RESPONSE TO THE DRAFT NATIONAL PLAN TO IMPROVE LITERACY AND NUMERACY IN SCHOOLS

*Department of Language, Literacy, and Mathematics Education*

*An Roinn Teanga, Litearthachta, agus Matoideachais*
PREFACE / RÉAMHRÁ

The Department of Language, Literacy, and Mathematics Education, Mary Immaculate College, University of Limerick, which has as its primary responsibility the preparation and education of student teachers in language (English and Gaeilge) and Mathematics Education welcomes the report and the public debate on Better Literacy and Numeracy for Children and Young People: A National Draft Plan to Improve Literacy and Numeracy in School.

There is universal agreement on the critical importance of literacy and numeracy skills for our children. As teacher educators we have a key role to play in the preparation of teachers to undertake the challenge of successful promotion of children’s literacy and numeracy skills. However, it is important to note that Initial Teacher Education is but one important component of this process, along with Induction and Continuing Professional Development. The significance of the quality of teaching and learning in literacy and numeracy in our schools at primary and post primary level cannot be overstated.

The Department of Language, Literacy, and Mathematics Education comprises thirteen full-time staff members plus a number of part-time staff. The department members have many years teaching experience and hold qualifications at the highest academic level, along with a very high profile (national and international) as researchers in the fields of language (English and Gaeilge) and Mathematics Education.

The invitation from the Minister for Education to respond to this Draft Plan is timely in light of the findings published recently by the OECD indicating a significant drop in standards of literacy and numeracy in the Irish school system and with the imminent introduction of a four-year B.Ed. degree programme in the Colleges of Education.

Our Department engaged willingly and enthusiastically with the report. However, it was felt that the inclusion of the Colleges of Education in the drafting of such an important document would have enhanced the report significantly. Also, an indication in the Draft Plan of the criteria used to evaluate the lessons observed in English and Mathematics would have enlightened significantly the debate on the report.

The success of any approach to improve the standards of literacy and numeracy will depend on a coherent and integrated plan developed and agreed by all the key stakeholders, teachers, those involved in pre-service teacher education, induction and continuing professional development, with CPD being a mandatory and integral part of the school year for each teacher.
The ultimate success of any plan is its implementation and the provision of adequate resources. *Ní mór na hacmhainní cuí a chur ar fáil chun an bhó seo a chur thar abhainn mar ní chothaíonn na briathra na bráithre.*

As Head of Department I wish to thank and commend my colleagues for this comprehensive and insightful response to the *Draft National Plan to Improve Literacy and Numeracy in Schools.*

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Seán de Brún

Head of Department / Ceann Roinne

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An Roinn Teanga, Litearthachta, agus Matoideachais

February / Feabhra 2011
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English Language

Dr. Áine Cregan, Teresa McElhinney, Dr. John Doyle, Dr. Martin Gleeson
1 INTRODUCTION

As teacher educators with responsibility for the teaching of the pedagogy of English, we welcome the invitation extended by Mary Coughlan, TD, to respond to the recent publication *Better Literacy and Numeracy for Children and Young People: A Draft National Plan to Improve Literacy and Numeracy in Schools*. We view this opportunity to contribute to the shaping of policy in literacy education very much as part of an *on-going* dialogic process through which ideas are shaped and transformed. Such reflection and debate is timely, given the startling and unsettling findings recently published by the OECD, indicating a sharp drop in standards of literacy and numeracy in the Irish School system.

It is very much to be welcomed that this is a *Draft* Plan, and that a response is encouraged, so that as many voices as possible participate in the process to ensure that the best possible action to support the effective development of literacy and numeracy is taken into the future. It is essential, however, that this debate is a rigorous one which is informed by current and relevant research, best practice and subject expertise. We believe that the starting point for this debate must be an appreciation of the complexity of factors affecting the language and literacy development of our learners.

*Specifically we welcome:*
This response focuses on those aspects of the Draft Plan targeted at improving literacy levels. It is organised around the twin pillars of **Vision** for improved literacy and **Implementation** factors to deliver improved literacy as presented in the Draft Plan. It articulates a vision for the development of improved literacy which considers such factors as:

- The opportunity for debate regarding literacy issues and curricular reform
- Reconfiguration of ITE programmes in Literacy and Numeracy with increased opportunity for students to become familiar with research based best practice
- The recommendation to devise specific learning outcomes at five points of children’s literacy development in primary school
- The reaffirmation of the central leadership role to be played by the principal in curricular areas and in guiding his/her staff through the change process
- The encouragement for schools to engage in the process of self-reflection in the identification of their own priorities for Continued Professional Development
- The commitment of robust support to be provided to NQTs through the national teacher induction programme
- Increased opportunities for teachers to understand children’s literacy development and research based best practice through expanded CPD provision
In tandem with the vision for improved literacy, this response considers also how such a vision might be implemented, with particular reference to the importance of teacher knowledge, and the professional development of teachers through Initial Teacher Education and Continuing Professional Development.

2 VISION FOR IMPROVED LITERACY

2.1 Definition of Literacy
The broader inclusive definition of literacy in the Draft Plan is very much to be welcomed, but the socio-cultural context of literacy development needs to be acknowledged in a meaningful definition of literacy, as evident in the NESF report – “A social-cultural view of literacy (Hall, 2003, p.55) argues that learning to read and write cannot be removed from the context in which it happens and understanding this is as important as the technical skills” (NESF, 2009, p.16). Cook-Gumperz (2006) argues for embedding the development of literacy firmly within a socio-cultural context. She contends that ‘as socially constructed, literacy is best regarded as part of an ideology of language, a socio-cultural phenomenon where literacy and orality coexist within a broader communicative framework not as opposites, but as different ways of achieving the same communicative ends’ (ibid., p.3). Given the critical impact of variation in patterns of language use among children on the development of literacy skills and on success in the school context, (e.g. Eivers et al., 2004; Pellegrini, 2002; Pellegrini and Galda, 1998; Dickinson and Moreton, 1991; Dickinson and Sprague, 2002; Olson, 1977; Snow, 1983), it is imperative that the socio-cultural perspective is included in a broad-ranging definition of literacy to underpin a national plan for the improvement of literacy skills among children.

In addition, it is critical that an agreed, fully comprehensive and accurate definition of literacy is clearly represented through the consistent use of unambiguous terminology throughout the Draft Plan. Why, for example is the term ‘language skills’ used separately in the heading on page 25 as being given priority if, as stated in the definition of literacy in the introduction, spoken language is included as part of the development of literacy, and conversely, on page 29, why are key literacy skills referred to as phonemic awareness, phonics, sight vocabulary, spelling and the development of fluency and comprehension, with no reference to oral language development?

2.2 Rationale

The brief rationale for the Draft National Plan to Improve Literacy and Numeracy in Schools indicates that:

- **Reading scores** have not improved in over thirty years as measured on National Assessments of English Reading
- **Poor achievement** in literacy among children in disadvantaged schools has been a concern for some time
- Some recent evidence from inspections in primary schools has revealed that a significant proportion of lessons in English are not satisfactory
Given the range of sources available in a national context throughout the past ten years, it is surprising that the rationale does not include insights derived from National Reading Assessments, reviews of the implementation of the 1999 English Language Curriculum, reports regarding Standards of Literacy and Numeracy in Disadvantaged Schools and insights gained from analysis of Whole School Evaluations.

Such analysis could have included commentary on the recommendations of the 2004 National Assessment of English Reading (ERC, 2005) which indicated that average performance in reading among pupils in fifth class had not shown significant improvement since 1980. It is worth noting that this report indicated that “no single initiative, activity or change is likely to lead to a substantial increase in reading standards” and went on to make several recommendations regarding differentiated reading instruction, supporting children’s reading comprehension skills, developing effective home-school reading links in the promotion of children’s literacy skills, recognising the need for effective whole school approaches to literacy instruction and the increased levels of support required for children in DEIS schools.

Surprisingly, the rationale contains no discussion of these major recommendations or the initiatives to improve literacy standards in schools arising from them.

Furthermore, it would have been desirable and worthwhile to analyse the policies of effective literacy instruction in high performing countries cited in the Draft Plan such as Finland, Canada, Australia and New Zealand and outline the possibilities for emulating this practice in an Irish context.

2.3 1999 English Language Curriculum

Reviews of the implementation of the 1999 English Language Curriculum by the NCCA and the Inspectorate identified concerns regarding the difficulties encountered with planning using the curriculum strands, the co-ordination of whole school and classroom planning, whole school policy on assessment, differentiation, oral language development, effective collaboration with parents and effective instructional practices to support children’s writing development.

There is one inescapable conclusion to be drawn here, namely, that there have been concerns about the structure and content the 1999 English Language Curriculum for some time.

Furthermore, the rationale contains no analysis of contemporary research regarding international best practice in effective literacy instruction. Fortunately, this research is voluminous, of high quality and for the most part unequivocal on the key instructional
components necessary to support the literacy development of all children. Such knowledge has been identified from renowned reviews of the scientific research literature of the past twenty years including,

- *Thinking and Learning about Print* (Adams: 1990)
- *Preventing Reading Difficulties in Young Children* (Snow, Burns & Griffin, Eds. 1998)
- *National Reading Panel (2000)*
- *What Research Has to Say About Reading Instruction* (Farstrup & Samuels, Eds. 2002)
- *Teaching Reading* (Australian Government, 2005)
- *Reading Instruction That Works* (Pressley, 2006)
- *Best Practices in Literacy Instruction* (Gambrell, Mandel-Morrow, Pressley)
- *The Handbook of Reading Research Volume Four* (Kamil, Pearson, Moje & Afflerbach, 2010)

The insights gained from these reviews and the contributions of researchers of international repute on key instructional elements such as *word identification*, (Ehri, Blachmann, Stanovich, Shaywitz, Stahl), *vocabulary*, (Baumann, Beck, Mc. Keown, Kucan, Graves) *fluency*, (Rasinski, Kuhn,) *comprehension* (Pressley, Duke, Pearson, Afflerbach, Collins-Block, Keene, Harvey, Raphael), and *assessment*, (Walpole, McKenna, Rathvon) have contributed significantly to the development of a plan for the enhancement of children’s literacy development.
2.4 Balanced Literacy Instruction

A confluence of opinion among international literacy researchers has led to the promotion of balanced literacy instruction as the means through which literacy should be explicitly developed in schools. This balanced approach envisages literacy instruction by knowledgeable teachers, who have the ability and confidence to select the most appropriate instructional approach to facilitate the literacy development of each individual child. One useful definition and example of this integrated balanced approach is offered by Cowen (2003):

\begin{quote}
A balanced reading approach is research-based, assessment-based, comprehensive, integrated and dynamic, in that it empowers teachers and specialists to respond to the individual assessed literacy needs of children as they relate to their appropriate instructional and developmental levels of decoding, vocabulary, reading comprehension, motivation and socio-cultural acquisition with the purpose of learning to read for meaning, understanding and joy.
\end{quote}

(Cowen, 2003:10)

Unfortunately, the 1999 English Language Curriculum does not reflect this balanced integrated approach to effective literacy instruction which has been so prevalent in literacy research in the past decade. Perhaps this is understandable given that the present curriculum has been in use for the past eleven years. However, it is surprising that the Draft Plan does not prioritise the update of the present curriculum to reflect current international best practice as an immediate priority in the improvement of literacy standards in this country.

Specifically, the curriculum needs to reflect the following elements of balanced literacy instruction:
Current scientific research on effective early literacy instruction is unequivocal on the importance of an integrated programme of phonological / phonemic awareness training, shared / emergent writing, explicit phonics instruction, sight vocabulary, shared reading and guided reading of levelled text on children’s word identification development. While the present curriculum promotes the development of sight vocabulary, shared and guided reading and writing, it offers insufficient guidance on the importance of phonemic awareness training and its impact on children’s reading and spelling development. There is no reference to the importance of explicit systematic phonics instruction as a key element of effective word identification instruction. This is surprising given the recommendations regarding systematic phonics instruction in every major report on reading instruction from *The First Grade Studies* (Bond & Dykstra, 1967) to the National Early Literacy Panel (2008).

There are no examples of the stages associated with children’s emergent writing development or the impact of phonemic awareness training and shared writing on the development of same. However the greatest lacuna is the failure to transmit the vital complementary nature of reading and writing instruction in support of children’s early literacy development.

Similarly, while opportunities to promote children’s oral reading fluency have long been considered essential elements of effective early literacy instructional programmes, they are noteworthy by their absence from the 1999 English Language Curriculum. In this respect the curriculum would benefit from the inclusion of a range of appropriate strategies to promote children’s oral reading fluency development, including, Choral Reading, Echo Reading, Repeated Reading, Paired Reading, Readers’ Theatre, to name but a salient few.
However, the need to update the curriculum is particularly compelling in the case of effective comprehension instruction, as the improvement of children’s comprehension has consistently been highlighted in recommendations made in reports of reading standards, and implementations of the 1999 English Language Curriculum throughout the past decade. Unfortunately this continues to be the case as the first recommendation arising from the 2009 National Assessments of Mathematics and English Reading suggests

“The promotion of self-regulated comprehension strategies at all class levels across a range of paper and digital texts”

*(DES, 2010:89)*.

The 1999 English Language Curriculum envisions the ‘development of higher comprehension skills from the middle classes on’ (Ireland, Department of Education and Science, 1999:61). In fact prediction is the only comprehension strategy that is advocated between junior infants and second class. It is only in third class that comprehension strategies such as evaluation, analysis, assimilation and summarisation are to be introduced. Proficiency in word identification skills is prioritised in the early years, with comprehension being developed when the child can read with accuracy and fluency. However, current research suggests that comprehension strategy instruction is also an essential component of effective early literacy instruction. (Collins-Block, Rodgers & Johnson, 2004; Gleeson, Courtney et.al. 2010).

Of the ten comprehension ‘skills’ addressed, only five correspond with those validated by international research – summarisation, inference, prediction, synthesis and evaluation. Despite the international debate on the importance of distinguishing between ‘skills’ and ‘strategies’ (Duffy & Roehler, 1987; Afflerbach et al., 2008), there is much imprecision in the language used in the Revised Curriculum. While the curriculum espouses much of the language associated with comprehension, it would benefit from appropriate examples of effective comprehension instruction based on current research.

A robust body of research (National Reading Panel, 2000; Duke and Pearson, 2002; Block and Duffy, 2008; Raphael et al., 2009) demonstrates that explicitly teaching children strategies for understanding what they are reading, improves comprehension in a range of text genres. Reading strategies are the reader’s deliberate goal-directed attempts to control and modify their efforts to decode text, understand words and construct knowledge (Afflerbach, Pearson and Paris, 2008:69). Comprehension Strategy Instruction (CSI) enables children to become purposeful, active readers who are in control of their own reading comprehension. It is accepted in reading research (Block & Paris, 2008; Gill, 2008) that the following strategies form the core of an instructional framework in CSI:
Research suggests that the strategies are most effectively taught through the application of a *Gradual Release of Responsibility Model of Instruction* (Pearson & Gallagher), with the emphasis on teacher modeling and direct instruction of individual strategies in the earlier stages, progressing to a scaffolded approach with children working in mixed ability collaborative groups and ultimately enabling children to become self-regulated strategic readers.

While there is frequent reference to the promotion of *higher order thinking skills* throughout the Draft Plan, the cognitive strategies that enable children to develop such skills namely, *prediction, visualisation, questioning, making connections, clarifying, making inferences, determining importance and synthesising* are developed across all curricular areas and are not solely the preserve of the English Language component of the Primary School Curriculum.

### 2.5 Oral Language and Literacy Development

Substantial research has addressed the relationship between facility with oral language, and the acquisition and development of literacy skills in what has been referred to as ‘mounting evidence of the key role of oral language in supporting reading’ (Dickinson et al., 2003, p.466). It is important to note the abundance of research which highlights that while code-related skills such as phonological awareness are particularly important in the initial phases of learning to read, a broad range of oral language skills (such as knowledge of vocabulary, syntax, discourse skills, oral comprehension, productive narrative skills) become increasingly important as children move past the code-breaking phase into aspects of literacy such as fluency and comprehension (e.g. Bowyer-Crane et al., 2008; Catts and Kamhi, 1999; Dickenson et al., 2003,
Locke et al., 2002; Muter et al., 2004). These findings underpin the importance of oral language for the development of literacy skills at all levels, not exclusively in early childhood education. Reference to oral language development in the Draft Plan is most particularly aligned with this early developmental stage (see for example, section 1.5, p.12), implying that, contrary to research evidence, it is only at the early childhood phase that oral language development is really important.

It is critically important that oral language development is promoted throughout the education process, given its significance in the development of literacy skills.

Building on international movements in curriculum development which highlighted the significance of oral language as a foundation for success in school, the promotion of oral language in Irish primary schools is very much in evidence in recent curriculum documents (1971; 1999). Notably, in the Revised Primary Curriculum (English) (1999) there is an increased emphasis placed on oral language development such that language learning is characterised as an integrated process involving the development of oral language, reading and writing, in which oral language is given a key role throughout the curriculum, recognised as having a central place in the process of language development and given an equal weighting in the integrated language learning process. In fact, oral language is identified as being ‘the single most important element in realising the integrated language learning experience’ (p.26). Critically, however, reports have consistently shown that oral language development remains problematic in its implementation in classrooms, both internationally (e.g. Alexander, 2003; Corden, 2007; Wasik et al., 2006) and in the Irish context (e.g. DES, 2005; DES, 2010).

Giving priority to language skills, literacy and numeracy as emphasised in the Draft Plan (p.25) is therefore very much to be welcomed. Noteworthy in this regard is the response in the Draft Plan to findings of evaluations of the implementation of the English Curriculum (e.g. DES, 2005; LANS, 2005; NCCA, 2005; Cregan, 2010) that there is a need to get the content of the curriculum right (p.25), in particular in the form of less obscure, more precise learning outcomes (p.25; 44) to support effective implementation in the classroom.

Commitment to improving both the content of the English curriculum and its accessibility for teachers is key to promoting better literacy development in Irish primary classrooms.

The proposal, however, that teachers should be required “to emphasise the development of literacy and numeracy above all other aspects of the curriculum” (p.25) and “to use all discretionary curriculum time for the teaching of literacy and numeracy” (p.30), with the concomitant effect of reducing time available for a range of other curricular areas seems counterintuitive at the least, especially given the research evidence to support the development
of literacy skills across a range of curricular areas. The raison d’être for this proposal appears to be based on an argument that a consequence of introducing new subjects to the primary curriculum ‘may have been a reduction of the amount of time devoted to the core areas of literacy and numeracy” (p.28). However, no evidence for this conclusion is presented. The proposal appears contradictory in light of the much repeated aspiration in the Draft Plan that the teaching of literacy would be “integrated across all aspects of the curriculum” (pps.13; 17; 25). It is suggested that “there is little evidence of a focus on literacy development outside of the teaching of English” (p.28). This would seem to point a way forward – rather than reducing the number of subjects on the curriculum, surely increasing the focus on literacy development across these subjects would achieve the desired outcome.

2.6 Writing and Literacy Development

Research into the reading and writing behaviours of young children challenges the traditional idea that children’s language development occurs in an organised sequence, i.e. oral language, followed by reading, then followed by writing (Lerner and Kline, 2006, p.430; Heller, 1999, p.399). Lerner (2000, p.442) describes writing as ‘the most sophisticated and complex achievement of the language system’, through which we integrate ‘previous learnings and experiences in listening, speaking and reading’. Current thinking, in identifying the many connections between written language and oral language and reading, emphasises the integrated nature of language development, which begins long before children enter school and which should be reflected in schools’ language curricula (Evers, Lang and Smith, 2009, p.461; Lerner and Kline, 2006, p.431; Government of Ireland, 1999, p.2; Heller, 1999, p.20).

The English Language segment of the Irish primary curriculum, which was revised in 1999, envisages language learning as an integrated process in which the three forms - oral language, reading, and writing - are inseparable (Government of Ireland, 1999a, p.45). In relation to writing - sometimes seen as the silent ‘R’ (NWP and Nagin, 2003, p.2) or ‘the ignored stepchild of reading’ (Bradley, 2001, p.118) - the curriculum emphasises that together with oral language and reading, writing has an equal contribution to make to the child’s language development. The Draft Plan, however, does not seem to acknowledge in as unambiguous a manner the ‘equal contribution’ that both reading and writing make ‘to the child’s language development’. In some instances (e.g. p.11) the document uses the term ‘literacy’ in reference to reading and writing, but generally the document discusses literacy in the context of reading, and almost exclusively in terms of those elements of reading which can be evaluated and assessed easily. Adopting, and in turn transmitting to children, a similarly narrow view of writing results in children, ‘who struggle to write...(construing) writing as perfect spelling and grammar and/or neat penmanship’ (Bradley, 2001, p.118), elements which are easily identifiable and can be corrected. While good spelling, grammar and penmanship are essential skills for a writer, nevertheless, to attain competence in writing, writers must also be proficient in such areas as
generating ideas, planning, organising, drafting, editing and redrafting writing. Attaining such competence is ‘hard work’, according to Resnick and Hampton (2009, p.17) who write that:

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Students...must understand that getting ideas down on paper is only a first step. They must be willing to rethink how these ideas are organised and expressed and to examine a draft in light of how well it communicates. They must make needed changes willingly...They must assume responsibility for various rounds of changes until, finally, the document communicates and is as good as they can make it...
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Similarly, in discouraging a limited view of writing, Lerner and Kline (2006, p.443), draw attention to the many related abilities that writing requires, such as, facility in spoken language, the ability to read, and cognitive strategies for problem solving.

In order to become competent writers and to engage in the type of writing required by society, students need to build a foundation beginning in the primary school. In laying this foundation, teachers adopt effective approaches. In the English Language Curriculum, and by extension in the Draft Plan, Process Writing is the approach which is advocated. This is an acknowledged effective approach to the teaching of writing. However, it is only one approach. There are others, such as

- **Genre Writing**
- **On-Demand Writing**
- **Strategic Writing**
- **Writing Across the Curriculum**

to name but a few. A curriculum which advocates the use of such varied approaches will recognise that the knowledge and skills required to understand and produce particular writing genres, as well as those required to teach them, are best acquired by engaging in such activities as writing for some authentic purpose or writing in a real genre for a real audience (Hampton and Resnick, 2009, p.56; Duke et al, 2006, p.345; Eskey in Ferris, 2003, p.55). Thus, children are encouraged to draw on their experiences, both in and out of school, in relation to areas such as hobbies, friends, parties, trips, television programmes and children's literature (Lerner and Kline, 2006, p.465), and to write for readers ‘who will read the written text for its communicative purpose and not solely for evaluation’ (Duke et al, 2006, p.352).

### 2.7 Early Primary Years Perspective

In their joint position statement of 1998 on early literacy development, the International Reading Association (IRA) and the National Association for the Education of Young Children (NAEYC) state that the early childhood years are the most important for literacy development. Thus sections 4.2 and 4.3 of the Draft Plan deserve particular attention as they focus on early
childhood education and the proposed actions to improve literacy and numeracy in the early years.

One of the key developments in early childhood education has been the focus on developmentally appropriate practices (DAP). The NAEYC articulates this philosophy in their 1996 position paper by defining the developmentally appropriate curriculum as one which, amongst other criteria, provides for all areas of a child’s development, includes a broad range of socially relevant, intellectually engaging and personally meaningful content across disciplines and whose plans frequently integrate across subject areas to encourage children to make meaningful connections and provide opportunities for rich conceptual development (Bredekamp & Copple, 1997).

Developmentally appropriate infant classrooms are joyful places where effective teachers prioritize the nurturing of a love of books, story, reading and language while at the same time systematically and explicitly teaching the critical aspects of emergent and early literacy development. A similar emphasis would be welcomed in this Draft Plan; it is regrettable that a national plan for better literacy makes no reference to any of the following:

- story
- storybook
- pleasure of reading
- motivation

Perhaps the promised ‘relentless focus on literacy’ has forsaken the joy of reading in favour of a more narrowly focussed programme that produces measurable results through standardised assessment. We owe our children more.

As the Draft Plan refers frequently to Aistear, the 2009 curriculum framework for children from birth to six years in Ireland, the role of Aistear in ‘getting the curriculum right’ merits some scrutiny. It is important to note that we welcome this significant NCCA publication as it brings to a wider audience much of our philosophy of early years teaching (on the Bachelor of Education and Graduate Diploma in Education: Primary Teaching programmes), e.g. an emphasis on play, play-based approaches, active learning, holistic and integrated learning, and social interaction. Here, our purpose is to examine its proposed role in the Draft Plan to improve literacy.

To begin with, the references to this proposed role are not always consistent. It is stated initially that the intention is that ‘over time’ Aistear ‘replaces the present infant curriculum’ (p.16). Subsequent references, however, are made to the need for the Primary School Curriculum (PSC) to be ‘amended to reflect the approach that should be used from three to six years’ (p.26), ‘restructured’ so that it builds seamlessly on the approaches to teaching and learning advocated in the Aistear framework’ (p.27) and ‘review[ed] to bring it into line with the
approaches to teaching and learning advocated in the Aistear framework’ (p.27). The uncertainty of approach is further accentuated by the later proposed action to ‘review the contents of the L1 curriculum to make clear the learning outcomes to be expected in each of the strands; this review to build upon the alignment of the infant curriculum with the Aistear curricular framework’ (p.29). This would appear to imply that some alignment of the ‘infant curriculum’ with Aistear is to precede a review of the L1 curriculum contents. Yet there is no explicit stand-alone ‘infant curriculum’ to date. The PSC is presented in seven curricular areas and the content of each is presented in levels corresponding to four two-year cycles, the first of these being junior and senior infants. A much clearer statement, therefore, is needed of how Aistear is to impact on the curriculum (i.e. as a replacement or as a complementary framework) and of its place in the sequence of curricular reform.

What is clear, however, is that Aistear is considered to have a key role to play in the curricular reform advocated by this Draft Plan. Thus it is essential to examine Aistear’s approach to the teaching of literacy in the early years. Aistear uses four themes to outline children’s learning and development, aligning two of these themes, Communicating and Exploring and Thinking, most closely with the subject area of English in the separate NCCA audit of Aistear and the PSC (NCCA, 2009). While the aims, learning goals and ‘sample learning opportunities’ for ‘young children’ (defined as aged 2½ to 6 so not directly comparable with the age of the infant class cohort) given in the framework are valid ones, it is important to note that they are general in nature and that key literacy skills identified in this Draft Plan - ‘phonemic awareness, phonics, sight vocabulary ... and the development of fluency and comprehension’ – are not specifically referred to in Aistear. Indeed, the audit makes clear that Aistear does not prioritise early literacy and numeracy, unlike the PSC which states:

‘Within the context of a broad and relevant curriculum and a commitment to the highest quality of educational provision for all, the particular goals associated with literacy and numeracy are a priority of the curriculum. The acquisition of literacy and numeracy skills is central to effective learning in every area of the curriculum and to the child’s social and community life outside school.’

(Introduction, 1999, p. 26)

In their Report for the Joint Committee on Education and Skills (October, 2010), the NCCA state that ‘one of the key differences between Aistear and the ‘Infant Curriculum’ is that

‘...Aistear highlights the importance of and provides examples of how to help young children become confident and competent speakers, listeners, emergent writers and readers, as well as skilled thinkers. The Primary School Curriculum prioritises literacy and numeracy but as curriculum reviews and more recent research have shown, gives limited practical examples to teachers of how to support children’s language and literacy development.’
In fact, while there is much to be welcomed in *Aistear*, it is important to note that it does not adequately address the above identified PSC shortcomings as it makes little explicit reference to the key literacy skills and how they are to be developed and assessed in the infant classes.

For example, play is correctly identified in *Aistear* as ‘one of the foundations for literacy and numeracy’; the *Aistear* information leaflet for primary teachers offers a Q&A example of how the framework ‘gives an insight to the types of practical information and ideas which the new curriculum framework offers primary school teachers in planning for and using play to support young children’s learning’. In this example, a teacher of 28 junior infants who wishes to prioritise play as a medium of learning asks how, given the pupil to teacher ratio and the lack of space and equipment, she can incorporate play in her classroom. Part of the proffered solution is as follows: ‘Could you do with a few less tables or could you rearrange them into a smaller space? Instead of having presses and bookshelves flat against the wall, could you turn them into dividers to create small, child-sized spaces for floor play? ... Resources for play can be expensive ... there are alternatives: Shoe-boxes make great building blocks.’ The Draft Plan in stating that the focus in *Aistear* on play and ‘on communicating, (and) on exploring and thinking ... will be new to many teachers working with infant classes’ fails to acknowledge the existing expertise and professionalism of our primary teachers who plan daily learning opportunities for the development of communicating, exploring and thinking skills in their classroom. If the Draft Plan offers *Aistear*’s ideas as radical solutions to the literacy problem, it should at least be aware that many of its strategies (e.g. using ‘pretend play...to develop children’s literacy and numeracy skills’ and using ‘storytelling to promote higher-order thinking skills’) have been employed for many years in many infant classrooms. We should question the value of presenting the obvious and familiar as innovative practices to a well-educated professional teaching body that may see these suggestions as at best amusing and at worst patronising. What teachers need is a curriculum that specifies content, methodologies, learning outcomes and assessment procedures that reflect the elements of balanced literacy instruction outlined earlier in this response.

The proposed action to ‘*Restructure the infant curriculum so that it builds seamlessly on the approaches to teaching and learning advocated in the Aistear framework*’ includes as one of its five points the following: ‘*Provide for a print saturated environment within the infant classroom.*’ Noteworthy here is the terminology, ‘print saturated’ replacing the accepted ‘print-rich’. The importance of a print-rich environment is well highlighted in the PSC, getting frequent mention and indeed a dedicated section in the *English Language: Teacher Guidelines* chapter on *Approaches and Methodologies*. How then does this merit being part of the action of *restructuring* the infant curriculum? Is this a case of the Emperor’s new clothes?

The Draft Plan acknowledges the data that points to beneficial effects of low adult-child ratios in early years education and comments that Finland ‘sets the benchmark for literacy performance’; the recommended adult-child ratio for 3-6 year olds in a school setting in Finland is 1:13. One would expect, then, that the lowering of the adult-child ratio in infant classes...
2.8 Educational Disadvantage

Studies exploring the relationship between marginalisation and educational achievement have found that ‘children from marginalised populations the world over consistently underperform academically as compared to their peers from communities of power and status’ (Purcell-Gates, 2008, p.12; Rescorla & Alley, 2001; Juel et al., 1986; Lonigan & Whitehurst, 1998; Whitehurst,
Recognising this, the Draft Plan rightly points to the need to target “available additional resources on learners at risk of failure to achieve adequate levels of literacy and numeracy” (p.33). It is critically important that these available additional resources are deployed strategically for maximum benefit in these straitened times. In light of this, it is disappointing that the first full report of the evaluation of the DEIS initiative is not yet available to inform decisions taken on resourcing to maximise the development of these children’s potential in literacy development, particularly since early indications are that ‘schools are not universally successful’ (p.34).

It is problematic also that the Draft Plan only commits to continue to support the learning of children in DEIS urban schools (p.34), with no reference to those DEIS schools in rural contexts. The anticipation that the required professional development support for teachers in these contexts can be delivered by a mere twenty literacy development advisors (p.35) is worrying. The emphasis on improved target setting (p.35) in these schools is very much to be welcomed, although how it is envisaged that “supports for this can be strengthened to enhance best practice in planning and target setting” (p.35) with a reduced team of advisors is unclear. In the context of disadvantage it is of concern that oral language development again appears to be targeted only at the pre-school level and only in those pre-schools that act as feeders for DEIS Urban Band 1 schools (p.35). This reductionist approach to the development of oral language skills where they are most needed is gravely concerning in light of earlier evidence of the critical connection between successful literacy development and facility with oral language, and the particular importance of this among children from non-mainstream contexts.

The approach recommended for enhanced oral language development favours the adoption of a “proven” oral language development programme. This programme is not named. It is suggested in a footnote (p.33) that DEIS schools have access to specialised initiatives in literacy. Only one of these initiatives - First Steps - has an oral language strand. While it is essential to make appropriate resources available and accessible to teachers, there is a danger that in promoting one particular approach one sends the message to teachers: Follow this approach and it will solve the problem. In effect, the ‘programme’ or ‘approach’ then becomes the ‘curriculum’, containing all that is needed to address children’s difficulties in literacy. Such an oversimplification of the complex task of supporting children’s literacy development in primary school fails to take sufficient account of one essential element, teacher expertise. The success of any initiative to improve children’s literacy is largely determined by the quality of the teaching. Is there a danger that an over-reliance on a ‘one-size-fits-all’ approach may result in some teachers seeing a programme like Reading Recovery or First Steps as an alternative to good classroom teaching, rather than another approach (among a range of approaches) which complements good classroom practice in order to enable children to access and engage in their classroom curriculum? Surely, it would be better to up-skill all teachers to develop approaches to the teaching of Oral Language, Reading and Writing, which might more usefully deliver the required developments and be more sustainable in the long-term.
The recognition of the importance of “academic language skills” (p.36) is laudatory and marks a significant awareness of the profound nature of the compounding of disadvantage experienced by many children in DEIS and other schools by virtue of their variety of language. It is critical that schools and teachers are empowered and supported to acknowledge the existence of, and to respond to, this need at all levels of the education process. In pursuit of this goal, to problematise children as being deficient (p.36) in any way must be resisted.

The shortcomings identified in the report in relation to the development of literacy skills of children at risk need to be addressed as a matter of urgency, in order that the implementation of this Draft Plan for better literacy in our schools actually delivers improved literacy development for all our children.

2.9 Parental Involvement

We welcome the proposed action to ‘provide direct supports to parents to encourage them to support their children’s language, literacy and numeracy development’ (p.48) and the recognition of parental engagement as ‘critically important in the early years, particularly in the development of children’s language skills and emergent literacy and numeracy skills’ (p.47). These ‘direct supports’ must be identified and the means by which they are to be provided must be made clear. One of the ‘learning experiences’ outlined under the Communicating theme in Aistear highlights the importance of what we must presume is one of these supports – the Home School Community Liaison co-ordinator. It is of concern, therefore, that this scheme (along with other educational support systems such as SNAs and EAL teachers) has been affected by recent cutbacks. Such cutbacks are inconsistent with the proposed actions of the Draft Plan.

The Draft Plan recognises the unique context of each school in its proposed action to ‘Ensure that parental engagement in children’s learning is integrated into each school’s teaching and learning strategy and development plan’ (p.48). Many schools already draw up a comprehensive family engagement plan that best meets the needs of their pupils and families; it is vital that all schools are appropriately enabled to do so through the provision of adequate funding/logistical support and structures. We believe that teachers of infant classes have a pivotal role to play in establishing positive relationships with families.

Parental involvement in children’s education is found to be positively associated with academic achievement across race and culture (e.g. Fan & Chen, 2001; Jeynes, 2003; 2005; West et al., 1998). There are consistent findings in the literature that children who come from homes where parents have higher levels of education and higher income levels have more advanced language skills than other children (e.g. Mantzicopolous, 1997; Snow et al., 1998; Duncan and Brooks-Gunn, 2000). This is thought to occur as a consequence of variation in parent-child interaction styles (e.g. Hashima & Amato, 1994; Mistry et al., 2004).
It is important that the Draft Plan recognises the need to enable parents and communities to support children’s literacy development, and the suggested actions are to be welcomed. However, to establish meaningful engagement with parents which delivers real change for the better in improving children’s oral language development needs careful planning if children are to derive optimum benefit from the process. It will require significant allocation of time, resources and expertise to deliver results that actually make a difference. Many lessons may be learned from international research on this question. Successful partnership between school and parent involves increasing parent knowledge around factors such as the

- expectations of the school for parental involvement
- the importance of their involvement, and
- their capacity to become involved

(e.g. Baker et al., 1995; de Baryshe, 1995; Lynch et al, 2006; Wiegel et al., 2006.)

Parents need to be made aware of the significance of oral language development for their children, and what they must do to support the school in a meaningful way in developing their children’s oral language skills (e.g. Hart, 2000; Lynch et al., 2006). A feature of successful intervention programmes is the need to reduce the confusion for parents of the role the school expects them to play in supporting their children’s education and to share with parents the knowledge required to provide this support effectively (e.g. Henderson & Mapp, 2002; Epstein, 1986). This requires clear and regular communication between the institution of the school and the parents of the community of children it serves.

While a national information campaign will undoubtedly contribute to this process, it is at the level of each individual school that parent involvement can be most productively harnessed to the benefit of the child.

It is critical that resources in the form of additional personnel, increased awareness on the part of teachers as to how best parents might enhance their children’s oral language skills for success in school and in the development of literacy skills, and more time to plan and execute initiatives to reach out to parents meaningfully are made available to schools.

Clarity of approach and purpose is paramount to achieve success in this most critical of initiatives. This is recognised in the Draft Plan (p.48) but no indication of the availability of resources and no plan to roll out these initiatives in order to achieve these outcomes is presented. Again, what is articulated in the Draft Plan seems in danger of being laudatory in its aspiration but lacking the drive and detail to assure stakeholders of meaningful action for change.
2.10 Assessment

There seems to be a much greater emphasis in the document on summative rather than formative assessment. (The word test, in one form or another, is mentioned 34 times!) Emphasis appears to be on assessing/testing children in order to compare their achievement/ability levels with others both in Ireland and internationally. This type of assessment is very narrowly focused and will undoubtedly impact on the type of teaching/learning that goes on in the classroom. Even the various documents/publications which originated in or were endorsed by the DES promote a broader, more holistic view of assessment. For example, the NCCA in *Assessment in the Primary School Curriculum: Guidelines for Schools* states that ‘assessment involves gathering information to understand better how each child is progressing…and using that information to further the child’s learning’ (p.7). In asserting that assessment ‘goes far beyond testing’, the NCCA goes on to describe assessment in terms of ‘building a picture over time of a child’s progress and/or achievement in learning across the *Primary School Curriculum*’, adding that the information ‘about how the child learns (the learning process) as well as what the child learns (the products of learning) shapes the picture’ (p.7). Similarly, the *English Language: Teacher Guidelines* views assessment as a means of monitoring individual children’s progress in order to ‘plan the contexts, strategies and content that will contribute most effectively to their learning.’ The Draft Plan itself proposes to: ‘Ensure that children’s development of language and early literacy and numeracy skills are adequately assessed and monitored in early years education.’ According to the NCCA, the assessment guidelines in *Aistear* are intended to build on the information contained in the aforementioned publication *Assessment in the Primary School Curriculum: Guidelines for Schools*. Both these sets of guidelines encourage formative assessment, indeed *Aistear* promoting a continuum of assessment methods comprising Self-assessment, Conversations, Observations, Setting tasks and Testing.

While there is some detail given in the document to the assessment of reading, there is little or no reference to effective evaluation and assessment of writing. The document does refer to the data provided by the National Assessments of English Reading, which show that the ‘literacy skills of Irish students in primary schools…have not improved in over thirty years.’ On examining these National Assessments, however, one cannot but conclude that any detailed information contained therein in relation to the children’s success in writing was gathered mainly from interviews with teachers, rather than from the administration of actual ‘writing tests’.

How does a teacher gather information in relation to a child’s ‘engagement with the writing process’ (Shiel and Murphy, 2000, p.119)? Current research (as well as DES publications) advocate using a wide variety of assessment tools, but particularly promote the use of Teacher-Child Conferencing, a practice widely recognised as being a central element in teaching-learning, and an acknowledged evaluation/assessment tool used by teachers to monitor, grade and provide feedback on children’s engagement with and success in the various processes of writing. The DES itself promotes the effectiveness of such conferencing in children’s
development as writers (English: Language: Teacher Guidelines, p.82), and outlines how, when used with a clear rubric, teacher-pupil conferencing can provide important assessment information (Assessment in the Primary School Curriculum: Guidelines for Schools, p.24-26). Furthermore, the National Assessments, which are referred to a number of times in the Draft Plan, highlight the reluctance of teachers to provide opportunities for teacher-pupil conferencing, which they recognise as being a central component of the writing process, as outlined in the English Language Curriculum. Yet, in the Draft Plan there is a notable absence of any real discussion on the value of this type of assessment and how it can be used to support children’s language/literacy development.

Writing Portfolios (using samples of children’s writing) are seen as an effective way of encouraging children to invest in the literacy process’ (Pahl and Rowsell, 2005, p.126). What better way to evaluate/assess a child’s writing achievements than to read samples of his/her writing? But then how does one ‘test’ this? The general thrust of the Draft Plan in relation to writing (included under the umbrella term literacy, rarely on its own) seems to be on the acquisition of writing skills, particularly those which are easily assessable, e.g. spelling, grammar. However, what is required is an effective, holistic and easily-workable assessment tool for children’s writing.

Assessing oral language skills, while fundamental to enhanced oracy and literacy development, is cumbersome, time-consuming and challenging. It requires high levels of expertise among teachers in relation to the precise oral language skills to be assessed and the range of tools to be used. Assessing competence in oral language is complicated by the fact that oral language development is recursive, inextricably linked with cognitive and experiential growth. It requires observation of children in a range of meaningful interactive contexts (e.g. audience, purpose) over a period of time. This, coupled with the absence of a standardised measuring instrument to assess oral language in Irish primary classrooms, compounds the difficulty of ‘using baseline data from assessments to inform the planning of learning goals’ (p. 12).

It is very important that the literacy ‘knowledge, skills and attitudes’ (p.25) are not defined or described using too narrow a focus. There are many facets to language/literacy – all very important, but not all easily assessable. Are we to limit our focus to include only those outcomes which can be measured? Is literacy to be seen once again as ‘a set of transferable skills, to be transferred and disseminated’ (Pahl and Rowsell, 2005, p.115) and by extension, easily assessed? If so, how do we measure the effects of ‘good practice’ such as Free Writing, Independent Reading, Reading and Writing for Pleasure? Surely, any effective assessment of children’s literacy must include the twin approach of assessing both literacy/language learning (i.e. gaining mastery of the required skills) and using this learning to engage with and produce texts in school, at home, in the workplace etc.

The School Like Ours initiative would require teachers to gather evidence from ‘standardised achievement tests administered in schools towards the end of a phase of the curriculum’, one
of these phases being identified as ‘end of 2nd class’. While well-constructed standardised tests are valid assessment tools, they are not the only assessment tools and have limited use with young children other than for diagnostic or research purposes (Kostlenik, Soderman & Whiren, 2011). Authentic and developmentally appropriate assessment in the early years must include the ‘innumerable and complex ways in which teachers appraise children’s learning in the classroom…almost any type of assessment other than standardised tests and similar developmental inventories and achievement tests’ (McAfee & Leong, 2007). The very real danger that teachers will feel under pressure to alter their curriculum and teaching to fit the standardised test/s exists and will result in a much narrower approach to assessment of young children’s progress and achievements than is currently recommended in the literature. There is a real danger that adopting the type of ‘standards-driven’ approach to improving literacy levels among our children and young adults, which seems to underpin the Draft Plan, will lead eventually to the ‘rewarding’ of successful schools and the ‘punishment’ of those deemed as ‘low achieving’, ‘performing poorly’ or ‘failing’. Such thinking has in the past resulted in such practices Payment-by-Results, Streaming and League Tables. Do we want a return to these?

The Review(s) of the Primary School Curriculum (NCCA, 2005, 2008) highlight teachers’ requests for support in developing their assessment practice. What is needed is strategic and purposeful assessment systems that use ongoing, multiple methods for gathering information (Shepard, Kagan, & Wurtz, 1998; NAEYC & NAECS/SDE, 2003). For these to be implemented, attention must be given to several factors such as the need to identify a broad range of developmentally appropriate strategies for authentic assessment and the need to provide well-designed CPD to support teachers to use these strategies. Other factors include the extra time needed to engage in a comprehensive assessment programme and the constraints of implementing such a programme in classrooms where there are high adult-pupil ratios. Central to the philosophy of developmentally appropriate practice in the early years is the concept of appropriateness – age, individual and socio-cultural; a one-size-fits-all approach is seen as neither functional nor desirable. Our assessment practice with young children must fit within this framework and recognise individual variation in learners, differences in styles and rates of learning, a child’s facility in English and stages of language acquisition (NAEYC, 2009).
3 IMPLEMENTATION FACTORS

The reference on page 29 of the Draft Plan that “the proportion of schools in which weak practice was evident in the teaching of English is significant” as reported in the *Incidental Inspection Findings: A Report on the Teaching of English and Mathematics in the Primary School* (2010) is concerning, not only as a finding, but also because this finding has emerged consistently throughout the past decade (e.g. Cregan, 2007; 2010; DES, 2005; Eivers et al., 2004; NCCA, 2005). The relationship between practice and literacy development is central to reform and warrants close scrutiny.

Research findings clearly signal an undisputed significance attaching to the teacher for effective and successful practice leading to high quality learning by the student. Reviews by Santiago (2002), Schacter and Thum (2004) and Eide et al. (2004) all suggest that the most important school variable affecting student achievement is teacher quality. That teachers can make a difference is undisputed (e.g. Mortimer et al., 1988; Tizard et al., 1988). Fullan (1993) states that ‘there are no substitutes to having better teachers ... We cannot have a learning society without a learning profession of teachers’ (Fullan, 1993, p.131, in Coolahan, 2002, p.30). The work of researchers such as Tough (1977), Wasik et al. (2006), and Wells and Mejia-Arauz (2006) have demonstrated that teachers can make a dramatic difference to the language development of children. Importantly, several studies have found that when oral activities involving the use of ‘literate’ style language have been emphasised for children for whom this
type of language knowledge is not well developed, literacy standards have improved (Galda, Shockley & Pelligrini, 1995; LeFevre & Senechal, 1999). Significant impacts such as these don’t occur by chance, however. Fundamental to successful practice is the concept of **teacher knowledge**, which it is agreed, is an important factor influencing teacher quality and effective practice.

### 3.1 Teacher Knowledge

It is accepted that teacher knowledge is a key element in implementing and sustaining reform in education worldwide (e.g. Earl et al., 2001). The work of Shulman (1987) refers to the importance of ‘pedagogical content knowledge’ (in Poulson, 2003, p.55). Relevant findings (e.g. Snow, 2003) indicate that teacher knowledge for the successful teaching of English comprises an array of knowledge, notably

- **knowledge of content**
- **knowledge of pedagogy** and also
- **knowledge of learners**
- **knowledge of the curriculum, and**
- **knowledge of one’s beliefs as practitioner**

(e.g. Alexander, 2003; Corden, 2007; Poulson, 2003; Riley et al., 2007; Wysse & Jones, 2007). A critical aspect of teacher knowledge is content knowledge, which in English appears to be accessible by virtue of the fact that all teachers can speak the language, but complicated by the level of technical knowledge required in what is an intuitive process (Snow, 2003, p.129). Much attention is given to the significance of teacher knowledge in relation to oral language, proposing that ‘despite its importance for learning, many teachers know much less about oral language than they need to know’ (Wong-Fillmore & Snow, 2003, p.20). Among the specific aspects of language knowledge required for oral language development are, for example:
It is of concern that in a recent report (Cregan, 2010, p.84) teachers were found to be particularly vague about the specific content of language learning needed in the school context. Teacher knowledge of language skills which need to be developed in general, and in particular knowledge of those language skills required for success in the school context was not articulated clearly by many teachers. Teachers’ content knowledge of and ability to select key instructional elements of literacy development such as phonological / phonemic awareness; word identification; fluency; vocabulary; comprehension; writing and spelling within a balanced programme of effective literacy instruction contributes significantly to the developmental trajectory of the diverse needs of children within the primary school classroom.

Critically, of course, being able ‘to make the transition from personal knowledge and understanding of a subject to the representation of that subject to their pupils’ (Corden, 2007, p.116) is essential for effective teaching. A social-constructivist pedagogy, deriving from the socio-cultural nature of learning, in which group and pair work around open-ended, interactive discourse, involving exploratory and reflective learning, pupils taking risks, and sharing thoughts and ideas is widely advocated (e.g. Barnes, 1992; Bruner, 1986; Wood, 1988; Corden, 2007; Wells & Mejia-Arauz, 2006; Wysse& Jones, 2007).

The pedagogical implications of such an approach include increased emphasis on group work and exploratory learning through talk, exemplified in discussion opportunities, exchange of ideas, sharing information and problem-solving. This is in contrast to a transmission model of teaching (e.g. Barnes, 1976), where teachers emphasise information transfer, determining what is to be taught, transmitting information, and testing children to ensure that it has been learned. It is characterised by the teacher initiating the discourse with a question to which the pupil responds, followed by feedback in the form of an evaluation from the teacher (Mehan, 1979; Wells & Mejia-Arauz, 2006). This model of teaching has been found to disadvantage those children whose out-of-school culture does not expose them to this pattern of interaction (e.g. Heath, 1983; Tharp & Gallimore, 1988), provides no link between the patterns of everyday

- knowledge of the basic units of language (phonemes, morphemes, words, sentences, discourse);
- knowledge of processes of vocabulary acquisition and the importance of accurate definitions and explanations when introducing vocabulary;
- awareness of dialects and an appreciation of their validity and complexity;
- understanding of academic style of language – its existence, its significance, and its characteristics (Wong-Fillmore & Snow, 2003, pp.20-33).
language use and those more formal patterns required in the school context (Lemke, 1990), and gives children minimal opportunity to voice their own ideas or to respond to the ideas of others (Wood, 1992).

Unfortunately, in the Irish context, a review of teachers’ and children’s experiences of the Primary Curriculum (English) by the National Council for Curriculum and Assessment (2005), found that ‘whole class teaching was the organisational setting which teachers most frequently reported using to teach the English curriculum, followed closely by individual work. Teachers reported limited use of group and pair work with children in their classes’ (NCCA, Primary Curriculum Review, Phase 1, 2005, p.2). This finding was replicated in Cregan (2010, p.85).

3.2 Teacher Professional Development

Recognising the centrality of teachers, the Draft Plan devotes considerable attention to the question of improving the professional practice of teachers. A key point articulated in the Draft Plan is the concept of the ‘teacher education continuum’ (p.17) encompassing Initial Teacher Education, Induction and Continuing Professional Development. Recommendations to enhance the professional practice of teachers are confined in large part to the first and third phase of the teacher education continuum – ITE and CPD.

Significant emphasis is placed on the role of ITE to make a ‘critically important contribution to the excellence of the teaching profession’ (p.15). While it is accepted that ITE has an important role to play in teacher education, it is worth noting that ITE is the first phase of teacher education, and that much professional development will occur also during the induction phase and throughout the teacher’s career in the form of continuous professional development. Points of note in the Draft Plan in relation to ITE and CPD include:

- Students in Teacher Education Programmes are predominantly referred to as ‘teachers’ rather than ‘student teachers’.
- Bullet points two and three (p.15) could more accurately be re-worded as follows: ensuring that initial teacher education courses begin to develop the students’ knowledge, understanding and ability to apply educational theory and practice effectively; and

It is critical that teacher knowledge is at the centre of reform to improve literacy standards in the context of the Irish Education system, focussing particularly on teacher knowledge of the content of the English curriculum, awareness of those pedagogical strategies and approaches which research finds are most supportive in that context, and crucially, knowledge of the learners such that teaching is not derived from a deficit perspective which pathologises the child.
rigorously supporting young students during and at the end of the ITE phase to reach the highest level proficiency possible as assessed through examinations and in professional practice.

- This wording acknowledges the potential for development at the ITE phase while recognising that ITE is the first stage in a lifelong process.
- The ‘requirement’ (p.15) for teachers to ‘undertake professional development courses during their teaching careers’ is very much to be welcomed. The mandatory element of continuous professional development appears to be lost however, as the Draft Plan continues, citing the provision of ‘access to approved professional development courses’ (p.20), and removing the requirement element in this proposal.
- **Mandatory CPD is essential if the literacy skills of children are to be raised.**
- Identifying key topics for professional development of teachers (p.17) is very much to be welcomed, and it is of note that such topics must include a ‘focus on the explicit teaching of the structure and function of written and oral language’. Given findings in relation to the nature, amount and significance of teacher knowledge for effective teaching evident from research literature outlined earlier, greater elaboration of these key topics is desirable.
- The focus on ‘designing’ learning experiences of students (p.17) by teachers is very much to be welcomed but is somewhat contradicted by a proposal to increase dependence on a ‘proven’ programme for oral language development (p.35).
- Actions which support the development of ‘reflective’ practitioners, capable of ‘ongoing research’ are laudable, as is the proposal to increase the duration of the B.Ed programme to four years (p.18). The re-configuration of the B.Ed programme needs careful consideration to achieve the desired outcomes.

**Conclusion**

Despite vast resources being assigned to literacy development worldwide, significant numbers of children continue to struggle. The response to the challenge on both sides of the Atlantic is often “an unremitting focus on the mechanics of decoding, a nod to comprehension, and very little consideration for the development of engagement with text” (Dombey, 2010, p.47). Such a response, historically, has failed to deliver the much sought-after rise in literacy scores (e.g. Earl et al., 2003; Ofsted, 2006). It is critical that our response: the Draft National Plan to Improve Literacy and Numeracy in Schools learns from mistakes made elsewhere and capitalises on an opportunity for real change. What is abundantly clear is that there is “No Quick Fix” (Allington & Walmsley, 2007). Significant reform requires knowledge and understanding and takes time. The recommendations which follow are aimed at facilitating such a process.
4 RECOMMENDATIONS

Arising from the considerations presented, the following recommendations in relation to the vision for change in literacy as well as the implementation of that vision, are made:

- To develop a rich, broad, comprehensive, inclusive definition of literacy which is used consistently in dialogue to promote improvements in literacy levels

- To use repeated findings from the many evaluations of literacy development carried out over the past decade, since the introduction of the Primary School Curriculum, to underpin decisions for future change

- To undertake significant reform of the English curriculum. Such reform needs to take cognisance of
  - the significant body of evidence which points unequivocally to best practice
  - repeated calls from teachers for clarity and accessibility of curriculum content
  - the opportunity and potential provided for rich literacy development across all curricular areas
o the need for clarification of the impact of *Aistear* and its place in the nature and sequence of curricular reform in the early years of primary school

- To set in train a strategic **deployment of resources for all learners at risk**, which derives from needs-based evidence. This to include
  - Ongoing, adequate support for schools, such that knowledgeable teachers deliver effective literacy instruction, with access to
  - A wide range of appropriate teaching and learning resources, and
  - Latitude at school level to increase time for the development of literacy skills, both during literacy instruction time, and across all curricular areas and to ensure that
  - Schools are facilitated to effect empowered partnership with parents and the community for enhanced proficiency in children's literacy skills

- To establish **assessment** practices which lead to real improvements in literacy levels. We must learn from experiences in other jurisdictions so that the regressive practice of ‘teaching to the test’ is not promoted in the Irish Education system, or that the ‘Schools like Ours’ proposal does not lead to the establishment of league tables or the suppression of potential development of children in certain contexts. Rather, it is recommended to establish a practice of effective assessment
  - both formative and summative, which includes
  - a variety of assessment tools
  - to target a range of literacy competencies
  - carried out by informed practitioners
  - designed to support all children to achieve maximum potential.

In order to implement the vision for change presented, it is recommended that a focus which supports the ongoing development of increased teacher knowledge through teacher education at all stages in the continuum is established. To this end it is important that:

- All parties involved in the promotion of literacy development in **Initial Teacher Education** consider the content of the proposed four-year B.Ed and two-year Graduate Diploma Programmes, with a view to maximising student-teacher engagement with research, content and pedagogy of effective literacy teaching across a range of contexts. Such consideration should take account, among others, of the need for
  - Increased time for the pedagogy of English, both during English and across other curricular areas
  - reduced class sizes to facilitate understanding, reflection and engagement with research
  - significant experience of professional practice in a range of contexts
Continuous professional development, both at the **Induction** phase, and throughout **In-Career** development, is undertaken as a matter of priority. Such professional development needs to be
- a requirement not an option
- strategically targeted to expand the currency of teacher knowledge, in line with the most up-to-date research findings
- strongly focussed on the content as well as the pedagogy of the English curriculum as well as to
- meet teachers’ and learners’ needs, including the needs of English Language Learners, and children with Special Education needs, and
- undertaken periodically throughout a teaching career, with a
- focus which takes particular account of the importance of supporting parent involvement in the process of literacy teaching.
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Mathematics Education

Dr. Aisling Leavy, Dr. Mairéad Hourigan, Dr. John O’Shea, Áine McMahon
Introduction

As mathematics educators we welcome the recent spotlight placed on the teaching and learning of mathematics arising from publication of *Better Literacy and Numeracy for Children and Young People: A National Plan to Improve Literacy and Numeracy in Schools*. Recent national and international assessments have shown that there has been no significant improvement in Irish primary students’ attainment in mathematics. Indeed deficits in key skills such as problem solving have been identified\(^1\). Furthermore, mathematics is a core skill necessary to participate fully in society. For example, mathematics is necessary in everyday work/tasks from shopping to engineering, medicine to farming. Mathematics education has been referred to as an “objective judge” (Volmink 1994) and has lead to stratification in educational circles of those who possess mathematical knowledge and those who don’t. In some sense, then, mathematics has become a gatekeeper that dictates participation in certain elements of society, in particular in terms of access to 3\(^{rd}\) level study. This importance of mathematics is reiterated by Delaney (2010:4) when he notes that recent policy documents acknowledge ‘the importance of mathematics in a knowledge society.’ Therefore, a focus on improving the teaching and learning of mathematics will have societal benefits. Furthermore, the Primary School Mathematics Curriculum (1999) recognises that mathematics is a discipline in its own right and children should be allowed to experience this discipline in an enjoyable, fascinating and challenging manner. A renewed focus on teaching and learning strategies that target core literacies in mathematics, in addition to instructional practices, will foster an intellectual curiosity in mathematics.

It is our belief that a carefully designed and research-informed response, that takes into account the experiences of stakeholders in mathematics education (for example, teachers and mathematics educators), has the potential to revitalise the mathematics education components of Initial Teacher Education (ITE), induction, and Continuing Professional Development (CPD) programmes and in turn equip teachers with the critical and complex skills necessary to support the development of mathematically literate students.

The targeting of core skills together with a concomitant focus on problem solving provides sufficient evidence that, contrary to general opinion, the report does not endorse a back to basics approach to mathematics education. We make this observation based on a number of factors. Firstly, the report’s definition of numeracy as ‘the capacity confidence and disposition to use mathematics to meet the demands of learning, school, home, work, community and civic life’ (DES, 2010:9) incorporates reference to the capacity to deal effectively with the quantitative aspects of life. This definition is closely aligned with the definition of mathematical literacy as defined by the OECD (2004) which is ‘an individual’s capacity to identify and understand the role that mathematics plays in the world, to make well founded judgements and to use and engage with mathematics in ways that meet the needs of that individual’s life as a constructive, concerned and reflective citizen’. Secondly, the report identifies the radical

\(^1\) This will be explored in depth in section 1 of our response
nature of change at second level in relation to the teaching of mathematics referencing the project maths initiative. The DES goes on to suggest other system wide measures are needed to improve students’ engagement with mathematics and the development of their numeracy skills. Project maths is problem focussed and similar principles can be applied at primary level. Finally, the report also highlights ‘contemporary research into the teaching of mathematics shows the importance of a problem solving approach based on real life contexts’ (DES, 2010: 29). It acknowledges that much current practice in the primary school does not reflect this.

However the references to a relentless focus on progress and focussed priority on numeracy do not provide adequate guidance regarding what will be measured and what will be the focus of change that will stimulate improved performance in mathematics. A research-driven and needs-based conceptual framework focusing on mathematics education needs to be communicated; this framework should motivate and inform decisions regarding the alignment of instruction, curriculum and assessment. Measuring higher order mathematical understanding requires the development and use of tasks different to that commonly found in standardized tests (more akin to those found in PISA). Change however, must begin at the classroom level. The report provides insufficient detail regarding the classroom-level practices that support the development of higher order mathematical reasoning and how these are situated within a theoretical framework from which teachers can refer to when making judgements about classroom practices. For example, there are few if any references to constructivist theories, the socio-cultural dimensions of mathematics learning, and the situated nature of that learning within our classrooms and the communities from which children come. There is also an absence of any critique of the Primary School Mathematics Curriculum and the role that this curriculum, combined with a reliance on textbooks, contributes to patterns of achievement within the primary school.

The aspects of mathematics emphasised, albeit briefly, in the report are critical understandings highlighted by international research. In our response, we will refer to evidence from research studies in mathematics education that provide the backdrop to the recommendations we propose.
Our response is organised as follows:

1. **Performance of Irish Children in National and International Assessments of Mathematics.**

   In the first section we present data to support the argument that there is significant room for improvement in Irish students’ performance on mathematical assessments.

2. **Teacher Knowledge: What types of knowledge are required to teach mathematics?**

   We outline the types of knowledge teachers draw from when teaching mathematics. We do this to illuminate the complexity of mathematics education for those who believe that mathematics pedagogy consists of little more than a ‘ragbag’ of skills and procedures.

3. **The role of Mathematics in the preparation of teachers.**

   This section examines the literature pertaining to the role played by mathematics in the preparation of teachers. We refer to the approach taken by other universities to address the mathematics/mathematics education preparation of pre-service primary teachers.

4. **The case of ITE at Mary Immaculate College (MIC).**

   This section provides an overview of the challenges faced in providing mathematics education in ITE (and specifically in the context of MIC). We report on published research carried out over the past decade examining the mathematical content knowledge of our entry level pre-service teachers and identify other factors that present obstacles to the provision of best practices in mathematics education.

5. **Additional important issues**

   We discuss important issues highlighted in the report that relate to the agenda for mathematics teaching and learning. These issues include: the role of the (visual and performing) arts in primary education, assessment in the primary school, and catering for students with special needs.

6. **Recommendations**

   We present our recommendations in response to the report.
Section 1: Performance of Irish Children in National and International Assessments of Mathematics

We welcome the acknowledgement from the draft report that areas in mathematics (e.g. problem solving, measures and estimation) need improvement. We present data and report on research supporting the argument that the teaching and learning of mathematics requires immediate attention. The relevant studies provide evidence that there is substantial room for improvement in the mathematical literacy of Irish children.

National Assessments of Mathematics Achievement (NA)
Dating back to 1977, a series of national assessments have been conducted in primary mathematics. National assessments are conducted by the Educational Research Centre, Dublin and they focus on children at various levels both primary and post-primary. These assessments have consistently shown that Irish primary students perform well in areas such as understanding and recalling basic terminology, facts, and algorithms, but not as well in problem-solving and engaging in mathematical reasoning (Shiel and Kelly 2001; Surgenor, Shiel, Close and Millar, 2006). These conclusions are similar to the findings of TIMSS (Mullis, Martin, Beaton, Gonzalez, Kelly and Smith, 1997).

Early assessments involving students in second, fourth and fifth classes focussed on number, and these indicated that pupils were strongest in dealing with operations with whole numbers, and weakest in the area of problem-solving. This is consistent with current research examining the achievements of primary pupils in Irish classrooms (Shiel and Kelly, 2001; Surgenor et al. 2006). Evidently, teachers place less emphasis on the teaching of problem solving than on the teaching of number (Shiel and Kelly 2001; Surgenor et al. 2006). Research indicates that little has changed in terms of the nature of Irish pupils’ mathematical strengths and weaknesses since the implementation of the Primary School Mathematics Curriculum (1999). While acknowledging significant improvements in the strands of Data and Shape and Space when comparing findings of the national assessments (Shiel and Kelly 2001; Surgenor, et al 2006),

2 The following are two types of problems that students perform poorly on in recent national assessments in mathematical achievements (Surgenor, et al. 2006).

a) The time in Hong Kong is 8 hours ahead of Dublin. For example, mid-day in Dublin is 20.00 in Hong Kong. Sheila left Dublin for Hong Kong at 08:00. Her trip time was 13 hours. What was the local time in Hong Kong when she arrived?

b) 126 pupils in a school are going on a trip to the museum. A coach holds 48 children. A minibus holds 16. Which of these should the school hire so that there are as few empty seats as possible?
   A. 2 coaches
   B. 2 coaches and 1 minibus
   C. 2 coaches and 2 minibuses
   D. 3 coaches
there are a number of reasons to play these findings down. Many of the items in which improvements were apparent in the Shape and Space strand tested lower order thinking skills (Surgenor et al. 2006). Another important factor is that pupils taking the NA (1999) test had no exposure to the strand unit of Chance unlike pupils completing the NA (2004) version. This may have contributed to the observed improvement in the Data component.

Weaknesses which persist include limited ability on items requiring higher order thinking skills particularly in real world contexts (Surgenor et al. 2006; Eivers et al. 2007). While Irish pupils demonstrate an ability to demonstrate procedural knowledge in familiar contexts, their ability to use their knowledge in new and/or realistic contexts has been found wanting. There is also consensus that the high achievers in the Irish context are not being adequately challenged.

The 2009 National Assessments of Mathematics and English Reading changed target grades to 2nd and 6th Classes. Five process skills were assessed: Understand and Recall, Implement, Integrate and Connect, Reason, and Apply and Problem-Solve. In the National Assessment of Mathematics the overall mean percent correct scores were 57% for Second Class and 55% for Sixth Class. The figure below, from the National Assessment of Mathematics 2009 (Eivers, Close, Shiel, Millar, Clerkin, Gilleece & Kiniry 2010, 31) highlights that both Second and Sixth Class children performed least well in questions involving applying and problem-solving. These findings suggest that the strengths and weakness of Irish students has remained stable across assessments despite the roll out of the Primary School Mathematics Curriculum.

A focus on the teaching of mathematical problem-solving in Ireland is timely and due in no small part to the conclusions drawn by Shiel and Kelly (2001), Surgenor et al. (2006) and Eivers et al. (2010). These national assessments make for worrying reading particularly for those who emphasise the need for a focus on higher level mathematical processes such as problem-solving. The reports found students performed least well when engaging in mathematical
reasoning, analysing, solving problems, and evaluating solutions, and understanding and making connections between mathematical concepts and processes. Such findings reinforce the reportage on the implemented curriculum and highlight the shortcomings of practice which prioritises teacher–led didactic teaching over opportunities for children to work collaboratively to solve realistic meaningful problems.

**Third International Mathematics and Science Study (TIMSS)**

The Third International Mathematics and Science Study (TIMSS) (1995) was an international assessment of the mathematics and science knowledge of students at five grade levels in over forty countries. The study focussed on two age groups, 9-year-old primary students and 13-year-old secondary students. The mean scores of students on the mathematical ability tests showed that fourth class Irish pupils ranked well above the OECD average but at post-primary level, Irish pupils ranked within the OECD average (Mullis et al. 1997). These TIMSS (1995) figures highlight a decrease in the level of mathematical ‘ability’ between the senior grades at primary level and the initial grades at post-primary level. We should remember that during the senior grades at primary level, and the initial years at post-primary level, instruction requires students to be competent in using higher level skills such as analysis, prediction, estimation and evaluation and that all the research discussed below indicates Irish students perform less well in these areas compared to areas involving lower level skills involving simple contexts. The difficulties in relation to problem solving have been alluded to in both the published report (DES 2010) and in the more detailed National Assessment of Mathematics and Reading report (Eivers et al. 2010).

The focus on performance in national assessments and the comparisons made following the publication of outcomes on international assessments, such as in TIMSS (1995), often lead to debate about the degree to which students can explain the mathematical thinking and reasoning that informs their responses. Data revealed by TIMSS (1995) is particularly interesting here. Cognisant of the fact that this was prior to the introduction of the Primary School Curriculum (Government of Ireland, 1999a; 1999b), TIMSS (1995) data highlights that fewer than 40 per cent of fourth class students in Ireland had teachers who felt it was important to think creatively, with 52 per cent of students being required to practice computational skills during most lessons (Mullis et al. 1997). This is a particularly important statistic as an emphasis on creativity and experimentation is critical to the problem solving process.

**Programme for International Student Assessment (PISA)**

The Programme for International Student Assessment (PISA), coordinated by the Organisation for Economic Cooperation and Development (OECD), tests and compares school children's performance across 57 countries. PISA assesses 15-year-old students' performance on ‘real-life’ tasks considered relevant for effective participation in adult society and for life-long learning. This is reflected in the definition of mathematical literacy which underpins the PISA

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assessments. The OECD (2003: 156) defines mathematical literacy as ‘an individual’s capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments and to use and engage with mathematics in ways that meet the needs of that individual’s life as a constructive, concerned and reflective citizen’. This reflects the importance of problem-solving skills and constructivist philosophy: the individual must be able to utilise all mathematical skills and concepts acquired in the mathematics classroom in real-life situations and understand the use of such mathematical skills and concepts.

Student achievement in PISA is categorised at the various levels illustrated in table 1. Tasks at Level 1 are associated with a minimum level of mathematics achievement, such as the ability to recall basic multiplication and division facts, the ability to read and interpret simple graphs, charts, scales and diagrams, and the ability to solve simple problems involving multiplication and division. Levels 2 and 3 are associated with students who have demonstrated a moderate level of mathematics achievement. At this level, students are engaged in basic reasoning, using problem-solving strategies, and linking symbolic structures to real world situations. At the upper end of the scale, at levels 5 and 6, students have an advanced level of mathematics achievement. Students at this level can develop their own novel approaches to problem solving, can select, compare and evaluate solution methods for solving problems, can communicate their mathematical ideas, and can discuss and compare their own mathematics with the mathematics of others.

The following table, adapted from Eivers, Shiel and Cunningham (2007: 27), illustrates proficiency levels on the combined mathematics scale in PISA 2006, the percentages of students achieving each level, and compares the Irish scores to the OECD average.
Table 1: Proficiency levels on the combined mathematics scale in PISA 2006, and percentages of 15 year old students achieving each level (Ireland and OECD average)

<table>
<thead>
<tr>
<th>Level Cut-Point</th>
<th>At this level, a majority of students can</th>
<th>IRL %</th>
<th>SE</th>
<th>OECD %</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 6 Above 669.3</td>
<td>Evaluate, generalise and use information from mathematical modelling of complex problem situations</td>
<td>1.6</td>
<td>0.25</td>
<td>3.3</td>
<td>0.09</td>
</tr>
<tr>
<td>Level 5 607.0 – 669.3</td>
<td>Develop and work with mathematical models of complex situations</td>
<td>8.6</td>
<td>0.67</td>
<td>10.0</td>
<td>0.12</td>
</tr>
<tr>
<td>Level 4 544.7 – 607.0</td>
<td>Work with mathematical models of complex concrete situations</td>
<td>20.6</td>
<td>0.94</td>
<td>19.1</td>
<td>0.16</td>
</tr>
<tr>
<td>Level 3 482.4 – 544.7</td>
<td>Work in familiar contexts usually requiring multiple steps for solution</td>
<td>28.6</td>
<td>0.90</td>
<td>24.3</td>
<td>0.16</td>
</tr>
<tr>
<td>Level 2 420.1 – 482.4</td>
<td>Work in simple contexts that require no more than direct inference.</td>
<td>24.1</td>
<td>1.00</td>
<td>21.9</td>
<td>0.17</td>
</tr>
<tr>
<td>Level 1 357.8 – 420.1</td>
<td>Work on clearly defined tasks in familiar contexts where all relevant information is present and no inference is required</td>
<td>12.3</td>
<td>0.93</td>
<td>13.6</td>
<td>0.15</td>
</tr>
<tr>
<td>Below Level 1</td>
<td>Not respond correctly to more than 50% of Level 1 questions. Mathematical literacy is not assessed by PISA.</td>
<td>4.1</td>
<td>0.50</td>
<td>7.7</td>
<td>0.14</td>
</tr>
</tbody>
</table>

The data presented in table 1 reflects the findings of other assessments such as the National Assessment of Mathematics Achievement (Shiel and Kelly 2001; Surgenor et al. 2006, Eivers et al. 2010) and TIMSS (1995) (Mullis et al. 1997). Irish students are proficient at tasks associated with levels 1-3, yet do not compare as well when dealing with mathematical reasoning and developing approaches to analysing, evaluating and working with complex mathematical problems (levels 5-6). According to the PISA 2006 results (Eivers et al. 2007), at levels 5 and 6 Ireland fares slightly less well than the OECD average and considerably poorer than countries such as Korea and Hong Kong where over 27 per cent of students reached level 5 or higher. However, research conducted in Ireland reveals that with the appropriate amount of time allocated to the exploration of higher level mathematical skills and with best practice modelled...
by primary teachers, Irish students are very capable in areas such as problem solving, estimation, prediction (O’Shea, 2003).

**Observations from classrooms**

The Primary Curriculum Review (NCCA 2008) and O’Shea (2009) reveal that teachers reported challenges with the development of higher order thinking skills. Not surprisingly, Shiel and Kelly (2001) stress the need for a more intensive focus on higher level mathematical skills, such as problem-solving in schools. Worryingly, according to Surgenor et al. (2006), 90 per cent of inspectors concluded that they were either ‘dissatisfied’/‘somewhat satisfied’ with pupils’ performance in engaging in mathematical reasoning, and 51 per cent reported dissatisfaction with the achievement of pupils in analysing and solving problems and evaluating solutions (Shiel and Kelly 2001). Both these reports posit limited student proficiency in performing higher level mathematical operations. It may be that teachers are inhibited by the repertoire of teaching methodologies they are confident in using as they facilitate the development of students' higher order mathematical processes (O’Shea, 2009). Indeed O’Shea illuminates the difficulties for teachers in making the transition from utilising traditional methods of teaching mathematics to employing those teaching strategies that reflect current best practice. One of the most significant factors in making that transition is the level of engagement and participation in ITE mathematics education programmes (O’Shea and Leavy 2010).

From a constructivist perspective, the employment of group collaborations in classrooms is essential; this skill of working collaboratively is particularly important in the development of problem-solving skills. However, 50% of inspectors expressed dissatisfaction with grouping arrangement for mathematics in single grade fourth classes (Shiel and Kelly 2001). The Primary Curriculum Review (NCCA 2008) also found that teachers reported challenges with using collaborative learning strategies. More recent observations of classroom teaching indicate that the landscape of the classroom as regards the use of collaborative learning opportunities in mathematics has not changed significantly. Between the period of October 2009 and October 2010 527 mathematics lessons were observed during incidental inspections by the inspectorate. In only 48.4% of the mathematics lessons observed were pupils enabled to work collaboratively (DES 2010b). However, observations indicate that there is satisfaction with many aspects of mathematics teaching and learning. The inspectorate found that 75% of teachers had prepared satisfactorily for the mathematics lesson evaluated, 82.7% had used appropriate teaching approaches during the mathematics lesson and 82.2% had provided the pupils with appropriate learning activities (DES 2010b).

There are also opportunities to increase the use of classroom practices and tools that support higher order mathematical thinking and reasoning. Shiel and Kelly (2001) revealed that teachers were reluctant to see the calculator introduced to the primary school and believed that computer software was not to be relied upon for teaching mathematics. These perceptions, where they exist, are particularly unfortunate. The use of new technologies can turn the
arduous tasks of tedious calculations and graph construction, for example, over to calculators and computers thereby allowing students to spend more time on mathematical reasoning and problem-solving.

In summary

- Little has changed in Irish primary students’ mathematical strengths and weaknesses, as evidenced in national assessments, since the implementation of the Primary School Mathematics Curriculum (1999).
- Irish students perform well with basic (lower-order) mathematics requiring the use of operations and the recall of basic facts and algorithms.
- Weaknesses are evident in higher order mathematical reasoning, in understanding mathematical concepts and in application of familiar procedures and techniques to contexts deviating from those with which students are familiar.

Overall, TIMSS (1995), PISA (2006), and National Assessments of Mathematics Achievement (Shiel and Kelly 2001; Surgenor et al. 2006; Eivers et al. 2010) illustrate that Irish students perform well when presented with basic mathematics requiring them to use operations and recall basic facts and algorithms, but are challenged when it comes to using higher level mathematical processes, including developing and working with novel mathematical problems and using their own methods and strategies in evaluating and solving mathematical problems.

It is pertinent to mention here that assessments of mathematics at the post-primary level have been shown to reinforce the importance of mathematics procedures (NCCA 2005b). This is concerning due to the high stakes nature of post-primary examinations. The Irish leaving certificate influences greatly the teaching of mathematics (Lyons, Lynch, Close, Sheeran and Boland 2003) and in turn we might expect an emphasis on procedures rather than reasoning. The visibility of problem solving is evident in post-primary mathematics, although current structures may facilitate the strategic neglect of problem solving for those students not aiming for upper A or B grades (cf. NCCA 2005b).

A chasm exists between exceptional performance with basic mathematical facts, algorithms and operations and somewhat limited performance in higher level problem solving processes. It is this underachievement in higher order mathematical processes and reasoning that needs to be addressed and it is achievable within the broader context of the recently published report.

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4 An NCCA comparison of Leaving Certificate mathematics examinations against comparable international exams, refers to greater levels of formal language and of advanced and formal mathematics, and decreased emphasis on the role of context in the questions posed in the examination. This prevalence of decontextualized questions, the authors claim, has lead to an ‘increased emphasis on recall and on the application of routine procedures’ (NCCA 2005b, p. 11).

5 This has implications for the mathematical beliefs and understandings of entry level pre-service teachers.
Section 2: TEACHER KNOWLEDGE

The impact of teacher knowledge
Mathematical competence requires that children construct rich conceptual understandings of mathematics, develop connections between procedures, concepts and representations, and engage in dialogue and discourse around mathematics. Supporting the construction of these competencies requires that teachers themselves have rich connected understandings of mathematics. Reform in mathematics education in Ireland and abroad, however, has changed both the types of mathematics (for example, the introduction of probability, statistics, and algebra to the primary level mathematics curriculum) and the way mathematics is being taught (for example, the recent emphasis on constructivist and socio-cultural approaches). These reforms require that many teachers teach mathematics in ways counter to how they themselves were taught (Ball 1988; Schifter 2001).

The important role played by teacher knowledge has been accentuated also by the established relationships between teacher knowledge and both instruction (Borko, Eisenhart, Brown, Underhill, Jones and Agard, 1992; Fennema and Franke 1992; Leinhardt and Smith 1985) and student achievement (Hill, Rowan, and Ball, 2005; Rowan, Chiang, and Miller, 1997). There has been evidence to suggest that some teachers lack the mathematical knowledge needed for teaching (Ma 1999) causing widespread concern about the preparedness of teachers to teach mathematics and leading in part to the accountability movements in the United States and United Kingdom.

In the following section we provide a brief overview of the nature of the mathematical knowledge required for teaching mathematics. Outlining this knowledge is an important task in this document, as it provides signposts to the types of knowledge that need to be targeted and developed in ITE mathematics education courses.

Types of knowledge required for effective teaching of mathematics
Teaching mathematics for understanding is a complex task. Hill, Schilling and Ball (2004) acknowledge that the knowledge required to teach mathematics effectively is ‘multi-dimensional’. Burke (2000: 23) suggests that graduating primary teachers require

...a good knowledge of the content and pedagogy of the subject areas to be taught along with a balanced and critical understanding of the theoretical underpinnings of different approaches to teaching-traditional/progressive, didactic/discursive, teacher-centred/child-

In order to teach any subject, including mathematics, effectively, it is proposed that teachers need many types of knowledge. As well as more generic knowledge (e.g. general pedagogical
knowledge, knowledge of students), Shulman (1986) posits that teachers require three categories of knowledge. These categories are subject-matter knowledge, pedagogical content knowledge, and curricular knowledge. Research in the past two decades, examining both the classroom teaching of mathematics and the knowledge needed to teach mathematics, has expanded the categories proposed by Shulman. Figure 2 outlines an important delineation of Shulman’s first two categories (subject-matter knowledge and pedagogical content knowledge) that has been posited by Ball, Thames and Phelps (2008).

<table>
<thead>
<tr>
<th>Teacher Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subject-matter knowledge (SMK)</strong> (Shulman, 1986)</td>
</tr>
<tr>
<td><strong>Pedagogical content knowledge (PCK)</strong> (Shulman, 1986)</td>
</tr>
<tr>
<td><strong>Common content knowledge (CCK)</strong> (Ball et al. 2008)</td>
</tr>
<tr>
<td><strong>Specialized content knowledge (SCK)</strong> (Ball et al. 2008)</td>
</tr>
<tr>
<td><strong>Knowledge of content and students (KCS)</strong> (Ball et al. 2008)</td>
</tr>
<tr>
<td><strong>Knowledge of content and teaching (KCT)</strong> (Ball et al. 2008)</td>
</tr>
</tbody>
</table>

**Figure 2: Categorisation of knowledge needed for teaching mathematics**

The first type of teacher knowledge is **subject matter knowledge** (commonly called ‘content knowledge’ in the general literature) which ‘refers to the amount and organisation of knowledge per se in the mind of teachers’ (Shulman 1986: 9). Elaborating further subject matter knowledge includes the facts and concepts of a discipline, its organizing frameworks, and the ways in which propositional knowledge has been generated and established. According to Ball et al (2008), subject matter knowledge is further categorised into **common** and **specialised** content knowledge. While it is perceived that most people would possess common content knowledge, specialised content knowledge refers to the knowledge required for teaching e.g. multiple strategies (Petrou 2007). Common content knowledge involves knowledge of the mathematics school curriculum, for example being able to divide fractions, calculate the mean, and identify a triangular number. Specialised content knowledge is mathematical knowledge beyond the curriculum – it is the knowledge of mathematics specifically used for teaching.

We will use figure 3 to illustrate the distinctive characteristics of common and specialised knowledge. We will use a simple subtraction computation commonly seen in 3rd class (figure 3a). Most people will be able to calculate the result as 178 (figure 3b). In order to teach, being able to perform this subtraction is necessary. This is common content knowledge (CCK). However, being able to carry out the procedure is not sufficient knowledge for teaching. Let’s
explore why. An error frequently manifested in classrooms is that presented in figure 3c. Specialised content knowledge of the mathematics (SCK) now becomes important. The teacher needs sufficient mathematical knowledge of subtraction in order to provide an explanation for the procedure; an explanation that is rooted conceptually in the meaningful manipulation of quantities. The teacher also needs sufficient mathematical knowledge to recognise the source of the error. A teacher needs to recognise that the student has calculated the difference between the two numbers in each column by subtracting the smaller digit from the larger digit. Such skills in error analysis require specialised knowledge of mathematics. This knowledge extends beyond procedural knowledge of why the algorithm works (understandings involving more than the procedure of ‘crossing out’, ‘putting down’ and ‘carrying back’ numbers) and requires an understanding of specific steps in the procedure, what they mean, and why it makes sense. Furthermore, specialised content knowledge is also necessary to inform the answers to questions such as these: what is the role played by zeros in different locations in the problem? When moving from problems that have one regrouping to problems which have two regroupings, what does the procedure indicate about the underlying activity with/on quantities?

![Figure 3: Subtraction requiring decomposition](image)

Importantly, subject-matter knowledge and the associated categories of common and specialised content knowledge (the unshaded regions of figure 2) are not the focus of any course of study for pre-service teachers in Mary Immaculate College.

The second type of teacher knowledge is **Pedagogical Content Knowledge** (figure 2). This refers to more than knowledge of the mathematics, and focuses more exclusively on knowledge for teaching. Ball and her colleagues categorise pedagogical content knowledge into knowledge of content and students (KCS) and knowledge of content and teaching (KCT). Knowledge of content and students (KCS) “combines knowing about students and knowing about mathematics” (Ball et al. 2008). This type of knowledge includes knowledge of common student misconceptions, mathematics that is perceived as interesting or difficult, and common approaches used by

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6 Prior to this century, the mathematics subject-matter knowledge of pre-service teachers was the focus of instruction at MIC through the provision of what was termed ‘Professional Mathematics’ courses.
children when presented with specific tasks. For example, teachers with sufficient KCS know that some children who recognize the shape in figure 4a (below) as a square may not identify the same shape as a square when rotated 45 degrees as in figure 4b (below). Knowledge of content and teaching (KCT) provides teachers with the understandings required to plan their teaching so that this misconception is challenged. This planning incorporates attention to the sequencing of instruction to address misconceptions and draws on useful examples to highlight the misconception. This type of knowledge is also necessary to inform the design of a sequence of instruction that provides a trajectory of tasks which build in complexity and at a speed that provides sufficient consolidation of understanding. Furthermore such teachers are aware of the advantages and disadvantages of using particular representations of quadrilaterals that feed into and support the misconception highlighted in figure 4.

\[ \text{a. } \boxed{\text{ }} \quad \text{b. } \boxed{\text{ }} \]

*Figure 4: A square and a rotated square*

These types of knowledge facilitate the transformation of personal content knowledge into a form which makes it accessible to learners (Rowland, Turner, Thwaites and Huckstep, 2009). Rowland et al. (2009) also categorise this type of knowledge further referring to ‘transformation’, ‘connection’ and ‘contingency’ knowledge for teaching. While ‘transformation’ refers to the means by which the subject matter knowledge is ‘transformed’ for the purposes of teaching through the use of demonstration, examples etc, ‘connection’ knowledge is required to make sequencing decisions. ‘Contingency’ reflects the teacher’s ability to ‘think on his/her feet’ i.e. react to the pupil responses/questions. Further exploration of these knowledge domains, while important for ITE contexts, is beyond the focus of this response.

The third category of teacher knowledge is **curriculum knowledge**, which is “represented by the full range of programs designed for the teaching of particular subjects and topics at a given level, the variety of instructional materials available in relation to those programs, and the set of characteristics that serve as both the indications and contraindications for the use of particular curriculum or program materials in particular circumstances” (Shulman 1986, 10). Possession of this type of knowledge suggests an awareness of how topics are arranged both in a school year and over longer periods of time and ways of using curriculum resources such as texts.
In summary

It is widely accepted within the mathematics education community that all three types of knowledge (subject-matter knowledge, pedagogical content knowledge, and curricular knowledge) need to be addressed in ITE. In addition to these areas, the task of identifying and reflecting upon beliefs and attitudes towards the teaching and learning of mathematics is a critically important task. While we will not address the attitudes and beliefs of entry-level pre-service teachers about mathematics in this response, it is important to note that the beliefs about what constitutes mathematics tend to be informed by post-primary experiences of mathematics and generally do not lend themselves to the types of beliefs and understandings required for teaching mathematics at the primary level.

There is no reference in the draft report for the need to develop pre-service teacher’s subject-matter knowledge for teaching mathematics. The report emphasizes the importance of pedagogical content knowledge. While pedagogical content knowledge is the central focus of pedagogies/methodologies in ITE mathematics education courses, success in these courses is predicated on the individual’s subject-matter knowledge of mathematics. Provision needs to be made in ITE to directly target subject matter knowledge of mathematics. There are currently no courses in ITE at Mary Immaculate College that address the subject-matter knowledge of pre-service teachers. It is assumed that pre-service teachers come ‘equipped’ with sufficient subject matter knowledge derived from their post-primary experiences of mathematics. Pre-service teachers have courses only in the pedagogy of mathematics, these pedagogy courses address only pedagogical content knowledge (the shaded region of figure 2). However, as we will illustrate in the next section, we find an alarming amount of our time dedicated to addressing the deficits in subject-matter knowledge of entry level pre-service teachers (in particular specialised content knowledge of the nature outlined in the subtraction problem in figure 3).
Section 3: The role of Mathematics in the preparation of primary pre-service teachers

Pre-service primary teachers at Mary Immaculate College access mathematics instruction through two possible avenues. All students take pedagogy of mathematics courses; these courses are taught by mathematics educators from the faculty of Education. A proportion of these same students study mathematics to degree level; these courses are taught by mathematicians in the Arts faculty.

Studying Mathematics as a Degree Subject

Ball (1990) challenges common assumptions about elementary mathematics teaching stating that, despite public perceptions, elementary school mathematics is not easy and that pre-college education is insufficient in providing teachers with the subject matter knowledge required to teach. This view is supported by a recent study of the statistical understandings of 457 entry-level Irish pre-service primary teachers which found that ‘Prior experiences with (school) statistics do not adequately support conceptual knowledge for teaching data at the primary level’ (Leavy and Sloane 2010). An earlier study of the mathematics knowledge of primary pre-service teachers carried out by Leavy and O’Loughlin (2006) found significant deficits in the ability of pre-service teachers to apply mathematical knowledge to unfamiliar contexts. The authors (2006: 53) stated that given the demands of mathematical reform movements internationally to develop among pupils connections between procedures, concepts and representations, that teachers themselves require ‘…rich connected understandings of the mathematical content…’. Hill et al (2005) support the view suggesting that the mathematical knowledge required for the work of teaching is vast given that this work includes explaining, interpreting pupils’ responses and the selection of appropriate examples and representations.

There have been a range of efforts dedicated to identifying teacher characteristics which are indicators of good mathematics teaching. Many of these efforts have focused on identifying teacher knowledge of mathematics. These investigations of mathematical content knowledge have involved administering tests of mathematical skills, identifying the number of mathematical courses taken, and using academic scores on mathematical tests of achievement. These studies were motivated, in part, by the perception that advanced mathematics can serve as a deepening and broadening, an extension, even, of primary mathematics. There has, however, been a plethora of research in recent years indicating that it is possible to complete advanced courses in mathematics without illuminating primary level mathematical understandings (Ma 1999; Ball et al. 2008). At a certain stage, it has been shown, the relationship between teacher mathematical knowledge and instruction levels out and simply increasing the number of mathematics classes taken does not bring about improvements in instruction (Borko et al. 1992). While knowledge of mathematics is a critical component of good mathematics teaching, focusing simply on how much mathematics a person knows...
underestimates considerably the types of knowledge that contribute to good mathematics teaching (Hill et al. 2004).

Indeed, there is ample evidence which contradicts the belief that teachers with higher levels of academic knowledge are better teachers (Burke 2000). Ball (1990: 449) challenges the assumption that ‘...majoring in mathematics ensures subject matter knowledge’, reporting that these same pre-service teachers also struggle to make sense of division with fractions or to relate mathematics to the real world. As outlined in the previous section subject-matter knowledge is important. However it is recognized internationally that subject matter knowledge beyond a certain threshold is not associated with greater pupil achievement i.e. primary teachers do not necessarily need to study mathematics to degree level (‘threshold’ view) (Department of Education and Science 2002).

Within the research literature, a criticism of the provision of a larger number of mathematics courses for pre-service teachers is that it tends to be irrelevant to the classroom (Wu 2006). Studies of final year pre-service primary teachers in Mary Immaculate College, who were also studying mathematics to degree level, indicate that these students do not demonstrate more sophisticated understandings of informal inference and other statistical concepts than their peers who are not studying mathematics to degree level (Leavy 2010; Leavy & Sloane 2010).7

The provision of mathematics courses for primary level pre-service teachers

This problem is not a uniquely Irish phenomenon. Other colleges and universities have worked to provide courses that address the knowledge needed for teaching mathematics as opposed to simply providing more mathematics. The outcome is that primary level pre-service teacher candidates are required in many jurisdictions to study ‘gateway’ courses in mathematics. These courses provide an emphasis on the types of knowledge needed to teach mathematics and present a deeper conceptual focus on mathematical concepts. In general, in the United States, there are a minimum of three such courses associated with primary education focusing on areas such as Number and Operations, Geometry and Measurement, Algebra, Probability and Statistics. Satisfactory completion of these courses is required to progress to Mathematics Pedagogy courses. In many colleges these courses are designed by a team of mathematics educators and mathematicians (including statisticians), thus drawing from the expertise of all partners in mathematics education.

7 It is important to clarify that undergraduate courses in mathematics are not designed, and neither should they be, to supplement the special mathematical requirements of pre-service primary teachers. Research indicates that many pre-service primary teachers, who study mathematics to degree, are unable to ‘unpack’ (Ma, 1999) their understandings gained in mathematics and make connections to pedagogy.

8 While there are many universities which offer courses of this nature, for those who want to read further, we direct you to the courses offered at the following institutions renowned for their emphasis in mathematics education: The University of Delaware, The University of Wisconsin-Madison, The University of Maryland – College Park, and the University of Michigan.
In summary, mathematics is a discipline with a specified body of knowledge and associated skills. Undergraduate mathematics courses are not designed, and neither should they be, to serve the particular needs of education students. Mathematics education is equally a discipline with its own unique body of knowledge and skills. Simply providing more courses in mathematics will not, as research clearly indicates, make our students better teachers of mathematics. What is required are custom designed courses, similar to those existing in other countries, that address the very unique knowledge demands placed on teachers of mathematics.
Section 4: Initial Teacher Education: The case of Primary Level Mathematics Education

Challenges facing Mathematics Educators in ITE
Pre-service mathematics teacher education is expected to help pre-service teachers develop many skills simultaneously such as knowledge, know-how, methods, attitudes and habits (Comiti and Loewenberg Ball 1996). It is extremely difficult to achieve these goals, especially in the limited time and space of initial teacher education (Nesbitt Vacc and Bright 1994).

Length of the Course
At present in Mary Immaculate College the length of the undergraduate teacher education course is three years in duration, the postgraduate course takes 1.5 years on top of an initial degree qualification. Such lengths are among the shortest in the countries partaking in the OECD (2005) study. In several countries, the period available for initial preparation is regarded as inadequate. There has been a tendency in many countries to extend their course in an effort to improve the quality of the programme on offer e.g. Finland extended its course from four to five years, while Australia increased the duration of their teacher education course from four to six years (Government of Ireland 2002; OECD 2005).

We welcome the extension of the course from three to four years. Current mathematics pedagogy provision consists of an amalgam of subject matter knowledge, pedagogical and curriculum knowledge. Due to time constraints and the number of ‘essential’ topics which must be covered in the skeleton course, there is little hope of giving pre-service teachers even basic insights into cognitive research on how children learn mathematics. With the provision of an additional year, we are particularly cognisant that there are limits to how much teacher-learners can ‘take in’ all at once. An additional year will provide opportunities to forge closer links with theory (as presented in our lectures) and practice (as experience in classroom settings). Pre-service teachers will have time to take stock of new insights and in some cases reconstruct their ideas (i.e. reflect on beliefs, experiences, attitudes) about the teaching of mathematics.

Conditions in which pre-service teachers are taught
The minimum group sizes at present in the undergraduate mathematics pedagogy courses are 50 (and frequently 60+). With the best of intentions and effort, combined with state-of-the-art facilities and the innovative use of technologies, it is extremely difficult to model best practices in mathematics pedagogy with such large group sizes. Smaller group sizes would maximise students’ experiences with the opportunities provided for problem-solving, mathematical discourse, exploration of alternative instructional strategies, and utilisation of a range of tools and equipment used in the teaching of mathematics. Furthermore, in order to facilitate pre-service teachers to embrace reform approaches completely, existing beliefs and assumptions
regarding mathematics and its teaching must be examined critically and used as a spring board for alternative experiences (Government of Ireland 2002; Peard 2007).

Characteristics of incoming students

Nature of post-primary mathematics experience (the case of Ireland)
Publicity has been escalating regarding the low levels of mathematical skills evident among Irish third level entrants generally (NCCA 2005b; Hourigan and O’Donoghue 2007). Irish studies concur that post-primary mathematics experience equates mathematics education with the memorisation of formulae and procedures as opposed to thinking creatively, providing reasons for solutions, or solving realistic mathematical problems (Hourigan and O’Donoghue 2007; Leavy and Sloane, 2010; Murphy 2002; NCCA 2005b). On a more positive note, into the future, efforts to ‘address the problem where it arises’ have begun. A new second level curriculum ‘Project Maths’ seeks to promote conceptual understanding and problem solving within realistic contexts (NCCA 2006). In the interim, however, there is no doubt that the nature of the predominant post-primary mathematics experience is exacerbating the demands placed on pre-service educators.

Influence of post-primary mathematics education on subject matter knowledge

International Context: Consensus exists that a teacher must possess a deep understanding of the content they are to teach (Feiman-Nemser 2001; Grossman et al. 2005). Mathematics education is no exception, where research advocates the need for ‘profound’ understanding of the fundamental concepts in order to be able to transform their learner knowledge into teacher knowledge i.e. use of appropriate examples, representation as well as their ability to respond appropriately to learners’ approaches and errors (Hill et al. 2004; Ball et al. 2005; Rowland et al. 2009). Studies internationally have reported that pre-service teachers demonstrate weaknesses in their conceptual knowledge and in some cases even in their procedural knowledge (Ma 1999; Falmer, Gerretson & Lassak, 2003).

The Irish Context: The research which has been carried out by a number of individual researchers in various Irish Colleges of Education (Wall 2001; Leavy 2004; Corcoran 2005a, 2005b; Oldham 2005; Leavy and O’Loughlin 2006; Delaney 2008; Hourigan 2009; Leavy 2009; Leavy and Sloane 2010) reflects international findings. The reality that although all entrants have achieved the minimum mathematics requirements in the Leaving Certificate, many demonstrate inadequate mathematics subject matter knowledge has received some attention (Wall, 2001; NCCA, 2006; Leavy & Sloane, 2010). Another consideration which needs to be mention is the decreasing confidence regarding what grades really signify (grade depreciation). O’ Donoghue (1999) suggests that we can no longer rely, to the same extent as before, on mathematics grades as valid indicators of student competence. The Leaving Certificate and Points system are designed as a selection instrument and as a result mathematics grades achieved in state examinations are not comparable to the same grades in the past (Murphy 2002; Hourigan and O’Donoghue 2007). The Working Group on Primary Pre-service Teacher Education (Department of Education and Science 2002) recommended that the minimum
standards in mathematics for entry to pre-service courses in Colleges of Education should be a grade D3 in Higher Level Leaving Certificate and C3 in Ordinary Level Leaving Certificate (Government of Ireland 2002). A recommendation from the recent report, on the preparation of pre-service teachers to teach the data strand of the primary level curriculum, carried out by Leavy and Sloane (2010) stated that: ‘A focus on mathematical content knowledge of pre-service primary teachers is critical. An increase in the entry level requirement for mathematics of pre-service primary teachers is merited to ensure sufficient levels of mathematical understanding.’ (p. 8)

Insights provided by three studies: Illustrations of how poor mathematical knowledge is manifested in the context of ITE at Mary Immaculate College

**Study 1**
The study of the development and implementation of a needs-led intervention to improve the mathematics subject matter knowledge of primary pre-service teachers found poor performance on mathematics items regardless of grade in Leaving Certificate Mathematics or level of study of mathematics (Hourigan 2009). We present three of the items administered to 272 second-year pre-service teachers at Mary Immaculate College.

**Item 11.** Write the following values below in ascending order (smallest first)

62.5% 1.25 0.375 0.75 ⅛

| Smallest | | | | Biggest |

**Item 13.** Tom spent ¼ of his money in the pet shop. He then spent two thirds of the remainder in the sports shop. What fraction of his money has he spent altogether?

**Item 32.** A barrel of water was used to give animals drinking water during the summer months. John was given a small cylindrical jar (which holds 45ml) to fill the barrel. He started filling at 9.20a.m. and finished at 11a.m. How many jars will it take to fill the barrel?

As can be seen from table 2, it became apparent that while performance in the test overall was found to be positively related to level of mathematics achievement and study to date, in many
items the levels of incorrect answers suggest poor conceptual knowledge and problem solving skills across the board.

In items requiring conceptual understanding such as item 11, where pre-service teachers were required to order the relevant fractions, decimals and percentages, while percentages of failure were higher among subgroups who studied mathematics for less time or at a lower level, substantial levels of inadequate knowledge was apparent across the board. This was also the case in the item requiring problem solving involving fractions (item 13) and capacity (item 32). These findings question the ability of both pre-tertiary and tertiary mathematics education in preparing students with appropriate knowledge and understanding of mathematics for teaching. It also calls in question the adequacy of current practice in relation to minimum entry requirements for the course (D3 O/H level LC mathematics). Such findings support research which questions the ‘meaning of grades’ and highlights the gaps and weaknesses in Leaving Certificate students at all levels (O’ Donoghue 1999; NCCA 2006). The findings also support the proposal that studying mathematics at degree level may not be conducive to the development of mathematics subject matter knowledge for teaching (Steffe 1999; Kahan et al. 2002; Goulding 2003).

<table>
<thead>
<tr>
<th>Item</th>
<th>Brief Description</th>
<th>LC OL % (N=)</th>
<th>LC HL % (N=)</th>
<th>LC Only % (N=)</th>
<th>Minor % (N=)</th>
<th>Major % (N=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Order rational nos.</td>
<td>68.4% (93)</td>
<td>37% (30)</td>
<td>62.7% (104)</td>
<td>45.7% (16)</td>
<td>40.6% (13)</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Fraction Problem</td>
<td>77.9% (106)</td>
<td>65.4% (53)</td>
<td>79.5% (132)</td>
<td>65.7% (23)</td>
<td>53.1% (17)</td>
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</tr>
<tr>
<td>32</td>
<td>Capacity Problem</td>
<td>62.5% (85)</td>
<td>43.2% (35)</td>
<td>62.7% (104)</td>
<td>40% (14)</td>
<td>43.8% (14)</td>
</tr>
</tbody>
</table>

LC OL: Studied mathematics at Leaving Certificate Ordinary Level
LC HL: Studies mathematics at Leaving Certificate Higher Level
LC Only: Studied mathematics to Leaving Certificate only
Minor: Studied mathematics as minor degree subject
Major: Studied mathematics as major degree subject

Table 2: Failure Levels of Various Subgroups on Individual Pre-test Items

Study 2
In a recent study by Leavy and Sloane (2010), 118 entry-level pre-service teachers were requested to construct a pie chart when presented with 30 data values (the pie chart was selected as it is the target of instruction in the Primary School Mathematics Curriculum. 34% of participants correctly constructed a pie chart and the remaining 66% of participants were unable to construct the pie chart. Of the latter, 14% of participants displayed considerable difficulty in constructing the representation – these participants completed the task but the resulting pie chart did not accurately illustrate the data. Almost half of all participants did not
complete the task (see figure 5). Further examination of figure 4 reveals interesting insights into mathematical understandings (note that effort to sum the columns of values). Examination of these responses shows that a variety of methods were used to construct the graph. However many respondents wrote on the survey that they ‘could not remember how to do it’ (see figure 6) and did not make any effort to represent the data.

![Pie Chart Attempt](image1)

**Figure 5: Incomplete attempt to construct pie chart**

![No Pie Chart Attempt](image2)

**Figure 6: No attempt to construct pie chart**

Poor mathematical content knowledge is not confined to the undergraduate students. A recent examination of the content knowledge of 60 postgraduate students at Mary Immaculate College found that 20% were unable to construct a triangle that had an angle of 110 degree. The task required participants to construct a triangle with one side 4cm, one side 6cm and the angle between these side having a of measure $110^\circ$. 20% of participants constructed triangles with angles of 70 degrees (see figures 7 and 8 below).

![Triangle Attempt](image3)

**Figure 7**

![Correct Triangle](image4)

**Figure 8**
In summary, these brief illustrations of content knowledge deficiencies provide an insight into the challenges faced in mathematics teacher education at MIC. Mathematics pedagogy courses are not designed to teach mathematics content – the presumption exists that students understand the mathematics they are going to teach. We are constantly struggling to meet the subject-matter knowledge demands of pre-service teachers in the absence of resources to address these needs.

In order to address the issue of substandard subject matter knowledge, Shiel et al (2006) support the Working Group’s recommendation that pre-service teachers should be provided with Professional Mathematics courses which would facilitate them to develop mathematics competence as well as their ability to reason mathematically and teach mathematics effectively.
Section 5: Other Important issues

The Role of the Arts in Mathematics and Science Education

We advocate for the important role played by drama in the primary classroom and believe that drama makes a valuable and unique contribution to the development of the child. Apart from the contribution of drama as a subject in its own right, a large body of literature exists supporting the notion that many scientists employ the arts as scientific tools. This research has revealed the interconnectedness between the arts and sciences. Studies of creativity have revealed that eminent scientists, mathematicians and engineers have drawn heavily on skills developed in areas of the arts (for example, spatial and kinesthetic thinking underpin studies of movement and rotation). The arts have inspired scientific progress – and Root-Bernstein, amongst others, argues that the contribution of the arts can be found in the invention of new techniques (virology research on polio vaccines was informed by Richard Buckminster Fuller’s geodesic structures), structures (protein structures have been modeled drawing from the Sculptor Kenneth Snelson’s invention of tensegrity; Computer chips are manufactured using methods adapted from the printmaking techniques of silk screening and etching) and the development of new aesthetics (pixelation was developed by artists in the pointillism movement). Robert Root-Bernstein, who researches the arts and creativity, states ‘active participation and demonstrated ability in one or more of the arts are far more predictive of success in science than standard measures such as scores on tests such as the SAT, or academic degrees’.

‘I found that the more I worked with [chromosomes], the bigger and bigger [they] got, and when I was really working with them I wasn't outside, I was down there. I was part of the system.... As you look at these things, they become part of you. And you forget yourself. The main thing about it is you forget yourself.’ (McClintock, quoted in Keller, 1983, pp. 69, 117).

The use of the imagination, acting and inventing have played important roles in the advancement of the sciences. This is particularly evident in the work of Barbara McClintock, who received a Nobel Prize for her work in genetics. She reporting empathizing with and having a feel for the organisms she worked with.

‘I do not remember exactly at what point I began to apply this way of examining my experience, but very early in my life I would imagine myself in the position of the object in which I was interested. Later, when I became a scientist, I would picture myself as a virus, or a cancer cell, for example, and try to sense what it would be like to be either. I would also imagine myself as the immune system, and I would try to reconstruct what I would do as an immune system engaged in combating a virus or cancer cell.’
Dr. Jonas Salk (1914-1995), Nobel prize nominee and developer of the Salk vaccine for polio, referred to the concept of "perceptual positions" in his work with viruses and cancer cells.

It is critical that we do not underestimate the ways in which the arts have contributed to innovation and the advancement of the sciences.

**Early Childhood Education**

In the US the National Association for the Education of Young Children (NAEYC) and The National Council of Teachers of Mathematics (NCTM) have spoken with one voice in respect to the assertion that ‘high quality, challenging and accessible mathematics education for 3- to 6-year olds children is a vital foundation for future mathematics learning’ (NAEYC & NCTM, 2002: 1). To support high quality mathematics education for 3- to 6-year-old children the NAEYC & NCTM (2002: 3) suggest that policy makers, institutions and programme developers should:

- Create effective early childhood teacher preparation and CPD
- Develop high quality standards, curriculum, and assessment
- Provide structures and policies that support teachers’ ongoing learning, team-work, and planning
- Provide resources to support children’s mathematical learning

Providing high quality mathematical experiences to children in the early years is a complex task which includes high quality curriculum development, effective ITE programmes and CPD, etc.

The draft report’s recognition of the importance of providing high-quality early childhood education which fosters a firm foundation in numeracy skills is welcomed. In Ireland the Primary School Curriculum (1999) supports children’s learning from four to twelve years and *Aistear*, the Early Childhood Curriculum Framework, addresses learning from birth to six years. The NCCA contends that *Aistear* and the Primary School Curriculum can complement each other ‘and when used together and supported by appropriate resources, can make a significant contribution to the experiences of both teachers and children in infant classrooms’ (NCCA, 2009: 21). However the NCCA note that ‘a critical question remains to be answered concerning the status of *Aistear* vis – à – vis the Curriculum’ (ibid).

The report’s recommendation that the infant curriculum needs to be reviewed ‘to bring it into line with the approaches to teaching and learning advocated in the *Aistear* framework’ (p.27) needs greater consideration. We believe a rationale for this recommendation needs to be given especially in light of the fact that there has been no rigorous evaluation of the implementation of *Aistear*. Furthermore, we feel that issues such as effective ITE programmes with emphasis on early childhood mathematics education, specialised CPD on teaching mathematics in the early years, provision of high quality curriculum, etc. need to be carefully considered when aiming to improve the teaching and learning of mathematics in the early years.
Provision for students with special needs in mathematics
The lack of adequate support for pupils with special educational needs in mathematics has been equally highlighted as problematic since the introduction of the Primary School Mathematics Curriculum’ (1999). The various studies which were carried out in order to evaluate the levels of implementation of the Primary School Mathematics Curriculum concurred that one of the major challenges teachers faced was the difficulty in catering for the range of mathematical abilities and needs which existed in their classrooms (NCCA 2005a; Government of Ireland 2005 a,b). In the National Assessment of Mathematics Achievement (2004) study 12% of qualitative comments received from teachers referred to the difficulty in implementing the curriculum due to the demands of dealing with the range of needs and abilities of pupils in their classrooms (Surgenor et al. 2006).

Meeting the needs of exceptionally able children
The report’s acknowledgement of the importance of differentiation is to be welcomed. We recommend that the DES considers the needs of the more able student in mathematics in further reports. This is particularly important to consider given that the NCCA, in collaboration with the Council for Curriculum and Assessment (CCEA) in Northern Ireland, published for the first time draft guidelines on exceptionally able children in 2008 which contended that 5 – 10% of the school population may be exceptionally able (NCCA 2008: 8).

Recent international studies reveal that able students in Ireland are not performing as well as we would hope. The 2006 Programme for International Student Assessment (PISA) found that higher achieving students in Mathematics in Ireland ‘could do better’ (Eivers et al., 2007: 36). More specifically, 15 year-old students at the 90th percentile in Ireland obtained a score that was 14 points lower than the OECD average score at that benchmark in PISA (2006) (Shiel et al. 2007: 46).

At a national level the 2004 National Assessment of Mathematics Achievement found that ‘teachers’ comments largely suggest that they experience some difficulty in attending to the needs of pupils with varying abilities’ (Surgenor et al. 2006: 23). Few school plans ‘included statements relating to...provision of enrichment activities for more advanced pupils’ (Surgenor et al. 2006: 27). In the report, responding principals voiced a general level of satisfaction with the Primary School Mathematics Curriculum but stated that they were concerned ‘that the curriculum provided fewer challenges for average and above average pupils’ (Surgenor et al. 2006: 27).

These studies highlight that catering for exceptionally able children in Irish primary schools is a matter of concern. Teachers need to be supported over an extended period in their attempts to implement a differentiated mathematics curriculum for children including exceptionally able pupils. This could take the form of working in collaboration with colleagues, continuous professional development, development of relevant challenging resources that correspond with the PSMC and work with outside agencies such as the Centre for Talented Youth in Ireland (McMahon 2004). In addition, problem solving needs to become an integral part of
Meeting the needs of children experiencing difficulty with mathematics
Since the introduction of the Primary School Mathematics Curriculum (1999), levels of learning support provision for mathematics were perceived by teachers to be poor and a common source of dissatisfaction (Shiel et al. 2006). In the NAMA (2004) study just over half of the pupils (50.6%) attended school where learning support in mathematics was available (Surgenor 2006). Carr (2004) suggests that these facts may not be a true reflection of what is happening on the ground. The truth may be disguised due to the fact that when the government claims that ‘...children have access to learning support. This hides the fact that many learning support teachers are shared between anything up to six or seven schools. In other schools learning support teachers simply have too many pupils in their case loads’ (Carr, 2004: 1-2). In the NAMA (2004) study, while 15.6% of pupils were deemed to be in need of learning support in mathematics, only 6.8% of pupils were receiving the necessary support (Surgenor et al. 2006).
It was also found that 96.1% of pupils attended schools where no junior or senior Infants received learning support in mathematics (Shiel et al. 2006). Carr (2004b) proposes that problems that remain unchecked at the early stages of education (i.e. primary level) lead to the perception that mathematics is ‘a difficult subject’. It also leads to children developing negative attitudes to the subject at an early age.

The draft report refers to the need to target ‘available additional resources to improving the learning opportunities and achievement of children who come from the most disadvantaged communities’ (p.13). This recommendation is laudable and necessitates dedication of resources to support its implementation. However there is research to suggest a history of inequity in the distribution of resources in the learning support service in addressing low achievement in mathematics in designated schools compared to non-designated schools. These concerns regarding equity issues for pupils in schools in areas of socio-economic disadvantage in accessing learning support for mathematics at primary level are concerning and these structures need to be addressed by the DES.9

Another issue which persists in relation to learning support is the disparity which exists between provision in relation to Mathematics and English. Carr (2004b) confirmed that the current learning support service prioritises literacy, where children with mathematical difficulties are provided a service only if there is spare capacity. In the study of disadvantaged

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9 See the following research:


schools approximately half of the schools involved had no learning support provision for numeracy (Government of Ireland, 2005 b.). Over time this imbalance remains, where the EGFSN (2008: 3) reports that ‘...such pupils receive three times more assistance with their English as they do with their maths from learning-support teachers’. Surgenor and Shiel (2008) label mathematics as the ‘Cinderella subject’ of learning support.

Assessment

The draft report states that improvement in schools can be promoted by improving radically the assessment and reporting of progress at student, school and national level. We agree that assessment is required but further reports/guidelines should highlight that assessment is more than just testing (NCCA 2007: 7). The NCCA (2007: 66) outline various assessment methods including self-assessment, conferencing, portfolio assessment, concept mapping, questioning, teacher observation, teacher designed tasks and tests and standardised testing. These should all be explored in depth to see how they can be used effectively to help children improve their mathematical understanding. The use of appropriate assessment methods is particularly pertinent given that the inspectorate found that in 34% of the mathematics lessons evaluated during incidental visits assessment practices were unsatisfactory (DES 2010b).

Assessment is not a panacea; we have to also address the social and economic factors that affect schools and the children that attend them. We need to very carefully construct what we mean by ‘assessment’ and the reports references to ‘relentless assessment’ are worrying. Overemphasis on summative assessment results in lost opportunities for learning that arise from formative assessment. If we look to the case of the United States and the assessment focus placed by the No Child Left Behind (NCLB) movement, we can avoid the failings of this high stakes assessment movement. Research on the outcomes of NCLB documented the narrowing of the curriculum to just what is tested, and found a huge increase in time spent in test preparation instead of genuine instruction. The work of Berliner found

‘teachers concerned about their loss of morale, the undercutting of their professionalism, and the problem of disillusionment among their students. Teachers and administrators told us repeatedly how they were not against accountability, but that they were being held responsible for their students’ performance regardless of other factors that may affect it. Dentists aren’t held responsible for cavities and physicians for the onset of diabetes when youngsters don’t brush their teeth, or eat too much junk food, they argue.’

Let us hope that in 10 years time we will not be in a similar position as our colleagues in the United States reflecting on the aftermath of NCLB

‘we are turning America into a nation of test-takers, abandoning our heritage as a nation of thinkers, dreamers, and doers.’ (Berliner and Nichols 2007, p. 48)
Section 6: Recommendations

The need for an integrated and coordinated response from all providers of mathematics education at all levels

Given the evidenced impact of pre-tertiary education on tertiary education, there is a critical need for change in practices at all levels of mathematics education. It is essential that the provision of mathematics at all stages of pre-tertiary education (i.e. both primary and secondary) reflect best practices. The EGFSN (2008) highlights the need to ‘mainstream’ good practice. Smooth transitions are essential across all levels of education and unless there is a coordinated effort to make reform across both primary and secondary education then advances made at primary level cannot be built upon and progressed at post-primary level.

Actions aimed at addressing mathematics content knowledge deficits of pre-service primary teachers

Dissatisfaction with the nature of pre-service teachers’ subject matter knowledge has resulted in an accountability movement in various education systems internationally e.g. US, UK. In such contexts standards were introduced and rigorously tested at various levels. For example, UK students must complete a mandatory test in mathematics in order to provide evidence of secure subject matter knowledge for Qualified Teacher Status (QTS). In the US, many states assess mathematics knowledge of pre-service teachers as part of their licensure process through the administration of Basic Skills Tests such as the Praxis.

Primary level pre-service teacher candidates are required in many jurisdictions to study ‘gateway’ courses in mathematics. In general in the United States, there are a minimum of three such courses associated with primary education focusing on Number and Operations, Geometry and Measurement, Algebra, Probability and Statistics. Satisfactory completion of these courses is required to progress to Mathematics Pedagogy courses.
While it is important to improve initial teacher education, this alone is insufficient (OECD 2005). The Commission of European Communities (2007) acknowledge that initial teacher education cannot provide the array of skills and knowledge necessary for a life-time of teaching. Pre-service education must be supplemented by ongoing professional development (OECD 2005; European Commission 2007). If qualified teachers do not adopt the role of lifelong learners, there is a great probability that they will experience feelings of inadequacy in the early months/years of practice (Burke 2000).

However, it is critical that the professional development opportunities are monitored to ensure the provision of experiences that support classroom teachers in their daily work. There is a broad expanse of literature examining the provision of continuing professional development (CPD) and efforts should be made to design CPD opportunities which reflect best practices in the field. For example, in mathematics education there is the need for CPD which provides opportunities to translate traditional research knowledge into forms pre-service and practising teachers can use to improve their practice. One such approach is Lesson Study, a Japanese form of professional development involving the design and observation of live lessons, called research lessons, by a group of classroom teachers. Lesson Study has been successfully implemented for the past 5 years at Mary Immaculate College with pre-service teachers.

**Recommendation 1**

- An increase in the pre-professional mathematics requirement i.e. an increase in the minimum grade achieved in Leaving Certificate Mathematics.

**Recommendation 2**

- The provision of targeted courses in mathematics that develop conceptual understandings of mathematics concepts critical to primary level educators. These courses should be aligned with the primary curriculum strands and address Number, Shape and Space, Statistics and Probability, Algebra and Measurement.

**Recommendation 3**

- The requirement that a passing grade in Mathematics Pedagogy courses is required to progress in the programme.

**Recommendation 4**

- The adequate resourcing of the mathematics education area to support the provision of mathematics education courses in groups of 25 students.

**Recommendation 5**

- An increase in the amount of contact time in ITE programmes to ensure that pre-service teachers gain experiences with innovative pedagogies across all strands of the primary curriculum for students of all ages and abilities.

**Actions aimed at supporting practising teachers in their teaching of mathematics**

While it is important to improve initial teacher education, this alone is insufficient (OECD 2005). The Commission of European Communities (2007) acknowledge that initial teacher education cannot provide the array of skills and knowledge necessary for a life-time of teaching. Pre-service education must be supplemented by ongoing professional development (OECD 2005; European Commission 2007). If qualified teachers do not adopt the role of lifelong learners, there is a great probability that they will experience feelings of inadequacy in the early months/years of practice (Burke 2000). However, it is critical that the professional development opportunities are monitored to ensure the provision of experiences that support classroom teachers in their daily work. There is a broad expanse of literature examining the provision of continuing professional development (CPD) and efforts should be made to design CPD opportunities which reflect best practices in the field. For example, in mathematics education there is the need for CPD which provides opportunities to translate traditional research knowledge into forms pre-service and practising teachers can use to improve their practice. One such approach is Lesson Study, a Japanese form of professional development involving the design and observation of live lessons, called research lessons, by a group of classroom teachers. Lesson Study has been successfully implemented for the past 5 years at Mary Immaculate College with pre-service teachers.
working in concert with local schools (Leavy, Hourigan and McMahon, 2010). Innovative approaches such as Lesson Study has been found to be highly effective with classrooms teachers and provide opportunities for a radical change in how professional development is provided in the Irish education system.

**Recommendation 6**

- The provision of professional development in mathematics education and the monitoring of the CPD provision to ensure the delivery of high quality courses responsive to the needs of teachers.

**Actions aimed at assisting parents and communities to support the development of mathematical literacy**

Anecdotal evidence from schools and parents indicates that parents have difficulty supporting the mathematical literacy of their children. This may occur as a result of their own mathematical competency, their attitudes and experiences of mathematics, or due to lack of familiarity with new pedagogies and approached to teaching mathematics (for example the ‘decomposition’ versus ‘borrow-and-pay-back’ methods of subtraction).

**Recommendation 7**

- The provision of opportunities for parents to refresh and update their own understandings of mathematics with specific attention to everyday approaches to support the development of their children’s mathematical literacy.


Gaeilge

Seán de Brún, Seán Ó Cathalláin, Siobhán Ní Mhurchú
Luaitear sa dréachtphlean ar litearthacht agus uimhearthacht go mbaineann an dréachtphlean seo le chéad teanga na scoile (DES, 2010a: 9, 29), an Ghaeilge i gcás na scoileanna Gaeltachta agus na scoileanna lán-Ghaeilge. Ach tuigitear dúinn gur litearthacht Bhéarla amháin atá faoi chaibhid. Má tá litearthacht sa Ghaeilge san áireamh, an bhfuil aon fhianaise sa dréachtphlean a léirionn go bhfuil géarghá le plean náisiúnta litearthachta don Ghaeilge do na scoileanna T1? Níor deineadh aon bhreathnú ar aon cheacht Ghaeilge i Scoileanna T1 nó T2 mar chuid de thuairisc na gcigirí (DES, 2010b). É sin go léir ráite, táimid go mór i bhfábhar gníomhú chun feabhas a chur ar chaighdeán litearthachta na bpáistí sna scoileanna seo.

**Scoileanna Gaeltachta agus Scoileanna lán-Ghaeilge**

**An Comhthéacs**


**Moltaí**

**Forbaírt na Litearthachta agus Taighde V Tástáil agus Tuairiscíú**

B’fhéarr go móir an bhéim a chur ar fhorbaírt na litearthachta sna scoileanna seo seachas an bhéim a chur ar thástáil agus ar thuairiscíú. Chuige sin ba chóir tacú le scoileanna Gaeltachta, mar shampla, cláir litearthachta scoilbhuaithe agus pobalbhunaithe a fhorbaírt agus a chur in oiriúint do na leanaí faoiain gcúram, ag cur san áireamh oidhreacht, cultúr, seanchas agus béaloideas an cheantair, agus le bhéim ar chur chuige traschuráilte. Tá ábhar den scoth foilsithe ag an Aonad Forbartha Curaclaim i gColáiste Mhuire gan Smál cheana féin (Ó Cathasaigh, 1998; 2003; 2009) a chabhródh go móir le múinteoirí an cur chuige seo a chur i bhfeidhmi sa seomra ranga.
An Curaclam

Ba chóir anois athbhreithniú iomlán a dhéanamh ar an dá churaclam Gaeilge (Scoileanna T1 agus T2).

Eolas Gairmiúil an Mhúinteora

Ní mór cúrsaí réamhsheirbhise a sholáthar chun eolas agus tuiscint na n-ábhar múinteoirí ar fhorbaírt an dátheangachais agus ar fhorbaírt na délitearthacha a chothú. Chomh maith leis sin ní mór oiliúint ghairmiúil leanúnach (OGL) scoilbhunaithe, le linn na scoilbhliana, a chur ar mhúinteoirí i scoileanna T1 chun eolas agus tuiscint an mhúinteora ar fhorbaírt an dátheangachais agus ar fhorbaírt na délitearthacha a chothú.

Measúnú


Soláthar Múinteoirí

Tá sé in am anois cúrsaí ar leith a fhorbaírt chun struth leanúnach múinteoirí lán-cháilithe a chur ar fáil atá toilteanach agus ábalta teagasc go héifeachtach trí mheán na Gaeilge (Mac Donncha et al. 2005; Máirtín, 2006).
Litearthacht sa Dara Teanga do na Scoileanna T2

An Ghaeilge sa Churaclam

Is cuid lárnach de churaclam na bunscoile i an Ghaeilge. Moltar sa churaclam Gaeilge na ceithre scil teanga, éisteacht, labhairt, léitheoireacht, agus scribhneoireacht a forbairt go córaisach agus a chomhtháthú lena chéile. Faraoir, ní thugtar aon aitheantas don litearthacht sa dara teanga sa dréachtphlean don litearthacht agus don uimhearacht.

Moltaí

Litearthacht sa Dara Teanga

Is gá tacaíocht chuí a thabhairt do mhúinteoirí i scoileanna T2 litearthacht sa dara teanga a chothú (An Roinn Oideachais agus Eolaíochta, 2007). Chuige sin ní mór réimse mór leabhar doleana, leabhair leictreonacha, agus bogábhar don chlár bán idirghníomhach a sholáthar, maraon le hoiliúnt ar ghnéithe nua-aimseartha TEC a chur ar mhúinteoirí.

Teagasc trí Ghaeilge

Tuairiscionn Harris et al. (2006) go dtacódh 24% de na tuismitheoirí i scoileanna T2 nach muintear aon ábhair trí Ghaeilge iontu le hábhar nó dó a theagasc trí Ghaeilge. Ag easc naír is an taidh sin molann na húdair chéanna tacaíocht a thabhairt do scoileanna ar mhian leo ábhair eile a theagasc trí Ghaeilge chun croí-chláir leathnaithe nó cineálacha idiarmheánacha den tumaideachas a tharbairt agus a chur i bhfeidhm. Bheadh an chur chuige seo ag teacht leis an ngluaiseacht oideachais ar a dtugtar ‘foghlaím lánpáirtithe ábhair agus teanga’ (Marsh, 2002), gluaiseacht ‘átá ag fáil tacaíochta go gníomhach ó Rannán Pholasáí Teanga Chomhairle na hEorpa’ (Harris et al., 2006: 178).
Oiliúint Ghaímiúil Leanúnach (OGL)

Ní mór oiliúint ghairmiúil leanúnach scoilbhunaithe, le linn na scoilbhliana, a chur ar mhúinteoirí i scoileanna T2 chun eolas agus tuiscint an mhúinteora ar shealbú an dara teanga agus ar fhorbairt na délitearthachta a chothú.

Measúnú

B’fhéarr go mór an bhéim a chur ar mheasúnú foirmitheach bunaithe ar dhírbhreathnú an mhúinteora, ar thascanna agus trialacha dearthá ag an mhúinteoir, ar phróifílí curaclaim (An Roinn Oideachais agus Eolaíochta, 1999b: 173-174), agus ar bhailiúchán d’obair agus de thionscadail an pháiste (An Roinn Oideachais agus Eolaíochta, 1999b; Ní Mhurchú, 2000).

Cumas Teanga an Mhúinteora

Baineann laigí le cumas teanga 25% de mhúinteoirí bunscoile agus tá deacrachtaí suntasacha ó thaobh labhairt na teanga ag 9% de na múinteoirí (An Roinn Oideachais agus Eolaíochta, 2007). Tá na huimhreacha seo ag teacht leis an taighde a dhein Harris et al. (2006). Dá bhri sin ba chóir na coinniollacha iontrála Gaedlge don chúrsa B.Oid. a ardú ó C3 go B1 san Ardteistiméireacht (ardleibhéal). Chomh maith leis sin beidh gá le córas tacaíochta leanúnach chun cabhrú le hábhair mhúinteoirí agus le mhúinteoirí lán-cháilithe feabhas a chur ar a gcumas Gaeilge.
Tagairtí


DES (2010a) Better Literacy and Numeracy for Children and Young People: A Draft National Plan to Improve Literacy and Numeracy in Schools. Dublin: DES.


