging from demonstrations and micro-teaching with groups of adults may induce a false sense of confidence and make trainees believe that such skills will be easy to teach with children as well. Finally, trainees who took part in the research may have over ranked the facility of the items by fear of judgement. This option, however, seem less likely due to the care that the research team took in explaining the purpose of the study and anonymising the questionnaires.

Table 4.2: Which of the following primary maths topics would you find difficult or easy to teach in the early grades?

	Percentage				
Topic	*Very Difficult*	*Difficult*	*Easy*	*Very Easy*	*Not suitable for grade*
(a) Adding two or three digit numbers involving renaming ('carrying')	6.75	14.52	45.19	30.88	2.66
(b) Comparing fractions	4.94	15.64	51.23	20.58	7.61
(c) Division	3.77	20.34	46.96	28.51	0.42
(d) Estimating and Measuring of Length, Volume and Weight	9.19	27.35	35.47	11.75	16.24
(e) Multiplication of numbers (two digits and three digits)	3.74	13.93	43.24	33.06	5.82
(f) Place value (0 to 100) i.e. tens, units etc	5.68	12.21	44.42	34.11	3.58
(g) Recognising fractions	5.06	22.15	47.68	20.25	4.64
(h) Solving word problems	7.22	22.47	42.27	18.97	9.07
(i) Subtraction from two or three-digit numbers involving regrouping ('borrowing')	5.04	18.70	39.50	33.40	3.36
(j) The meaning of numbers and counting	4.80	10.86	44.89	36.95	2.51

Figure 4.3



4.2.3 Trainees' pedagogical content knowledge and perception of practice in teaching maths

Some teacher education practices assume that primary school mathematics is not difficult, and that trainees who acquire sufficient mathematics content knowledge and knowledge of methods for teaching mathematics in schools will become good math teachers. This can lead to the belief that teachers only need to know a collection of facts and rules and that children can do math just by following set procedures to arrive at an answer (Ma, 1999). Our findings suggest that many trainees believe that. Trainees' construction of a good mathematics teacher showed that strong pedagogical content knowledge was seen as most important. Ball's research (2000) contradicts this assumption and shows that even when a teacher is able to do mathematics, he/she may not have the kind of mathematical understandings that can help pupils to learn it meaningfully. As shown in table 4.3, respondents agreed less that showing children lots of worked examples and being able to show maths in everyday situations makes a good maths teacher.

Table 4.3: What makes a good maths teacher?

	Percentage			
	Strongly Agree	Agree	Disagree	Strongly disagree
(a) Being good at mathematics	34.11	48.94	11.02	5.93
(b) Being able to show maths in everyday situations	41.28	40.00	15.32	3.40
(c) Teaching children to remember important mathematical facts	41.94	49.23	7.51	1.32
(d) Showing children lots of worked examples	25.73	40.86	24.60	8.58
(e) Being able to explain maths topics using simple materials	72.65	22.76	3.76	0.84

Over 90 percent of trainees think that using concrete and practical examples is the best way to help children understand basic concepts in maths (Table 4.4). This is followed closely by teaching important steps in solving maths problems and practicing worked examples. However, 12 percent strongly disagreed and 20% disagreed that showing lots of worked examples was the best way to help children understand basic concepts in maths even while tutors' and NQT's practice includes a lot of demonstrations. Demonstration is an effective method but as Ma (1999) pointed out: "a good vehicle … does not guarantee the right destination". In order to help pupils to make meaning of the mathematical and pedagogical concepts, demonstrations need to be combined to other forms of activities where pupils can take control of their own learning. The trainees we met were well aware know that the choice of the method to use while teaching depends on a number of factors. They mentioned the level of learners, rate of understanding, the number of pupils in the class, duration of lesson, availability of teaching aids, interest of the learners and the ability to retain what the learners have learnt in class.

> "The teachers should learn that pupils learn better while using concrete objects where they can touch, feel and see. Again, the teachers need to use simple language to the learners especially the ones in early grades of primary school and teachers should vary the methods while teaching to cater for individual differences" (Focus group, TTC3).

Table 4.4: The best way to help children understand basic concepts in maths is to:

	Percentage			
	Strongly Agree	Agree	Disagree	Strongly disagree
(a) Show them lots of worked examples	29.98	37.32	20.34	12.37
(b) Teach them to remember important steps in solving maths problems	37.98	45.06	13.73	3.22
(c) Make them practice lots of worked examples	35.46	47.77	13.16	3.61
(d) Use concrete and practical examples to teach	90.18	7.36	1.23	1.23

When asked what they would adopt from their training about teaching maths in lower primary, trainees from TTC 4 mentioned the use of instructional material, participation – group work – pair work, emphasize on learner centered approaches and mixing boys and girls in the sitting arrangement. Those from TTC 2 added that teaching from simple to more complex concepts is the most important. In all four TTCs trainees talked about the importance of using teaching material.

> "It is not about cramming formulae, e.g. in upper classes, but use of real objects in the children's experience…. yes, materials for teaching the formulae or concepts of addition, multiplication, division, subtraction." (Focus group, TTC3)
>
> "For example fractions - you have to ask the children to bring, for example mangoes, they cut them into parts to appreciate the value of 1/2, 1/4, 1/3 - the different fractions." (Focus group, TTC2)

The quantitative data also highlights the preference of trainees for manipulation in teaching addition (table 4.5), subtraction (table 4.6) and place value (table 4.7) with options 'c' using objects to show conversion of tens and 'd' lining up objects, perceived much more useful to teach subtraction than verbal explanations and doing the equation on the board. Similarly, the use of concrete material to explain the meaning of '3' and '5' was selected more than the other options and was selected as the first choice by a majority of trainees. Interestingly, really few trainees (22%) found using a story problem approach useful to teach basic additions. This approach can be particularly helpful when used properly. It is unclear whether or not the respondents understood what the item meant.

Table 4.5: Four teachers decide to use four different teaching and learning activities to teach addition sums up to 9. For example, 2+3 =5; 2+7=9 etc. Which of these approaches do you think is useful or not useful?

	Useful		Not useful	
	Freq.	%	Freq.	%
(a) Teach counting from 1 to 9 and worked examples of adding numbers that make up 9.	411	89.74	46	10.04
(b) Use a story problem approach.	97	21.90	346	78.10
(c) Use groupings of numbers and join up groups to make up a total of 9.	417	91.05	41	8.95
(d) Teach counting from 1 to 9 and put sums on the board and children find the answers	372	82.12	81	17.88

Table 4.6: Which of the following strategies would you use to help children do the subtraction: 52-25?

	Useful		Not useful	
	Freq.	%	Freq.	%
a) Explain it is not possible to subtract a smaller number from a bigger number so you use conversion of tens to give 12 before subtraction	304	66.67	152	33.33
(b) Explain that if you do not have enough to subtract, you can go to a friend who has more and borrow 10 and then you can subtract	375	80.99	88	19.01
(c) Use objects to show conversion into tens and units and then demonstrate subtraction by regrouping	411	89.35	49	10.65
(d) Line up 52 objects and take away 25 of them.	399	86.36	62	13.42
(e) Write on the subtraction vertically on the board and do the subtraction	325	72.06	126	27.94

Table 4.7 A child is finding it difficult to understand that '3' and '5' in the number '35' is not the same as the separate numbers '3' and '5'? Which *two* steps would you recommend to resolve this problem?

	Freq.	%
(a) Explain that the '3' is actually three tens so is not the same as the unit '3'	261	54.49
(b) Use concrete materials to teach them place value and the idea of tens and units	321	67.01
(c) Exchange one of three tens for ten units which makes the '3' in 35 bigger than '5' units	54	11.27
(d) Tell the child that the '3' in '35' is actually 30 and therefore clearly bigger than '5'	259	57.07

The discourse of trainees and the choices that they made in the scenarios presented in the questionnaire suggest that they value 'learner centered teaching' approaches to mathematics and recognise that pupils should develop their understanding by manipulating small objects from daily life. TTC practice, however, is more an illustration of what Kuhs and Ball's (1986) call a 'classroom-focused view of teaching', described by Thompson (1998) as a perspective where effective teachers are those who "skilfully explain, assign tasks, monitor student work … manage the classroom environment, preventing, or eliminating, disruptions that might interfere with the flow of planned activity" (Kuhs & Ball 1986:26) . Thompson adds, "accordingly, the students' role is to listen attentively to the teacher and cooperate by following directions, answer questions, and completing tasks assigned by the teacher" (p. 137). As we will see later on, this resonates also with what has been observed in some NQT classrooms thus our concern that trainees may reproduce this type of teaching in their own pedagogical practice in spite of the progressive views they expressed.

4.2.4 Summary

Tutors are the main source of knowledge of trainees. The availability of teaching and learning material seem to vary from one TTC to another and data from focus group interviews reveal that even where they are available, curriculum, guides and manuals are under employed. Other sources of knowledge mentioned include other trainees, experienced teachers and other resource persons.

Trainees generally know the main topics included in the primary curriculum but not necessarily at what level they are taught. While the extent and depth of mathematical content knowledge vary a lot between trainees, the questionnaire reveals that in many cases, respondents' knowledge and understanding of mathematical concepts were not always at a sufficient level to teach them. However, trainees' level of confidence in teaching lower primary maths as well as their perceived level of capability is really high. The teaching they received at the TTC appeared to have a positive impact on their self-confidence. However, they tend to overestimate what small children can do and perceive most early maths topics to be easy to teach.

The trainees have learnt that they have to use instructional materials and improvise where no instructional materials are available. They mentioned that teaching should be from simple/known to the hard/ unknown concepts. While they appear to value learner-centered approaches, the extent to which they are able to use them in an appropriate way is unknown. Insights from NQTs practice can provide clues into that important question.

4.3 Insights into NQTs' Knowledge, Understanding and Practice

4.3.1 Knowledge of Mathematics

It is significant that altogether 89.22% NQTs in this research perceived their capability to teach mathematics very high and high and 92.39% perceived their confidence high or very high but a smaller percentage of 85.81% reported very high or high capability for teaching reading and only 78.73% considered their confidence to teach reading high or very high. While the means for NQTs' capability and confidence to teach mathematics were lower than those for CPDs, they were higher than the means for their capability and confidence to teach reading. These statistics compare closely with the research team's observation that teachers were always more willing to be observed teaching mathematics than they were to be observed teaching reading. The questionnaire survey and lesson observation data illustrates that one reason for the NQTs' confidence is their clear knowledge and understanding of teaching early mathematics, especially with beginning concepts such as addition and subtraction. They demonstrated as, for instance Table 4.8 below shows, that children understand basic concepts by experiencing mathematics through working examples for practice, explaining processes and using concrete and practical examples.

Table 4.8: The best way to help children understand basic concepts in maths

The best way to help children understand basic concepts in maths is to …	Percentage			
	Strongly Agree	Agree	Disagree	Strongly Disagree
show them lots of worked examples	37.50	37.50	20.45	4.55
teach them to remember important steps in solving maths problems	52.27	43.18	2.27	2.27
make them practice lots of worked examples	50.59	37.65	6.59	1.18
use concrete and practical examples to teach	78.41	18.32	1.14	1.14

Good NQTs demonstrated sound knowledge of how children learn mathematics. In an interview following her lesson on subtraction, NQTKYM35 described her "knowledge of numerals, number line and fractions, as well as teaching division and sharing". She emphasised that in order to know whether children have understood, "you have to give work". Her colleague NQTKGM32 taught a lesson on division and involved the class in several sums for dividing up to 300 by 2, 3, 4 and 5, and explained in the interview that the learning activities she had used were an attempt to deliver the concept of division by engaging the children in problem-solving. A P.3 teacher, NQTKNM18, who taught long division with numerous examples, explained in an interview that in P.2 she would still teach the concept of division but not teach long division and in P4 she would teach long division but use bigger numbers. NQTKNM23 emphasised presentation of "parts" in her P.1 lesson on fractions, in a careful attempt to "not use the word fractions because this makes the concept difficult to understand but 'parts' is a common vocabulary at this age". She cut up guavas and oranges, which are commonplace items, and kept drawing the children's attention to the fact that parts of these were "missing" and "you can give a part to your friend and keep a part for yourself". The observation data offers some explanation for the high self-reported figures for the NQTs' capability and confidence to teach mathematics. It also explains the high percentages of teachers who agreed that teaching them to remember important steps in solving maths problems, using concrete and practical examples to teach them and making them practice lots of worked examples are the best ways to help children understand basic concepts in mathematics.

However, there were some instances of poorer NQTs with a lack of judgement not so much of what concepts were suitable in lower grades but how to package these concepts at this grade level. For example, when asked about the aims of his P.3 lesson, NQTKGM19 readily replied, "The lesson aimed to help pupils learn how to regroup numbers in order to subtract" but also admitted doubt as to whether the children were familiar with the term 'regrouping', "I don't think so. I think they are familiar with 'borrowing'". The tendency to use the language used at college to explain concepts to primary pupils implies lack of in-depth knowledge about how children learn mathematics. In her lesson on the topic *Addition of three digit numbers vertically without carrying*, NQTKNM21 used many examples which were worked in groups or by individuals. And yet the concept of tens was not effectively dealt with in spite of the availability of generous supplies of stones for counters since every child had his own collection of stones to use. Thus, many wrong answers came up in the children's books. NQTKYM35 demonstrated a lack of knowledge when, teaching *okugaita* (addition) in P.1, she wrote many examples on the chalkboard for them to copy and complete, using an empty box on the right of the sum: 2 + □ = 9, which half the class wrote as 2 + 2 = 9, or 2 + 3 = 9; 7 + □ = 9, which was predominantly completed as 7 + 2 = 9 or 7 = 3 = 9. Probed on whether the use of the box in the place of numerals was suitable in the presentation of this concept, the teacher suggested that "… it is okay, but maybe the children are used to adding only 2 or 3 to other numbers" and so used only these numerals. Even then the teacher had not recognised these errors while marked work round the class, and knew about them only during the interview, when they were pointed out by the researcher.

The cases of weaker knowledge of how children learn mathematics correspond closely with the smaller percentages of teachers reporting low and very low capability and confidence to teach mathematics. They also strengthen the picture of smaller percentages that disagree with the statement that the best way to help children understand basic concepts in mathematics is to use concrete and practical examples and to make them practice lots of worked examples. Besides the data is comparable to survey indications that even for the basic concepts like addition and division the figures for teachers reporting ease and difficulty of teaching these did not differ widely (Table 4.9).

Table 4.9: Difficulty to teach maths topics in first three grades

Topic	Very Difficult	Difficult	Easy	Very Easy	Not suitable for this grade
(a) Adding two or three digit numbers	11.90	34.52	38.10	11.90	3.57
(b) Comparing fractions	6.90	27.59	48.28	11.49	5.75
(c) Division	14.46	31.33	42.17	10.84	1.20
(d) Estimating and Measuring of Length, Volume and Weight	6.02	42.17	26.51	13.25	12.05
(e) Multiplication of numbers (two and three digits)	2.41	33.73	45.78	15.66	2.41
(f) Place value (0 to 100) i.e. tens, units etc		13.79	54.02	28.74	3.45
(g) Recognising fractions		27.38	50.00	21.43	1.19
(h) Solving word problems	10.47	31.40	40.70	12.79	4.65
(i) Subtraction from two or three-digit	13.48	43.82	24.72	14.61	3.37
(j) The meaning of numbers and counting	2.27	17.05	50.00	28.41	2.27

In spite of the noted cases of NQTs' weak knowledge of how children learn mathematics, they evidently knew, from their college experience, that teaching mathematics in the lower grades should follow the Thematic Curriculum. And yet, they had a big challenge interpreting its statement of competences with regard to development of numeracy, although they prudently sought the support of colleagues. NQTKGM27 reported "I follow the Thematic Curriculum. Teachers are given a curriculum and interpret it according to the class with others". On the same challenge, NQTKNM26 shared experience of the benefit of group support in interpreting the syllabus content and suggested methodology in "Teachers do schemes of work together basing on class and subject, and therefore, curriculum interpretation is done as a group where teachers share experiences. Improvisation is noted in the case of NQTKGM28 in another school, "I just use the thematic curriculum and MK maths textbook. …. No, there is no thematic curriculum document at our school. We borrow from friends. We use the thematic document (curriculum) as a guide and add more information to that document".

But the wisdom of identifying and using support is not always shared, for there is evidence of NQTs who struggle to interpret the curriculum single handedly. For instance, NQTKGM29 reported that he simply followed the curriculum as it was. In NQTKNM18's P.2 maths lesson under the theme *Living Things in our Division* and the sub-theme *Crop Growing Practices* he failed to apply the thematic content to numeracy skills development. In an interview he was asked to clarify the connection between the theme and sub-theme on the one hand and the actual lesson content he had taught, his response was,

> *The sub-theme and theme are directly from the thematic curriculum but I admit sometimes it is hard to connect them with the lesson being taught. The Thematic Curriculum is difficult to interpret.*

The teachers' perceptions of the demands of the primary curriculum may presuppose some general alignment of practice to the curriculum. The reality is explored in the following sub-section of data on NQTs' practice.
NQTs' knowledge is evidently as varied as the tutors' knowledge. Some are more knowledgeable than others about how children learn and their views on the levels of difficulty in teaching various concepts vary. Besides, NQTs demonstrate varying levels of knowledge of the Thematic Curriculum. It would seem that the delivery of the ITE curriculum has a great impact on NQTs' knowledge.

4.3.2 NQTs' Mathematics Practice

A number of NQTs preferred teaching mathematics to teaching reading, explaining that mathematics is practical since the learners get engaged in learning using many easily available aids. Lessons always had more or less a similar lesson structure. They started with revision of the previous lesson which would last at least 10 minutes. This was followed by introduction of the new lesson, which would then progress clearly as a repetition of the same lesson, a continuation of the previously taught topic but with new detail, or the beginning of a new topic altogether. Lastly there would be a lesson conclusion. All lessons were taught with reference to day-to-day experiences.

There was evidence of good practice in some NQTs' lessons, some of which are outlined in this sub-section. The chalkboard was commonly used by teachers and children as a basic aid in working examples. However, the weaker NQTs depended heavily on this medium. NQTKGM19, for instance, used the board extensively to

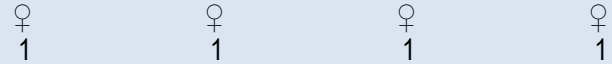
demonstrate in numerous examples, and NQTKGM20 drew sticks on the board to illustrate counters while leaving a lot of space for the children to demonstrate the steps to follow in working sums. In such cases, NQTs generally found it easier to concentrate on the chalkboard than to have the children use any tangible materials. NQTKYM36 taught a P.2 class of 19 only and gave out one small bundle of sticks and two piles of stones for counting. When asked why she had so few teaching aids whereas it would have been easy to collect more, she said "the class gets crowded when they use stones and sticks". This illustrates the teacher's ignorance of one way that children learn – through active engagement with learning aids. But good teachers had corners with a number of items such as stones, bottle tops, drinking straws, empty packets and others which children used to solve problems. In these instances, the children always worked in pairs or small groups, before they wrote any individual work in their exercise books. The practice of using these corners seemed so natural that the children turned to them once they had sums to do, even without the teachers' prompting. Some teachers - NQTKYM35, NQTKGM32, NQTKYM43 and NQTKNM23 - stood out for their dependence on activities using tangible materials in teaching addition, division and fractions in P.1 and P.2 lessons. A few teachers used charts and others ignored the charts on the classroom walls. Notably, no maths textbook was used in any of the classrooms where we observed lessons: teachers always carried their lesson plans and sometimes the resource book provided by NCDC and not textbooks.

NQTs' approaches to assessment of learning were different. One approach was judging by the time children used to accomplish a task in class. "There are fast children and slow ones", said NQTKGM20, in whose class some pupils were able to complete the exercise correctly, working very fast, while others obviously had difficulties. The teacher explained that she knew whether the children had understood by

> *… marking books round the class, taking note of those with problems and deliberately going to help them as the other pupils do their work. In addition, I give remedial assistance on a one to one basis during the lunch break to those who need extra help.*

But NQTKYM43 said she assessed learning by "… reviewing the previous lesson and asking them questions. I hope they understand thereafter. Secondly, it is the way children respond to the questions in class". Yet NQTKYM48, when asked whether his pupils understood the maths lesson, replied, "They all understood. In the lesson, they all put up their hands and I could ask them. So the form of assessment of mathematics observed included marking pupil's exercises, gauging their response to questions during lesson. These explanations are evidently based on tutors' demonstrations of assessment, for the teachers said that they learnt these approaches at the college. They are bound to arise even when in their own lessons the teachers may assess pupils by getting them to demonstrate learning through practical steps to solving mathematical problems. If anything lessons were always very practical, as the representations of NQTKYM43's and NQTKNM23's lessons below illustrate.

NQTKYM43, on dividing by 4, in P.2: Teacher introduces the subject *Okubara* (maths) and the topic *Okugabira* ine *hatine eri …* (division by four without remainder) and then, writing the sum 4÷4, asks the class "Who wants to do this?" When pupils hesitate, she invites four to the front of the classroom by name. She lines these up, facing the class, before she tells the class to count them. She invites a fifth pupil to the front, gives him four straws and tells him to give an equal number of straws to each of the four in the line. She then tells the rest of the class to count, "How many straws does each have?" They count and say, in chorus, "Kamwe (one)". Teacher goes on to illustrate the same in images on the board.



Then she asks the pupils, "How much is 4÷4?" to which they all say, "One". Next the teacher leads the class to work out 8÷4 through the same steps but using bottle tops this time. Children are then sent into their groups – 8-10 pupils in each – where they work out 20÷4 and 24÷4 using the stones they carried. One child counts 20 stones and then gives them out equally into the hands of four others who are holding them out. Then the group counts the stones held by each pupil. Individuals then write the whole sum in their exercise books. Teacher goes round the class supervising the group work and correcting errors.

In NQTKNM23's P.3 lesson on fractions, most of the time was spent on working examples of fractions. In one particular step, the teacher got some pupils to write "one half" on the chalk board before others came up to draw under the text different representations of half. In two instances there was a circle sliced into two equal parts, in another the pupil drew a square and divided it into two parts. The teacher then instructed the class to draw different shapes, use lines to show two equal parts on the drawing and shade one part using pencil. Then they all

wrote “one half” under each drawing. The next step involved working in small groups to cut guavas into halves so that each child in the group held a half guava. The teacher repeated that each half had been part of a whole guava until the whole was divided into two equal parts. NQTKYM43’s and NQTKNM23’s lessons stood out for the experiential approaches used by the teacher. The children were actively engaged in the learning activities and their experience of the concepts involved commonplace ideas illustrated using tangible materials.

In all the observed maths lessons, whether taught in English or local language, on addition, division, fractions, or multiplication, no less than three or four examples were worked by the teacher and the whole class on the chalk board, using tangible materials, before the pupils worked together in small groups. And the group work was only a bridge to individual work done in pupils’ exercise books.

There is some evidence that while some NQTs have good knowledge of mathematics, others have not fully mastered the knowledge of mathematical concepts with relation to what is suitable to introduce to children. Such weakness stands for limited understanding of how children learn mathematical concepts and is possibly related to the manifestations of some teachers’ struggles with interpreting the Thematic Curriculum. The linkages in these weaknesses suggest that college training does not place ample emphasis on interpretation of the primary curriculum. In spite of these knowledge gaps, teachers’ delivery shows a clear match between the specifications in the ITE syllabus and NQTs’ classroom practice. The teachers demonstrate mastery of approaches that facilitate children’s engagement in meaningful learning through extensive practice in problem-solving. Available data shows that the teachers have generally learnt that children learn mathematics through working a lot of practical examples related to day-to-day experience.

4.4 Summary of CPD Data and Comparison between Intended Competences and Espoused Competences

This section analyses interview and observation data of the knowledge and practice of teachers with more than three years’ experience of teaching mathematics – here called ‘Experienced teachers’ although few had received any CPD specifically on mathematics. Although in regular practice they teach reading and other areas of the curriculum as well, here they are referred to as mathematics teachers since they were observed in mathematics lessons. They are described in comparison to those who are perceived as their reading counterparts because they were observed in reading lessons.

4.4.1 Knowledge of Mathematics

Like their reading teacher counterparts, the maths Experienced teachers generally portray a good grasp of mathematics subject matter. Outstanding teachers confidently explained in appropriate terms both the subject content and the process of solving mathematical problems that are appropriate for the different levels. They also ably explained what children should be able to do in order to learn the subject. For example, CPDKBM03 said that children in early grades should learn to form the figures before learning the concepts they represent: “Without the numbers – the symbols – the concepts will remain too abstract.” She suggested the following steps for progression in teaching mathematics.

> *By the end of P.1 they should have learnt the concept of numbers…. They should be able to recognise them, count, … write the numbers. In P.2 they should build on that and be able to do addition, subtraction, multiplication, … up to multiplying numbers by 5, at least. Then in P.3 the teacher should give more tasks, so that by the end of P.3 children should have at least mastered simple addition and subtraction and multiplication.*

Asked why she placed a lot of emphasis on concepts, she pointed out that any misunderstanding of concepts leads to interruption in learning. She then went on to explain what sometimes leads to children’s misconception in maths, that is,

> *… the teacher’s lack of knowledge…when the teacher did not understand everything well, … the teacher is not well conversant with that particular topic. Also inadequate preparation, … sometimes the teacher may not have appropriate methods … may not have enough materials. Also time is sometimes inadequate. This may bring gaps and the child will always find maths difficult due to poor foundation.*

The teacher explained that children learn better in groups. She specified a few activities, pointing out that they

> *particularly love counting, grouping objects for multiplication, because the concept of repeated addition is too difficult. Grouping is better and only after mastery of grouping they should be introduced to repeated addition.*

Her colleague CPDKBM04 expressed similar knowledge. Illustrating how children learn, he said *Before the children go down to writing the content, they should be able to practice, for example tens and ones, counting the objects, tying the bundles. They should be exposed to pictures of the objects. The Thematic Curriculum emphasises oral work and we agree with them.*

Strength of CPDs' knowledge is illustrated also in their responses about the primary curriculum. Although the Thematic Curriculum was not in existence when they attended college, like the reading teachers, the CPD mathematics teachers are well acquainted with its topics. Yet, while they generally agree that the thematic arrangement is helpful for guiding teachers to teach the same topic in all subjects, they point out that the thematic approach presents some difficulties. These relate with linkages between theme and subject matter, content selection and suggested teaching approaches. For instance, teachers criticise the curriculum for the lack of obvious relationship between the themes and maths topics or concepts. CPDKBMO3, for instance, critiqued the theme *Food and Nutrition*, wondering, "How do I teach Maths with this? There is a teacher's guide and a resource book, but these are not enough for showing one how to teach Maths under this theme." Teachers also observe difficulties arising from the selection and sequencing of content. CPDKBM07 felt that the new curriculum is

> *… very congested especially in mathematics P.3 where there are so many concepts put together. In P.2, the designers of this curriculum touch on many different concepts to be done in one term and these cannot be easily completed in one term. Each of the days in the new curriculum has a different concept to be taught and therefore if a teacher gets sick and cannot cover the concepts then there will be a back log of work to be done in that specific class. This causes lack of efficiency amongst teachers. The only beauty with this thematic curriculum is many of the strands are repeated in other subjects and therefore if pupils did not understand when a teacher of mathematics (was) teaching they might understand when another teacher of another subject is teaching.*

An isolated instance of CPDKYM45's interview suggests, however, that there may be CPDs who still want to develop their knowledge of how children learn mathematics. Responding to the question of whether there were areas in which she lacked confidence, the teacher said "I want to know how to make children understand and do better". It is difficult to trace the roots of this because while Experienced teachers agreed that in teaching mathematics they depended mostly on what they learnt at the college, CPDKBM05 said that the college did not give trainees much content that is applicable to primary school. According to this teacher, because the trainees were required to pass their examinations, the content taught them at college was more of what they met at secondary level. The claim finds support in CPDKBMO3's comment that while her initial training equipped her with useful knowledge of group work, learner-centred methods and participatory methods, she thought that "… a lot of what is taught in college is far removed from the reality in the primary classroom. It is not what you expect when you are in college." It is also reflected in CPDKBMO4's description of the knowledge acquired from college training. Although he described himself as confident, referring to his efforts to upgrade knowledge by attending various courses after initial qualification, he noted that a lot of knowledge is offered at the PTC "but this does not help anyone work well with the changes in the curriculum which were ushered in without reference books." Responding to the question of whether college training matters, he explained that

> *College training introduces the teachers to the profession and it helps one to begin realising what is required of you and tells you why you should do it. But of course you go to a school after training and realise you have to think about what you are doing and why you should do it that way. When you have just qualified you can't do that.*

In line with her colleagues' thinking, CPDKYM45 suggested that colleges

> *… should improve on their teaching. Most of the tutors would mostly give us a topic and tell us to go to the library and find out some things. But you see a child from S.4 …. It is not easy to just find out things for yourself.*

The suggested gaps imply the usefulness of CPD programmes as a source of knowledge although, as suggested by the data of teachers' interviews on practice, analysed in the next sub-section, the application of this knowledge cannot be taken for granted.

CPD mathematics teachers, like their reading counterparts, have attended training in seminars and workshops and they appreciate the role that this training is playing in improving their teaching. All said that they had learnt some new ideas from such training and acknowledge the contribution of experienced teachers in grounding them in their profession.

4.4.2 Experienced Teachers' Practice

Teaching methodology in mathematics classes was to that in reading classes only in general ways. Teachers in rural schools used the local language as medium while those in urban and privately owned schools used English because, as they explained, the parents preferred it. CPD mathematics teachers employed largely the same methods employed by their reading counterparts, the most popular ones with mathematics teachers being whole class discussion, guided discovery and demonstration. However, a clear distinction is observable between CPD reading and mathematics teachers' application of method: mathematics lessons were generally much more active than the reading lessons and, on the whole, demonstrative of participatory methods. In this research, mathematics teachers were bound to illustrate concepts with several examples on the chalkboard before inviting individual pupils to work out some examples as the rest of the class approved each step towards the final solution and then sending the class into groups to work out more sums using tangible materials/objects.

Several teachers made use of locally available materials, including drinking straws, stones, bottle tops, fruit, paper, sticks and tins, to teach counting, addition, subtraction, and fractions. In a class on shapes, CPDKYM30 held out a circular piece of paper and asked who could draw a circle. A few boys tried drawing on the chalkboard, after which the teacher gave a similar card to everyone in class and they drew circles in their exercise books by tracing around the edge of the card. CPDKBMO4's lesson on tens was active with pair, then group and then individual work on counting tens and ones using straws. CPDKBM47 had children count with sticks and stones when in groups, then pairs and then individual work, they solved subtraction problems. Teachers also often made reference to day-to-day situations. For instance, CPDKYM45 taught multiplication and used yellow bananas, a common fruit in the area, to illustrate that any number multiplied by zero gives you the value zero. She made children role play empty promises:

Teacher: You, (pupil's name), promise to give (another pupil's name) two yellows tomorrow.
Pupil: I will give you yellows tomorrow.
Teacher: Okay, you must say "two yellows. I will give you two yellows tomorrow".
Pupil: I will give you two yellows tomorrow.
Teacher: And you don't bring the yellows. Class, how many yellows will he have?
Teacher: Okay. But tomorrow you promise again that you will bring two yellows. Promise.
Pupil: I will give you two yellows tomorrow.
Teacher: And still you don't bring the yellows, but still you promise. And you don't bring. Now, class, how many yellows will he have.
Class: None.
Teacher: So, zero multiply by zero is ….
Class: Zero.

In the same way CPDKBM31illustrated the concept of multiplication as repeated addition by having children group bottle tops in fours before bringing all the piles into one and counting how many bottle tops they had altogether. In order to assess pupils' learning of concept Experienced teachers often stop to observe children doing a class exercise in their books. Some first assign the class a few tasks to work out, go round the classroom giving help to individuals as they mark their work, before assigning the children a few more tasks. Their observations in individuals' work help them determine learners' progress. Explaining assessment approaches, some teachers made reference to similar classroom instances besides observations of the children's behavior outside the classroom. CPDKBMO4 explained how he would recognise learners' misconception of something he has taught:

The best way to check is with an in-class or end-of-lesson assessment. Some children will call you as you go around, to say they have a problem. Then you know that child is intelligent. But another one will simply fill in answers without understanding, and get them wrong. Then, asked how he knew that the learners were making progress or were ready for the next step, he responded

> *If they are able to implement what they have been taught. For example if P.1 have understood or … learnt tens and ones, they would pick things on the compound and tie them up in bundles or count ones, then I would be a happy man. I would say 'Now they have learnt.'*

CPD mathematics teachers' practice was not without challenges. One of the greatest challenge was in teaching large classes, and especially having to do continuous assessment in such classes, as cited by CPDKBM03, CPDKBM07 and CPDKYM30 for instance. CPDKBM03, argued that it is not practical to expect a teacher handling a large class to do individual assessment:

> *… individual assessment demands a lot of time and yet it is supposed to be done during the lesson and in a structured mode. That is besides the assessment of the whole class at the end of the sub-theme. This continuous assessment is supposed to be for small numbers – you must record data … target the children for assessment so that you focus on those children and note the data in the cards.*

Teaching large classes was particularly challenging because teachers could not do what they felt was right for the children. CPDKBM04 put it in the following terms.

> *The teacher cannot be effective in a large class. …organization of activity, selection of materials … Theoretically, teachers are encouraged to go and handle this but the real challenges in a large class are specific and threatening. In smaller classes, you reach individuals but in a large class like the one I have just taught, when you think half the class have got the concept, you tend to move on.*

Another challenge was in finding instructional materials, as was pointed out by CPDKBM47, CPDKBM04 and CPDKYM45. As CPDKBMO4 and CPDKYM47 said teachers are not always able to teach some sub-topics, much as they would have wanted to, because of the lack of materials, especially textbooks, and particularly in 'UPE schools'.

Some of the methods recommended in the Thematic Curriculum were a source of challenge too, due the mixed ability character of the classes. CPDKBM07 and CPDKGM08 said that group work is not easy since the children are grouped according to their abilities. She explained that she often found that she had to use a lot of time trying to help the weak group, which limited the time she had for the other groups. Her colleague said that teaching children with disability in the same class with other children is difficult especially in a large class.

4.4.3 Summary

All in all, the CPD mathematics teachers are fairly knowledgeable in the subject content and generally confident and enthusiastic about teaching mathematics in lower primary. They are able to deliver the content of mathematics using truly participatory methods characterised by use of tangible objects selected from a range of locally available resources. Their classroom practice is testimony to the ITE curriculum having influenced them to teach mathematics by experiential approaches. However, even some of the most knowledgeable and articulate teachers still acknowledge challenges because of their limited competences in using some of the recommended methods or in exploiting their immediate environment to teach the content topics. There are some who are quite knowledgeable in pedagogical content knowledge but whose practices do not reflect this knowledge.

The observed gaps in CPDs' competences may be attributed to the lack of a systematic approach to professional training for teachers of mathematics (as well as reading). All informants in the initial survey considered CPD a significant yet neglected aspect of teacher education and training, reporting that much more is being done on a small scale, as either school- or CC-based activity or programmes, than is being done at the national level. One informant at the MoES explained that there has not been real unified activity since 1998-2000. In her view, 12 years ago, there was

… systematic description and planning based on needs identification, and delivery was synchronised across the country. Currently there is only a response to ongoing reforms in the national curriculum, and sometimes to issues arising in DES reports. I think CPD still needs to be streamlined, … institutionalized for both tutors and teachers. (Informant, MoES)

CPD is predominantly the responsibility of DTE through the Teacher Development and Management System (TDMS) structures. They are managed by Coordinating Centre Tutors (CCTs) who are part of the college staff but are deployed to coordinating centres (CCs) where they lead the professional development activities for teachers, headteachers and school management committees, supervised by the DPO. CCTs train the teachers and headteachers in various areas that are often identified through consultation at school level. Workshop topics often include the TC, HIV/AIDS, child-friendly schools, instructional materials, continuous assessment, counseling and guidance, psycho-social care and peace education. The cascade approach is used in CPD programmes, with tutors receiving the training and then going on to train the teacher trainees and practising teachers.

Currently there are 570 CCs in the country but not as many CCTs, which means that not all teachers are reached with CPD programmes. A college may have up to 24-38 CCs spread in three to five districts. Busuubizi PTC for example has 24 CCs covering the three districts of Kiboga, Mubende and Mityana. Nakaseke Core PTC currently has 38, down from a previous 57, spread throughout four districts. CCTs are supported in their work by the freedom for flexibility in approach and by colleagues' and teachers' input. They are expected to use a resource person, such as a fellow CCT or a pre-service tutor who is knowledgeable or experienced. Some look beyond college resources to other opportunities, using teachers as trainers. Asked how he manages to reach the large number of beneficiaries in his CC, the CCT of Naddangira explained that after facilitation at the zonal level, which is general, an activity can also be done at the school level, especially "… as a catch up programme for teachers". A CCT may ensure coverage by identifying teachers who are learning the content fast and use them to support others to choose a specific area for training content, thereby engaging teachers actively and empowering them to train peers.

CC training activities involving teachers' convergence on a centre are funded by the MoES at the average cost of USh 6000 per day per participant, for transportation and feeding. CCTs move on motorcycles and are paid USh 80,000 per month for fuel. School-based CPDs are not funded nationally and the expenses may be only with regard to lunch for the participants.
NGOs and education funding agencies also play a role in CPD, especially by supporting the entry/implementation of innovations or interventions through a selected teacher's college. They often emphasise their role as supporters of the system rather than funding bodies or donors although training allowances are bound to be higher when CPD activities are organised by a non-government body.

There are no reliable reports of CPD programmes specifically targeting the teaching of reading and mathematics. This is in spite of the responses of 42% teachers in the survey who indicated that they had ever attended such CPD programmes. The data in Table 3.9 in section 3.4 suggests that only 13.15% of all teachers in the sample who had attended CPD programmes had participated in mathematics and reading training. This suggests a significant gap in the professional capacity of professional capacity of reading and mathematics teachers.

Chapter 5: Key Issues for Policy and Practice

This chapter brings together statements of the key policy and practice issues raised about the initial teacher preparation and continuous professional development of teachers for teaching reading and mathematics in the lower primary grades. In reflecting on these issues that this research raises, the team has been guided by research questions 7 and 8, specifically:

> Which teaching competencies and skills should be incorporated into the curriculum of primary teacher education programs and which should become the preferred focus of teachers' professional development activities?
>
> How can professional knowledge and skills in teaching reading and mathematics be effectively transferred and shared within and among primary teacher training programs and beginning teachers?

The following sections explore these issues with a focus on the strengths and weaknesses of the teacher training programme and recommended approaches to improvement. The details should aid reflection by teacher education policy makers at the MoES and the practitioners at KYU and the colleges.

5.1 Teacher training: the strengths and weaknesses

Data analysis in Chapter 2 revealed singularity of the ITE programme in Uganda, designed and certified by KYU and monitored by DTE, covering both government owned and private colleges. This character is a strength in as far as singularity also implies uniformity of teacher preparation activities in all the colleges. It is a potentially critical resource in primary teacher education policy dissemination and implementation. A key assumption of the recommendations of this chapter is that the uniformity in ITE programme can be depended on to support change across the entire system.

But the data also revealed wide differences between the ITE mathematics and reading syllabuses, which imply broad discrepancies between the actual capabilities of teachers in teaching reading and mathematics. The ITE mathematics syllabus illustrates strengths for emphasising trainees' understanding of both the mathematical concepts and the appropriate methods of teaching these concepts and discouraging cramming of content. It illustrates the prioritisation of trainees' engagement in practical work not only as a means of learning practice but also as part of the experiential methodology of teaching mathematics. The data therefore indicates the intention of the syllabus to prepare teachers with the complete set of desired competences: knowledge of mathematics content, pedagogical content knowledge of mathematics, practical skills for teaching mathematics and understanding of the reasons behind methodology. On the other hand, the English syllabus places emphasis on improving the trainees' communicative language abilities and dwells a lot on knowledge of language content. It does not reflect specific attention to preparing the teacher to teach reading and, in the little space allocated to teaching reading, dwells on methods from a theoretical approach. The syllabus thus promises teachers who may have some pedagogical content knowledge of reading but lack the desired knowledge, practical skills and understanding.

It is significant that besides specifying the same content as is found in the Thematic Curriculum that is currently used in the primary school, the ITE mathematics syllabus highlights the learning competences to be developed in the pupil. On the other hand, the design and focus of the ITE English syllabus is far removed from the Thematic Curriculum, with the former emphasising the objectives of teaching language as opposed to the mother tongue (medium) and English (non-medium) reading, writing, listening and speaking competences to be developed in the

learner. The alignment of the ITE mathematics syllabus with the Thematic Curriculum promises ease of teaching mathematics in the lower grades while the discrepancy between the ITE English syllabus and the Thematic Curriculum promises difficulty of teaching reading at the same level, that is content gaps as well as paucity of skills. Indeed the analysis in Chapter 3 and Chapter 4 indicates that the gaps in NQTs' and CPDs' knowledge, pedagogical content knowledge and practice are directly linked to the gaps in the curriculum and to the gaps in the teacher educators' knowledge, pedagogical content knowledge and practice.

The above indications point to the need for drastic shifting of the teacher education practices in search of improvement. It is legitimate to consider investment in change at the college level rather than passing a quick judgement on the system as weak because, as the data shows, the colleges constitute a TE system and there can be hope for impacting the practices of this system. Besides, as the data of Chapter 3 and Chapter 4 indicates, this system has great influence on the competences of both the NQTs and Experienced teachers. The teachers draw considerable confidence from their college training and, in spite of any recognised weaknesses in their training, they make reference to it as source of both knowledge and method. The data has already strongly suggested that adequate training at the level of ITE can change things favourably creating a critical mass of able teachers of mathematics and reading. Change in ITE practice is the subject of the next two sub-section.

5.2 Curriculum Review

It seems that a priority area of TE policy change is the curriculum. There is need for KYU and the DTE at MoES to undertake a very careful curriculum review process with the goals of (i) unifying the ITE curriculum with the primary curriculum specifications, and (ii) unifying the general aims of the mathematics and language syllabuses to focus both on the primary learner.

Preferably there should be a unified ITE curriculum with respective components for developing literacy, numeracy and life skills, the aims of which should revolve not around the teacher trainee but around the primary learner in actual Ugandan primary classrooms which are large, resource-poor and multilingual and whom the trainee is being prepared to impact in the long run. These aims should be expressed with regard to change in the primary learner's behaviour in these specific classroom contexts rather than improvement in the trainee's behavior. The review of the curriculum should therefore involve contributions by, among others, technical persons at NCDC, specialists of reading and mathematics and researchers as well as specialists in the methodologies of teaching children. The content specialists and researchers should lead the exercise in locating issues in the international literature of reading and mathematics, working with the experts in children's methodology to guide the classroom application of all the desired content knowledge.

Particularly for improving teacher preparation for teaching reading, the literacy development component – not separate English syllabus - of the ITE curriculum should present a concern for the teaching of reading in lower grades as the foundation for building this crucial learning skill. The specifications for teaching reading should include specification of reading targets such as phonological, phonemic, alphabetical and word level skills, accuracy, fluency and speed. They should reflect illustration of clear linkage between the more discrete needs of beginning readers and the higher text level skills that facilitate comprehension. But to ensure strength in preparation of teachers for teaching both reading and mathematics, the curriculum should be designed to offer the trainee not only the content of the two learning areas but also a lot of practice in real classrooms rather than 'ideal' classrooms in the suggested methods for teaching them so that they are both knowledgeable about the methods and capable of implementing them and can reflect on their effectiveness. This way the trainee should leave the college well equipped with the knowledge of how children learn reading and mathematics, the pedagogical content knowledge of the subjects and the requisite practical skills as well as their justification.

Curriculum review as a practice should be extended to the training activities at the college. Teacher educators and trainees should engage in active review and interpretation of the ITE and primary curriculum as a means of identifying not only the expressed teaching requirements but also the gaps within and between these curricula. Based on the review and interpretation findings the trainers should fill the content and methodology gaps and provide critical feed back to the curriculum designers at NCDC and KYU.

5.3 Preferred Competences for ITE Curriculum

Analysis of the data of teaching reading mathematics in Chapters 3 and 4 is rich with instances of variations in teacher educators', trainees', NQTs' and Experienced teachers' knowledge of how children learn reading and mathematics, their pedagogical content knowledge and practice. While the variations in competences is visible across the groups of participants for mathematics, with notable weaknesses in the knowledge of some NQTs, there seems to be a general mastery of skills for facilitating experiential learning through providing for a lot of examples involving use of tangible objects. The variations are more sharply visible in the case of teaching of reading, with knowledge gaps as well as weak practice exhibited by teacher educators, trainees, NQTs and CPDs. The data bears evidence that NQTs practicing in schools that place direct demands on them for effective teaching of reading do better than others and that Experienced teachers are generally better able to connect lower level to higher level processing skills. The findings contain indications that even when they leave college, teachers are still ready to learn. Much as the practice gaps are partly due to teacher educators' and teachers' failure to interpret and exploit their environment, the combination of these and knowledge gaps implies a lot for ITE training.

ITE training in mathematics should meet requirements for equipping trainees with clear principles of how children learn concepts and when they should be considered ready for exposure to the different concepts. It should engage trainees in more hands on practice in the improvisation of learning materials including the collection of commonplace objects in the school and home environment.

For teaching reading ITE training should include exposure to the content of reading across the lower level and higher level skills. It should highlight different foci and provide thorough knowledge and skills of teaching sound level processing, alphabetical awareness, and word level abilities. Trainees should learn how to teach speed, fluency and accuracy as crucial reading competences for comprehension. Training should also demonstrate for the trainees the justification for teaching comprehension in the lower grades including multiple comprehension strategies and production and use of reading materials in local languages. It is important that as demonstration of the acquisition of reading competences as specialised ability initial training differentiates between the value of general teaching methodology and the methods of teaching reading to children.

5.4 Preferred Competences for CPD Curriculum

The value of short, focused CPD programs in reading and maths is undisputed by the respondents of this study. They would be most beneficial if their design and management included:

a. a coherent set of modules focused on very specific skills in early reading and maths for NQTs that could serve as a follow up to the training given in pre-service
b. being aligned with the ITE training and with the primary curriculum for lower primary reading and maths
c. active participation by teachers rather than simply receiving information

School-based CPD in Uganda organised by the teachers themselves and the CCT system that address specific issues in the teaching of early reading and maths identified by teachers has the greatest potential to reach a large number of teachers.

Specific skills in reading might consist of:

- production, management, use and storage of reading materials in local languages, enough for each child to have direct sightline to text on a daily basis
- greater practice in the teacher reading aloud to pupils in parallel with wider use of different comprehension strategies
- -diagnosing children's attainment in reading and consideration of specific strategies to support them

Specific skills in maths might consist of:

- considering ways in which maths within the thematic curriculum can be further exploited in all topics
- production, management, use and storage of appropriate teaching and learning aids in maths for in sufficient quantity for large numbers of pupils in a class

- focusing over time on addressing weaknesses in teachers' conceptual understanding eg of fractions and geometry but with an emphasis on pedagogical content knowledge rather than just mathematic content knowledge.

5.5 National Reading Policy

Data on ITE in Uganda reveals some indecision, or at least laxity, over how colleges should train teachers to teach reading. The responsibility of preparing teachers in this respect seems to lie between the ECD and Language departments while the specific responsibility of training teachers to teach reading in the local language is vaguely perceived and often shelved. The reason for this gap may be the lack of commitment to any specific requirements for teaching reading in schools. Clear statements of what should be taught in schools and how it should be taught would facilitate a global statement on teacher training, thus a national reading policy. It will therefore be very difficult to implement any recommended practices for training teachers in the teaching of reading and mathematics, however desirable they may be, unless there is a national reading policy clarifying a guiding philosophy of reading and its dictations for what should be taught in lower primary school in Uganda.

With a national reading policy there will be specifications for the teaching content and methodology as well as assessment practices at primary school which will be matched by the requisite teacher training content and methodology. It will indicate the contributions of the relevant departments at the college and allocate responsibility to a specific one on the basis of the reading philosophy. This would make for improved approaches to teacher preparation and CPD.

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Appendix 1: Objectives of the 1995 English Syllabus

By the end of the course, students are expected to

1. express themselves in simple, correct oral and written English and likewise be able to teach the same to their pupils in primary schools.
2. practice the appropriate methods and techniques of teaching English Language with Literature effectively.
3. acquire the necessary effective reading and writing skills which they can utilise for their personal study and also later pass on to their pupils.
4. practice functional and creative writing skills supported by wide and selective reading.
5. Identify the basic characteristic needs and underlying psychology of individual pupils so that these pupils can be helped accordingly.
6. get acquainted with the various approaches, methods and techniques of teaching the four basic language skills (listening, speaking, reading and writing) at lower, middle and upper primary levels.
7. practice the techniques of organisation and improvisation at lower, middle and upper primary levels.
8. Handle and guide learners to study Literature books in primary schools.
9. Select and use appropriate improvisation techniques for teaching various language aspects in the primary school.
10. outline the details of the content of the language teaching materials at each of the three levels of the primary school system (i.e. lower, middle and upper levels)
11. design and use appropriate teaching language games at various levels of the primary school. (p.1)

Appendix 2: Expressed objectives of the 1995 Mathematics Syllabus

	Expressed course objective	**Emphasis**
	It is expected that if the content of this syllabus is carefully taught, the student will be able to:	Pedagogical Content Knowledge
1	Acquaint himself/herself with the use of locally available materials as a means of enhancing the mathematics learning through their use as mathematics teaching aids.	Practice
2	Use mathematical experiences as a basis of making a mathematical generalisation that can lead into deducing a mathematical formula – an art that should be passed on to the primary school pupils.	Practice
3	Use geometrical instruments to draw geometrical shapes in two and three dimensions and investigate their properties using the geometrical instruments. This should lead to developing the skill of accurate drawing and measuring	Practice
4	Gather information from everyday experiences in the form of data. Use the data to carry out statistical calculations and interpret the results by basing the interpretations on everyday experiences.	Practice
5	Design games (i.e. tossing a coin, die etc.) that can be used in the teaching and interpreting of experimental probability.	Practice
6	Relate experimental probability to theoretical probability. Use the theory encountered in both experimental and theoretical probability to solve everyday problems.	Practice
7	Draw and interpret graphs that are based on his/her experiences and use the graphs to make mathematical deductions.	Practice
8	Enhance and enrich his/her mathematical deductions	Knowledge
9	Apply and also guide primary school pupils to apply mathematics to solve problems in everyday life.	Practice