

COUNCIL FOR THE MATHEMATICAL SCIENCES

The Institute of Mathematics
and its Applications

The London Mathematical
Society

The Royal Statistical
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Submission to the Select Committee inquiry into the Bologna Process

The Council for the Mathematical Sciences (CMS), comprising the Institute of Mathematics and its Applications, the London Mathematical Society and the Royal Statistical Society, is pleased to present its evidence relating to the inquiry on the Bologna Process. This response reflects the conclusions and recommendations of a CMS report *The Bologna Process and Master's Courses in the Mathematical Sciences*, released October 2006. The report was prepared by a working group consisting of representatives from the three societies as part of the Council's ongoing role of representing the interests of the mathematical sciences to government and other public bodies.

The Bologna Process and Master's Courses in the Mathematical Sciences is presented as an annex to this submission, and is also available online at www.cms.ac.uk/CMSsubmissions.html

Implications of the Bologna Process for the UK Higher Education sector: advantages and disadvantages.

1. The CMS welcomes the process in so far as it encourages more cooperation between and mobility of staff and students. Comparing practices with European (and other colleagues) is a useful corrective to possibly complacency.
2. A structure that is unique to the UK Higher Education sector is the integrated masters courses that exist in mathematics sciences, physics, chemistry, engineering and other subjects. These are enhanced undergraduate courses that typically take one more year to complete than a standard Bachelor's degree. These courses, generally known as MSci, MMath, MChem, MPhys etc., are of great importance within the mathematical sciences in providing sources of well qualified people trained to substantially beyond the First Cycle level, well equipped both to enter employment and to go on to further study.
3. It is vital to the health of these disciplines that such courses are accepted as being equivalent to a combined First and Second Cycle qualification, despite the fact that there is often no clear break point between the cycles in these qualifications. Implementation of the Bologna Process would severely disadvantage the mathematical sciences unless this is the case.
4. Compliance may need some amendments to course design, but it is imperative that generic interpretations of the requirements for compliance evolve in such a way as not to cause unfortunate subject-specific consequences.
5. The funding arrangements for the crucial Second Cycle must be considered by Government. Given the nature of most of these courses, and the arrangements which

were agreed for integrated masters courses, the natural ‘parent’ body to fund the Second Cycle is the DfES and not the Research Councils.

The agenda for discussion at the 2007 meeting in London – clarifying the UK position.

6. The UK has generally welcomed the development of Learning Outcomes as course descriptors, rather than relying on numerical credits; this approach should be supported.
7. Nevertheless, as with credits, there are some current inconsistencies between different statements of Learning Outcomes. Some statements insist that M-level work includes some ‘which is at the forefront of knowledge in a field of work’. This is wholly unrealistic in the mathematical sciences and must be strongly resisted.
8. Statements to the effect that M-level work is ‘informed by the forefront’ are entirely acceptable, as are statements in which the concept of ‘research’ is given a broad meaning. It is on this basis that the integrated masters (MMath type) and one-year postgraduate masters (MSc type) meet the descriptors of Learning Outcomes for the Second Cycle. The CMS supports the use of the Dublin Descriptors as being the most appropriate expectations for the Second Cycle.
9. Clarification of the ‘exchange rate’ between the Credit Transfer and Accumulation Scheme (CATS) and the European Credit Transfer System (ECTS) is needed, and the inconsistencies between the two systems must be resolved.

The implications of a three-phase structure of higher education awards for one-year Masters and short undergraduate courses (HNCs, HNDs and Foundation Degrees).

10. For postgraduate courses (i.e. courses of MSc type), the usual UK practice is to offer a one-year programme containing 180 CATS credits with at least 120 at M-level. This is compliant with the Bologna Process where a Second Cycle qualification typically requires 90-120 ECTS credits with at least 60 at M-level – *unless* cognisance is taken of the apparent limitation of a full calendar year to only 75 ECTS credits. Clarification of this issue is urgently needed.
11. The model of 3+2+3 (BSc + 2-yr MSc + 3yr Doctoral) seems likely in many European countries, but is not the only pattern allowed. It would be very damaging to the future of MMath courses and highly unattractive to UK students if they had to fund themselves for two-years of an MSc course. The importance of proper funding structures is evident.

Awareness and engagement in the Bologna Process within HEIs

12. A lack of guidance has resulted in HEIs responding to the issue rather late in the day and in ways that threaten the uptake of integrated masters courses.
13. Some universities are assuming that their four-year MMath courses do not comply with the Bologna agreement. If universities make individual decisions to cut their courses without coherent guidance, then the outcome would be disastrous for mathematics and other subjects, and for employers who seek these graduates.

14. Students are beginning to make uninformed choices. The MMath graduates of the Bologna-compliance deadline of 2010 have already enrolled.

Opportunities to enhance the mobility of students from the UK

15. The CMS is supportive of opportunities to enhance the mobility of students from the UK and would like to emphasise the extra breadth and employability gained by a period in another country.
16. If student mobility between universities in different European countries is to be a reality then First and Second Cycle qualifications gained in the UK need to be accepted elsewhere as appropriate preparation for a doctorate. Quite apart from considerations of credit levels and length of study, it is true that academic traditions are somewhat different in the UK from those in most other European countries. In a report to the Institute of Physics [*The Bologna Process and UK Physics Degrees*, Gareth Jones (London, 2003), p. 13], referring to the situation in Physics, the author notes that ‘in the UK realistic problem solving, practical skills and applications are probably developed better whereas, in the rest of Europe, the theoretical foundations and advanced theoretical methods are developed better.’ The same is generally true of mathematical sciences. It is worth noting that the UK has been on the whole more successful in maintaining the numbers of students entering university to study mathematics than have other European countries: numbers have declined relative to the whole university cohort, but not as dramatically as elsewhere.
17. In principle the difference in academic traditions should not be a bar to mobility but it is something that universities in the UK and abroad have to take into account. This applies not only to students proposing to study to the next higher level, but also to students who spend a year of their Bachelor’s programme in an EU country.
18. If the UK wishes to redress the balance between incoming and outgoing students it needs to ensure that students are able to speak foreign languages at an appropriate level before they enter university.
19. Students will probably also need extra financial support. Currently, joint degrees are problematic, but mobility can be encouraged without joint degrees.
20. We welcome Erasmus/Socrates exchanges as being of great value, and encourage departments of mathematics in these schemes and to formulate their regulations to facilitate such exchanges.

The possible implementation of a European Credit Transfer System (ECTS) and a focus on learning outcomes and competencies.

21. The CMS is supportive of an ECTS based on learning outcomes, subject to our points made in paragraphs 6, 7, 8 and 9.

Quality Assurance systems in HE (teaching and research): the compatibility of UK proposals and Bologna

22. We believe that the standards set by the Quality Assurance Agency (QAA) in the UK exceed the standards proposed by the Bologna Agreement.

Degree classification reform in light of Bologna

23. The integrated masters degree combines First Cycle and Second Cycle qualifications, but it is not apparent from the way the qualification is badged that both are held.
24. The CMS Bologna Working Group concluded that institutions should make a dual award (First and Second Cycles) at the end of four years (five in Scotland), such as BSc.MMath, with a single classification. The years of the degree programme on which this classification is based can vary between institutions, but must include the final two years.

The broader impact of Bologna across Europe: a more standardized Europe and the consequences for the UK's position in the global market for HE.

25. We accept that mobility and cross-border understanding of degrees are important for the future of Europe, but feel it would be helpful if the Committee deliberated also the deeper strategic issues surrounding education in Europe. In particular, it would seem that the Bologna process is driven primarily by the principle of 'harmonisation'. The implementation of standards is crucial in establishing markets in commodities such as electrical appliances. But education is an extremely personal matter, and the diversity of requirements for educated people is immense. For example, 'conversion masters' can be extraordinarily effective in preparing people for employment, and are internationally attractive, but do not obviously fit in the Bologna structure. There is a risk that the emphasis on harmonisation in Bologna will actually be to the detriment of meeting these diverse needs of employers and society.

Martin Smith
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