The Octopus

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THERE ARE A NUMBER OF initiatives active around the Institute that respond to the ever-increasing incursion of the methods of Computer Science into just about every discipline represented here. Principal among them, of course, is the creation and dominance of the "College of Computing." But this was preceded by others – notably, the creation of a spate of mixed majors involving Course 6. These include:

6-7 *Computer Science and Molecular Biology*
6-14 *Computer Science, Economics, and Data Science*

There are rumors of more in the works; at the Institute faculty meeting in November 2017 the Provost suggested that there might be 25 more such mixed degrees!

It seems to me that these joint majors represent an ill-conceived, even retrograde, response to the increasing penetration of computer science methodology into other disciplines. They represent a structural response to a transient problem.

I'm not suggesting that the relevance of Computer Science methodology will subside. On the contrary, it's here to stay, and its integration into intellectual endeavors of all sorts will only increase over time.

But as these new methods get established, the faculty will adjust. Comfort level with the project of constructing undergraduate pathways including Course 6 subjects, or parallel subjects in various Courses, will increase. The temptation to outsource control will decline.

Jointly controlled majors will come to be an annoyance, an albatross.

This evolution is going to be accelerated by the birth of the College of Computing. This cataclysm in the political landscape at MIT will have many consequences, most of which we can't see yet. A sensible course of action would be to declare a moratorium on authorizing new joint majors of this sort.

Mathematics found itself in this position long before Computer Science. There was a time when engineering and other disciplines were much less dependent on mathematics than they are today. As the mathematical requirements of various fields has grown, the various Courses at MIT have added Course 18 subjects to their requirements or generated and taught subjects with significant mathematical content themselves. These latter developments have often been painful to the Mathematics faculty, which, naturally, feels that they have the best perspective on these subjects. But we recognize the reality: Course 18 does not have a monopoly on mathematics education at MIT.

Establishing joint majors such as 6-7 and 6-14, and the others, has the effect of removing from the non-Computer Science partner the responsibility of adapting to this new environment in which Computer Science is ubiquitous.

It provides the partner departments with an easy way out. They don't have to move, through hiring for example, to increase their own Computer Science capabilities. It seems to me that this represents a serious danger in the long run. These arrangements institutionalize a certain co-dependence between the

Computer Science Department – which naturally wants to maintain control of as much Computer Science instruction as possible around the Institute – and the partner departments, which see this as a way to avoid any realignment of their faculty appointments.

Less questionable options have been adopted by several departments. For many years the Mathematics Department has offered two distinct majors: 18 Mathematics and 18C Mathematics with Computer Science. This second major has always included several Course 6 subjects (though exactly which ones has been changed rather frequently over the past few years in response to successive curricular reforms within Course 6). Many courses are cross-listed between the two departments, and teaching them often alternates between the two departments.

A second example is represented by the exemplary (though poorly named!) 14-2 Mathematical Economics. This major requires students to take several courses offered within the Mathematics Department, but it's not "14-18," and certainly not "18-14." The major itself is entirely controlled by Course 14. It specifies several mathematics subjects, including a choice of one of three of our Undergraduate Seminars. These requirements ensure that these students will have genuine mathematical experiences, and interact closely with Course 18 majors and faculty.

It is to be hoped that going forward models closer to these will become the norm. ■

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