



centre for excellence in mathematics and statistics support



The 2023 Mathematics, Statistics and Operational Research Subject Benchmark Statement

Overview

- Disclaimer
- What are subject benchmark statements?
- What's New?
 - Assessment
 - Cross-cutting themes
 - Diversity
 - Accessibility
 - Sustainable Development



Disclaimer

- The QAA co-ordinates the production of Subject Benchmark Statements (SBSs) on behalf of the higher education community
- SBSs are reviewed through a rolling programme such that each SBS is reviewed approximately every five to seven years
- SBSs are written by members of the higher education community chosen by the QAA
- I chaired the Advisory Group that met throughout 2022 and drafted the document that was published, following a sector-wide consultation, in March 2023
- The views I express today are my personal views and not the official views of QAA

History of MSOR SBS

- 2002 1st edition
- 2007 2nd edition
- 2009 MMath annex
- 2014 3rd edition
- 2019 4th edition (very minor amendments to align with revised Quality Code)
- 2023 5th edition

<https://www.qaa.ac.uk/the-quality-code/subject-benchmark-statements/subject-benchmark-statement-mathematics-statistics-and-operational-research>



Subject Benchmark Statement

Mathematics, Statistics and
Operational Research

March 2023



What are Subject Benchmark Statements?

What are SBSs? (Official)

- SBSs define what can be expected of a graduate in the subject
- They are sector-owned reference points developed and written by academics
- Because of devolution, regulatory status of SBSs differs
 - England – not “sector-recognised standards” set out by OfS
 - Scotland – key reference point as part of Quality Enhancement Framework
 - Wales – key reference points as part of Quality Assessment Framework for Wales
 - Northern Ireland – part of current quality arrangements
- **Important points**
 - SBSs are not intended to prescribe any particular approaches to teaching, learning or assessment
 - Responsibility for academic standards lies with the higher education provider
 - Not intended to impose a national curriculum
 - QAA does not like imperatives – as in 2019 “must” appears just once in the document

What are SBS's? (Unofficial)

- A bulwark for MSOR against the “one-size-fits-all” agendas of university management
- 2002 SBS mentions the importance of blackboards
- All five editions of the MSOR SBS have mentioned that very high marks are more often achieved in MSOR than in many other subjects
- All five editions emphasise the importance of the professional judgement of academics, particularly in the area of assessment [See next slide]
- 2023 SBS *Controlled conditions, such as those provided by traditional examinations, are often essential* (Paragraph 3.51) [More about assessment later]

Professional judgement

- Continued emphasis on the importance of professional judgement, particularly in assessment

Some aspects of provider-wide assessment regulations might be less applicable in MSOR than other subjects and may need to be adapted to take account of the inherent nature of the discipline, otherwise the professional judgement of the examiners (internal and external) could be seriously compromised (Para 3.52, 2023)

- For comparison see paras 5.1.5 and 5.1.8, 2002.



What's new?

What's new?

- Academic standards (para 4.5 – 1st bullet)

*A reasonable understanding of the basic body of knowledge for the course of study, normally including calculus, linear algebra and **probability/statistics***

- Following the [2018 Bond Review](#), Academic standards (para 4.5 – 7th bullet)

Familiarity with at least one programming language and competent use of other appropriate MSOR technology

- Frequent reference to **Data Science** as a recent interdisciplinary development in MSOR and other subjects
- Inclusion of **Professional Standards** (para 4.9) in addition to Academic Standards

What's new? Assessment

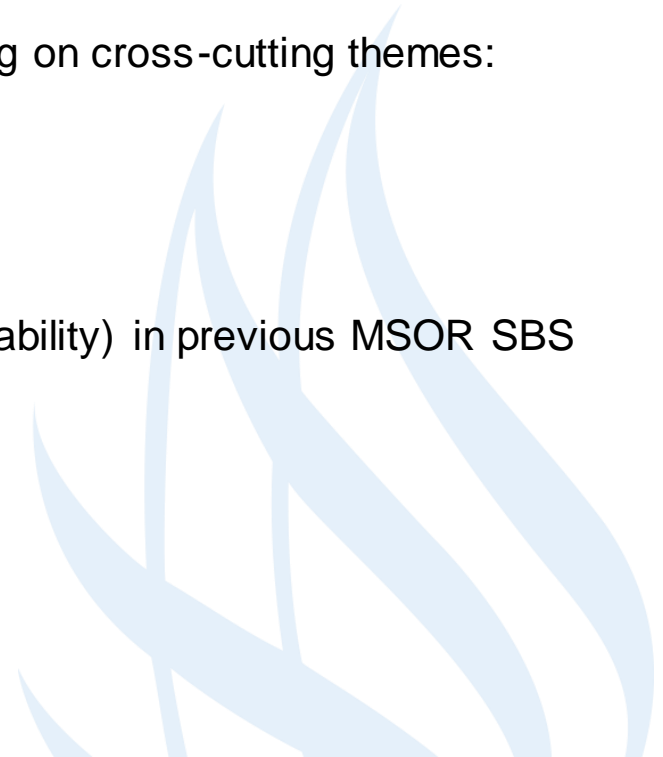
- 2023 SBS contains more focus on what is to be assessed (paras 3.44 and 3.45)
- 3.44 focuses on more “traditional” MSOR skills whilst 3.45 is broader

Summative assessment could also establish the student's abilities ... to:

- * pursue substantial independent projects and write reports*
 - * use existing software and write code*
 - * interpret, evaluate and critique the work of others*
 - * work effectively within a team.*
- Para 3.48 also encourages going beyond on exams
- A wide variety of methods may be used for assessment according to context and purpose, recognising that learners may exhibit different aptitudes in different forms of assessment.*

What's new? Cross-cutting themes

- The Advisory Groups writing SBSs have to work to a QAA provided template
- For 2023, the template contained new sections focusing on cross-cutting themes:
 - *Equality, diversity and inclusion*
 - *Accessibility and the needs of disabled students*
 - *Education for sustainable development*
 - *Employability, entrepreneurship and enterprise education*
- There is very little on these themes (apart from employability) in previous MSOR SBS
- Reflect changes in the sector (and wider society)
- Important for the future health of the discipline



What's new? Diversity

- The word “diversity” is used four times in the 2019 SBS – each time it refers to the diversity of the subjects or the diversity of provision
- How diverse is the MSOR community diverse?
- The recent *Mathematics Pipeline in England* report ([Noyes et al. 2023](#)) shows approximately equal numbers of male and female students achieve GCSE grades A/A* but at undergraduate level there are 65% male and 35% female students
- What follows is a totally unscientific snapshot based on membership of the Advisory Groups that have drafted the different editions of the MSOR SBS

Membership of SBS Advisory Group

Year	n	% male	% white
2002	12	83	92
2007	7	100	100
2009	11	100	100
2014	9	78	100
2019	-	-	-
2023	19	68	95

Membership of SBS Advisory Group

- In 2002, a quick google search revealed biographies of seven members – five of these were educated at Cambridge
- In 2007 and 2009, MSOR Network, HoDoMS, IMA, LMS, ORS and RSS were asked to nominate members of the Advisory Group
- In 2014, EMS were also asked to nominate a group member
- In 2019 there was no Advisory Group as changes were essentially administrative
- In 2023, QAA made an open call for applications to be part of the Advisory Group. Composition of the group broadly reflected the applications.

What's new? Diversity & Identity

- One highly experienced member of the Group voiced the opinion that sometimes they feel that they should not identify as a mathematician because they are not involved in proving new theorems
- Para 1.10 *Providers should take steps to ensure that all MSOR graduates, whatever the nature of the course they have studied, are able to fully identify as professional MSOR practitioners*
- Para 1.23 *MSOR providers should reflect on their curricula and processes to ensure that no group is disadvantaged or othered.*

What's new - Accessibility

- The MSOR SBS identifies areas where MSOR has special requirements in supporting students with disabilities
- For example, assistive technologies such as screen readers and automatic captioning software have limitations when handling mathematical text
- This does not provide a loophole for MSOR not to provide accessible learning resources, rather the SBS calls on HE providers to ensure that MSOR staff have the tools required to do so (para 1.36)

Providers should acknowledge the special needs of MSOR and the deficiencies in many adaptive features of mainstream technology by providing additional resources which may not be needed by subjects where the medium is primarily text based

What's new? Sustainable development

- *MSOR is such a versatile subject that many of the 17 UN Sustainable Development Goals could be discussed in the context of MSOR degrees. MSOR is often taught using real-world examples or in the context of applications in other disciplines. Through these examples and applications graduates can appreciate how MSOR can help society to achieve the UN's sustainable development goals.* (Para 1.45)
- Progress towards the achievement of many of these goals will depend upon the analysis of data and the use of mathematical models.
- Helpful QAA guide: [Education for Sustainable Development Guidance](#)

Thank you for listening

