



WWW.IMTA.IE

Irish Mathematics Teachers' Association

Submission to Joint Committee on Education, Further and
Higher Education, Research, Innovation and Science

FEBRUARY 27, 2023

1. Introduction

1.1 The Irish Mathematics Teachers' Association is the national association representing and supporting Mathematics Teachers in post-primary schools in Ireland. Our membership continues to grow steadily each year and we now represent and support over 1,300 teachers of mathematics in the 2022/23 school year. This has grown from a figure of 669 in 2019/20. We communicate with our membership regularly, and offer CPD opportunities, conferences and competitions for post-primary students to promote mathematics in a fun and competitive spirit. We also gather members' views on the pressing issues of the day including, but not limited to, curricular developments at Junior Cycle and Senior Cycle, assessment issues including feedback on State Examination Papers, and emerging developments such as those faced in the light of the Covid-19 pandemic. We have gathered much data from our members (and from students) as to their views on some current issues and the future of mathematics education and are delighted to be afforded an opportunity to submit these here. We have surveyed our membership on two recent occasions with response rates of 434 and 444 respectively. The results of these surveys form the basis of many of our points.

1.2 In responding to queries about STEM education, we note that mathematics is a basic discipline in the STEM area. Difficulties have been encountered in trying to spread it across STEM and integrating it with other STEM subjects. In this submission therefore, while noting exciting possibilities for integration and cooperation with other subject areas, we will focus on mathematics as a free-standing subject. We will focus on the following five key areas: Junior Cycle mathematics, Leaving Certificate mathematics, Teacher education, female participation in STEM, and mathematics at primary level.

2. Junior Cycle Mathematics

2.1 The last three years have been difficult for us all in education, and implementing a new specification during a global pandemic is not without its challenges. However, our surveys indicate strong feelings among our respondents about the revised Junior Cycle (JC) specification for Mathematics.

2.2 When asked to state their level of agreement with the statement "Higher Level JC maths prepares students appropriately for Leaving Certificate (LC) maths", only 25.7% of teachers agreed or strongly agreed. As a country focusing its attention on STEM and all it has to offer, this is a most worrying statistic.

2.3 Our members are of the belief that the current JC specification is too long and cannot be adequately delivered in the context of decreased class contact time in many schools. The introduction of 400 mandated well-being hours at JC is having the adverse effect where teachers are frantically trying to squeeze in so much material, often in a very superficial and superfluous way. Many schools have seen reductions in their class contact time with JC students to facilitate the timetabling of wellbeing subjects, with some saying they see 2nd year

students only twice per week. There is no time allowed to fully explore the concepts being taught in the manner that is recommended by the Inspectorate. To fully embrace a new mathematical topic, students need time to practise the skills associated with that topic, then need time to make the necessary links to other topics across the specification as outlined in its unifying strand. Ultimately, for students to fully understand a topic they need additional time to embed the skills associated with the concept while also seeing applications of the skill in any real world scenarios.

2.4 Most notably, however, has been the demotion in the importance of fully understanding the topic of algebra in an entity in its own right. Our members assert that algebraic skills have been diminishing over time since the introduction of the Project Maths examinations in 2012, but the 2022 examination further compounds this. While we acknowledge that the 2022 paper was set in the backdrop of Covid and a disrupted junior cycle, the examination paper has only one question with explicit requirements to do any algebra. It was worth 25 marks out of 220. Algebra is no longer seen as a beautiful topic in its own right; there is no weight given to the beauty in abstract procedures purely for the sake of themselves. Everything now has to have a reason, a real-world situation or a context to be useful. The net effect of this on a shortage of skills at LC level is clear to see. Students struggle majorly with algebra at this level and it has a knock-on effect to their entire experience of the LC syllabus as a result.

2.5 The “one-size fits all” approach to JC mathematics is having a monumentally catastrophic impact on the subject. The HL course is now trying to accommodate those who would have done Ordinary Level (OL) in the JC examinations, as is the new OL accommodating traditional Foundation Level (FL) students. Neither is working in the eyes of our members.

2.6 We call for serious consideration to be given to the reintroduction of a second exam paper at JC HL, with adequate choice on both papers. Concerns have been raised around students’ poor numeracy skills too.

2.7 Removal of Foundation Level Junior Cycle Mathematics: Our members have expressed very emphatically their dissatisfaction that there is no longer a FL course and corresponding examination at JC level (in survey two, 83% agreed/strongly agreed with the reintroduction of the FL Mathematics examination).

2.8 There is a gap out there for students who are above the Level 2 Learning Programme (L2LP) threshold but still find mathematics challenging. In our survey, almost 60% of teachers disagreed/strongly disagreed with the idea that students who are just above the threshold for L2LP can succeed in OL mathematics. Many of these students have significant additional educational needs and find numeracy and literacy very challenging. The literacy levels on the OL paper are beyond many of these students and their wellbeing and mental health is being adversely affected as a result. Many of these students have disengaged from the education system already and have poor attendance rates.

2.9 Classroom Based Assessments: In our first survey, we asked teachers their attitudes to classroom based assessments (CBAs). In survey one, 80% disagreed/strongly disagreed with the idea of CBAs being beneficial to students with only 10% agreeing/strongly agreeing. Our members question the validity of the CBAs and especially question the time aspect if and when we go back to spending 3 weeks in each of 2nd and 3rd year on CBAs. They assert that the CBAs in the current form do not enhance the learning experience or outcomes for students; they are neither formative nor summative and have the potential to allow students embed misconceptions. We would call for a maximum of 1 CBA to be completed going forward (98% of respondents agree/strongly agree with this from survey two); we suggest keeping the CBA on statistics which would be done in 2nd year. This should be in a coordinated timetabled fashion with other subjects, so students would end up doing a maximum of 5 in 2nd year across all of their subjects and the same in 3rd year. This will vary from school to school but expecting students to potentially do 9 CBAs in each of 2nd and 3rd year is unrealistic and does nothing to aid student wellbeing.

3. Leaving Certificate Mathematics

3.1 Members feel strongly that there must be an element of choice on LC examination papers going forward (93.6% agree with this from survey two). The papers are too rigid and this has a negative impact on effective teaching or any exploration of topics in any great detail.

3.2 The course is proving too long to teach in the time available, with many teachers having to offer extra classes to complete the course (from survey two, 85.9% agree that the course is too long given the current time allocation). 66% of respondents (from survey two) report that they have to give additional classes to students outside of regular timetable to get the LC Higher Level (HL) course completed. Either a reduction in the maths syllabus is necessary as a result (along with choice on papers) and/or an increase in the time provided for LC mathematics needs to be provided.

3.3 While it is admirable that the numbers accessing LC HL have grown steadily since 2012, we have to question whether this is in the best interest of all students and the subject in general. Many students are opting to do LC HL for the 25 Bonus points on offer for a grade of H6 or above. From survey two, 80% of our members would like to see some reform in relation to the Bonus points on offer at LC HL. We would call for a thorough exploration of this complicated issue, to commence immediately.

4. Initial Teacher Education/Teacher Recruitment/Retention

4.1 It is of critical concern to our organisation that there is a serious shortage of qualified mathematics teachers in the state at present, despite excellent initiatives such as the introduction of the Professional Diploma in Mathematics for Teaching (PDMT). One of solutions to this issues is possibly financial in nature. We could incentivise qualified mathematics teachers with suitable financial arrangements.

4.2 We must also ensure that we have enough places and relevant incentives in place for people to qualify as mathematics teachers. Entry to some PME courses is dependent chiefly or only on prior academic qualifications and takes no account of the subject(s) being offered by would-be entrants. The model in which *each subject is preassigned a number of places* allows for appropriate priority to be given to applicants offering subjects in which teacher shortage is most acute. At present, we could be turning away many PME hopefuls each year without knowing the subjects they wish to teach. In particular, we need to ringfence places for STEM teachers.

4.3 For many years, Ireland had an oversupply of applicants for places in mathematics teacher education programmes (though not all applicants were suitably qualified). Increased stringency in required qualifications, together with the extension of the programme to two years with the introduction of the PME, have coincided with – and presumably are related to – a sharp fall in numbers of applicants. Consideration should be given to the length of time taken from entering college to qualifying as a teacher, especially in the situation in which student teachers are not paid. The state should foot the bill for prospective STEM teachers or offer them a full reimbursement of their fees after successfully working as a teacher in an Irish school after 5 years (or similar). We need to offer more supports to newly qualified teachers too and pay them a full 22-hour salary but increase their teaching load gradually over a number of years. NQTs should be mentored for a number of hours per week and encouraged to visit other schools and settings during time that they are not scheduled to teach. We need to nurture our NQTs; not scare them off.

4.4 The Teaching Council (TC) needs to give serious consideration to the requirements it specifies for accreditation of teachers. The present ones impose barriers that exclude good candidates. Several emails to the IMTA from qualified scientists, engineers and data scientists who have studied mathematics to the highest level report that they were told that they do not meet the requirements as set out by the TC to be a qualified mathematics teacher. This needs to be addressed urgently.

5. Female Participation in STEM

5.1 More investment and resources should be targeted at encouraging female participation in maths and STEM subjects in general. A huge campaign needs to be launched by the TC and other bodies to entice the brightest female minds into our profession. A similar ad campaign to the LIDL Ladies Football competition would be a wonderful way to start.

5.2 This is an area in which it may be useful to have some all-female options, analogous to the "CodePlus" programme that has entailed groups of girls working together on projects involving programming / aspects of computer science. Research points to encouraging trends with regard to subsequent uptake of STEM subjects.

6. Primary School Mathematics

6.1 It would be worthwhile investigating the amount of time spent on mathematics and numeracy per day in primary school classrooms. Is it uniform across the country/across schools even? Is there scope for some joined up thinking between the two? Many of our members believe that the issues we are facing at post-primary level are a direct result of an overloaded primary curriculum.

7. Executive Summary

7.1 In this submission, the IMTA focuses on five key areas related to mathematics education: Junior Cycle mathematics, Leaving Certificate mathematics, teacher education, female participation in STEM, and mathematics at primary level. Regarding Junior Cycle mathematics, the IMTA expresses concerns over the revised Junior Cycle specification, which we believe is too long and cannot be adequately delivered due to decreased class contact time in many schools. The IMTA also notes a demotion in the importance of fully understanding the topic of algebra in the new specification and calls for the reintroduction of a second exam paper at Higher Level with adequate choice. Furthermore, the removal of the Foundation Level mathematics course and examination at Junior Cycle level is a matter of concern for the IMTA, and our members believe that it has adversely affected the education of students who find numeracy and literacy challenging.

7.2 Regarding classroom-based assessments, the IMTA suggests that only one assessment (on statistics) should be completed in a coordinated timetabled fashion with other subjects, rather than the current nine assessments across all subjects in each of second and third years.

7.3 In the case of Leaving Certificate mathematics, the IMTA believes that the syllabus is too long to be completed in the allocated time and that some elements of choice should be introduced into exam papers. Additionally, we would call for a review on the impact of bonus points for Higher Level mathematics.

7.4 The IMTA is concerned about the shortage of qualified mathematics teachers in Ireland and recommends incentivising teachers through financial arrangements. We also suggest that we ringfence places for STEM education courses and provide more support to newly qualified teachers.

7.5 We call for more investment in and resources for encouraging female participation in STEM subjects in general and mathematics, in particular. The IMTA recommends launching a large-scale advertisement campaign to attract more women to the profession.