

Initial view of data:

The Mathematics question (*Did your program include Mathematics (includes Quantitative and/or Symbolic Reasoning)?*) on the End-of-Program Survey led to an overall finding that Math/QR was included in 45%-58% of academic programs between 2006 and 2011. As such, it is clear that the Math/QR division is on the low end in terms of representation across the curriculum (much lower than Humanities and Social Sciences, and comparable with Sciences and Art). Furthermore, the level of math/QR instruction was lower in Math/QR than other divisions. For example, 33%-43% of the Math/QR programs contained content that went beyond the Introductory level (i.e. Intermediate or Advanced). This is less than the comparable figures for Art (37-47%), Sciences (37-52%), Humanities (64-74%) and Social Sciences (60-70%).

What we focused on:

Our work group focused on two features of the Math/QR representation which are masked by the initial percentages above. Overall, we found that the differences between Math/QR and Humanities/Social Sciences were *more* pronounced than these data showed. First, we found that *if* Math/QR are present in a program, they are most likely to be present to only “a little” extent. Second, we found that the grouping of Math and Quantitative Reasoning led to a certain amount of confusion with respect to level of instruction. Essentially, subject matter which by some faculty was represented as “Advanced” (presumably QR) was represented by others as “Introductory” (Math). Thus the majority of “Advanced” work in this category appeared to result from more inclusive interpretations of QR across the curriculum. The paragraphs below elaborate on each of these two findings.

Extent of Math/QR in individual programs:

Arts, mathematics and the natural sciences are each not included in over 40% of programs, and even when they are included, they are not included "extensively" as often as humanities and social sciences. Arts and mathematics in particular tend to be included "a little" more than either moderately or extensively.

	Extensive	Moderate	Little	None		Extensive	Moderate	Little	None
Mathematics	89	92	141	267		15.1%	15.6%	23.9%	45.3%
Arts	122	89	142	234		20.8%	15.2%	24.2%	39.9%
Natural Sciences	153	56	97	282		26.0%	9.5%	16.5%	48.0%
Social Sciences	216	118	113	137		37.0%	20.2%	19.3%	23.5%
Humanities	283	129	94	78		48.5%	22.1%	16.1%	13.4%

We attempted to look for any trends over time in the amount of mathematics included in programs, but there was no trend apparent. We assume that the under-reporting of programs in 2010-11 explains the possible anomaly.

Mathematics									
AcadYear	Extensive	Moderate	Little	None		Extensive	Moderate	Little	None
2006-07	20	20	30	50		16.7%	16.7%	25.0%	41.7%
2007-08	16	20	30	50		13.8%	17.2%	25.9%	43.1%
2008-09	21	18	25	55		17.6%	15.1%	21.0%	46.2%
2009-10	19	18	39	57		14.3%	13.5%	29.3%	42.9%
2010-11	13	16	17	55		12.9%	15.8%	16.8%	54.5%
Total	89	92	141	267		15.1%	15.6%	23.9%	45.3%

We also looked at what planning units were including mathematics in their programs. Unsurprisingly, Scientific Inquiry leads the pack, but inter-area offerings are a close second. Environmental Studies follows with Society, Politics, Behavior, and Change next in line.

Level of instruction in Math/QR:

Of 323 programs that included any Math/QR between 2006 and 2011, 41 faculty coordinators rated the level of instruction in these areas as including Advanced level instruction (perhaps with Intro or Intermediate instruction also), and an additional 65 rated the level of instruction as rising to Intermediate level instruction (perhaps also with Introductory work). Looking just at the highest level of instruction in each program, this makes 13% Advanced, 20% Intermediate, 67% Introductory. However, further study revealed that while some programs rated (say) Calculus as Introductory work (perhaps since it is introductory in a disciplinary math curriculum), other programs rated typical precalculus (or lower) subject matter (e.g. algebra, ratios, beginning statistics) as Intermediate or Advanced (perhaps because complex thinking was involved in the problems tackled with these tools). To get a better handle on the data due to these apparently different senses of “Advanced” or “Intermediate”, we counted programs that clearly covered content that was advanced or intermediate from the disciplinary perspective of the mathematical sciences (math, computer science, statistics).

- 16 out the 41 “Advanced” programs’ content was clearly Advanced in Mathematical Sciences
- 4 out of the 65 “Intermediate” programs’ content was clearly Intermediate in Math. Sciences

We recommend modifying the survey to make it more clear how faculty are supposed to be interpreting this category overall, and the level of instruction in particular. However, specific modifications depend on what we are trying to get out of this question. As things stand, the data could be easily misinterpreted in two ways: either the data could be seen as over-representing traditional Mathematical Science subjects and depth across the curriculum or the data could be seen as under-representing the level of Quantitative Reasoning across the curriculum.