A Chara,

In our capacity as mathematics educators in Coláiste Mhuire, Marino Institute of Education, we wish to respond to the Draft National Plan to Improve Literacy and Numeracy in Schools. We found the draft document to be stimulating and broad, with many worthwhile proposals. Although there are many areas of interest to us, we respond in particular to three areas. They are initial teacher education and continuing professional development in numeracy, the content of mathematics textbooks, and the promotion of parental involvement. We finish by identifying three additional areas that we believe merit further elaboration in the final report.

1. Mathematics Courses in ITE and CPD

Increased understanding of the importance of subject matter knowledge in teaching and pupil achievement has occurred over the last three decades since Shulman (1986) introduced the concept of pedagogical content knowledge. In mathematics education, research by Hill, Rowan and Ball (2005) has shown that teachers' level of mathematical knowledge can be worth the equivalent of up to three weeks additional instruction in terms of pupils' gains on standardised mathematics tests. However, the type of mathematical knowledge that benefits pupil learning is mathematics that is applied to teaching, called mathematical knowledge for teaching. Let us illustrate this by means of an example from Deborah Ball's work. Multiplying 35 by 25 is something that teachers need to be able to do and most people who have done fourth class maths can do this successfully.

\[
\begin{align*}
35 \\
\times 25 \\
\hline
875
\end{align*}
\]

But teaching maths requires further knowledge. In the example below a child has done the same calculation and got a wrong answer. If a teacher is to help this child, the teacher first needs to figure out where the child went wrong. This is one of many examples of mathematical work, a kind of applied mathematics that distinguishes a teacher's mathematical knowledge from the knowledge needed by other people who work in mathematically intensive professions.
Measures of this knowledge have been used in an extensive study of Irish teachers' mathematical knowledge and a relationship was shown between the teachers' scores on these measures and the mathematical quality of instruction exhibited in the teachers' lessons (Delaney, 2010). Therefore, we strongly recommend that courses in mathematical knowledge for teaching be a key part of teachers' initial teacher education programmes and their continuing professional development. Modules and courses in developing teachers' mathematical knowledge for teaching would complement existing modules and courses in developing effective teaching methodologies.

2. Textbooks

We agree with the statement on page 17 that encourages the alignment of classroom practice with curricula rather than with textbooks. We recognise the importance of textbooks in supporting teaching and learning in school. However, we also recognise that existing textbooks contain errors and limitations (e.g. Charalambous, Delaney, Hsu, & Mesa, 2010; Delaney, 2005) that may militate against the effective implementation of the curriculum. We recommend that any mathematics textbooks used in Irish schools be approved on behalf of the Department of Education and Skills by subject experts with postgraduate qualifications in mathematics education.

3. Parental Involvement

The draft plan acknowledges the important role of parents in promoting literacy and numeracy. However, the focus is primarily on literacy and on information provision both at national and school level. For parents to be active partners in promoting their children's numeracy, a supportive relationship between parents and teachers is required. In order for this to move from aspiration to practice, teachers need specific guidance on how to involve parents in their children's numeracy development in a more meaningful way. In many cases parents only engage on the teachers' professional terms and both pre-service and in-service training is necessary to provide guidance in how to develop partnerships which work (Schecter & Sherri 2009; Epstein & Sanders 1998 and Addi-Raccagh & Arviv-Elyashiv 2008).

In Marino Institute of Education an elective programme is offered to student teachers to help them understand the challenges and opportunities that can come from developing partnerships with parents to support their children's mathematics education (for more see O'Dowd (2009)). Many teachers have had little training to date in establishing partnerships with parents and consequently we recommend that professional development for teachers in numeracy needs to enable teachers to establish such partnerships.
We would welcome the opportunity to discuss the issues above and other matters with the authors of the draft plan before they prepare the final document. Among the other issues that merit attention are interventions geared towards changing teachers' beliefs about the teaching of numeracy, initiatives to address gender-specific underachievement in numeracy and literacy and the inclusion of references to research evidence that informs any initiatives proposed.

Yours sincerely,

Seán Delaney, Ph.D.                         Valerie O'Dowd, M.Sc.


