

Response to the Literacy, Numeracy and Digital Literacy Strategy Consultation

The Irish Committee for Mathematics Education – a subcommittee of the Irish Mathematical Society

Numeracy, and mathematics more widely, underpins almost every aspect of modern society. We applaud the emphasis being placed on numeracy by the Department of Education, and are grateful for the opportunity that this consultation provides us with to help shape future developments.

As the Education Committee of the Irish Mathematical Society (which in turn is a member society of the European Mathematical Society), we represent the educational concerns of the professional body for mathematicians in Ireland. We are approaching this consultation process as both mathematicians and mathematics educators working in third-level institutions. Although the focus of this consultation does not encompass activities at third-level, the success or otherwise of mathematics education at both primary and secondary level has a direct impact on our ability to train our students to the level demanded by the modern workplace, and ultimately on Ireland's international competitiveness. In addition, we feel that a high quality mathematics education system will lead to a more numerate adult population.

Our submission is divided into four main themes: attracting teachers into mathematics, continuous professional development for teachers, the quality of textbooks, and the mathematics syllabi. We would like to propose suggestions in each of these areas. The details are laid out below.

1. Attracting teachers into mathematics

There is a national shortage of mathematics teachers (and in STEM subjects more generally). Steps should be taken to encourage graduates into the profession, and also to retain teachers once trained. We have three proposals to make in this direction.

- i. We propose the introduction of financial incentives (e.g. scholarships) for students to undertake teacher training, followed by salary supplements for these teachers when they enter the workplace. This would bring Ireland in line with other competitor countries. For example, these kinds of initiatives have been standard practice in the UK for many years. In addition, similar scholarship programmes in Canada and Australia have led to more minority groups entering the teaching profession (something which is also desirable in Ireland).
- ii. We suggest the use of quotas for entry into programmes for pre-service teachers to ensure that sufficient numbers of teachers of mathematics and other STEM subjects graduate each year in order to meet national demands.
- iii. We should look to increase the number of subject-specific pedagogy instruction hours as part of the teacher training process. Such a move would reflect both the importance of, and difficulties involved, with delivering quality mathematics education in the classroom.

2. *CPD for teachers*

There are two aspects to CPD training as far as mathematics is concerned: classroom practice, and the subject of mathematics itself. Many of our members are not qualified to comment on the former: this is in the realm of those with experience in the primary and secondary classroom. However third-level mathematicians, as the national experts in our subjects, have a role to play in the latter. We would encourage the Department of Education to use the expertise of mathematicians to ensure the mathematical accuracy of all CPD including any shared resources, as well as allowing us to provide insight into the subject beyond what is taught in classrooms. We believe that there would be enthusiasm among many third-level mathematicians to participate in such schemes.

3. *The quality of textbooks*

We are aware that to a very large degree, the mathematics which is taught in classrooms across the country is strongly influenced by the textbooks used. For this reason, it is of the utmost importance that the textbooks used are accurate and appropriate. It would be very helpful if the Department of Education would set up a committee to oversee the quality of textbooks used in Ireland. Such a committee could contain both mathematics teachers and mathematicians. Textbooks meeting the standard could then be placed on an official list of approved books, and teachers could use these with confidence. From our own analysis, and conversations with many stakeholders, we are concerned that many of the books commonly used in Ireland would not currently meet such a standard. This should be a matter of concern to all involved. However, the process in which a text acquires official approval could include a mechanism whereby any issues with a book could be addressed. Such a system for textbook review is common in many countries, including countries in Asia who score very highly on international tests such as TIMSS and PISA.

4. *Mathematics syllabi*

We have two suggestions relating to curriculum matters.

- i. As it stands, the mathematics syllabi consist of lists of learning outcomes. This is often not very helpful for the mathematics teacher who has to decide exactly how to achieve these outcomes. In practice there are many choices to be made, and the kind of detail required to actually deliver an appropriate course is not supplied. In such an information vacuum, it is natural that the textbook becomes the sole source of teaching wisdom (see 3 above). We propose that the Department of Education should produce a detailed document explaining all of the mathematics that leads to the learning outcomes in the syllabi. We note that such a document already exists for the geometry part of the Junior and Leaving Certificate Mathematics curriculum, and this could be replicated for all other facets of the school mathematics syllabi. Such texts exist in other countries, for example in the USA where the syllabus standards are accompanied by a book for teachers at all levels from K1-K12 (early learning through post-primary). We should emphasize that the proposed document would not be the same as a textbook; the idea is that it would outline and explain the mathematics to the teachers at the level of the teacher, not at the level of the student. This would provide an invaluable, and official, guide to the syllabi, and provide the benchmark to which all textbook writers must adhere. We believe there would enthusiasm among third-level mathematicians to write

such a document, and we encourage the Department of Education to explore this idea with us.

- ii. Occasionally, it might be necessary to make a small adjustment to an existing syllabus. We propose that there should be a mechanism in place whereby this can be done quickly and easily, without prompting a review of the entire programme.

Our committee is very willing to engage with the Department of Education and other state agencies on these matters. We would also welcome being informed of any future consultations in relation to mathematics education in Ireland.

Professor Ann O'Shea

Chair of the Irish Committee for Mathematics Education

Email address: ann.oshea@mu.ie

Webpage: <https://www.irishmathsoc.org/>