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**Revisiting the New Liberal Arts Initiative, 1980-1990.**

Any effort to define and integrate courses for liberal arts students about engineering and technology must take account of a major precursor: the Sloan Foundation’s New Liberal Arts Initiative, a $20 million effort between 1980-1990 to define, launch, and call into being, a wide-ranging suite of courses and programs that would incorporate technology and quantitative literacy within the classical liberal arts fields of study.

The NLA, as it came to be called, was initiated by a Vice President at Sloan, mindful that the launching of the kinds of courses envisioned would require start-up grants to colleges as well as the (then only print) publication of altogether new textbooks and other resource materials. Hence NLA funding had three components: a) start-up grants to individual colleges for course initiation and follow-up financial support; b) support to individual faculty for the research and writing of (~10) monographs; c) contributions to the MIT press to cover the publication of those books. The Initiative, launched with a call for proposals in 1980, closed its doors in 1990 with a Final Report, edited by Samuel Goldberg for Sloan, and published in 1990.

**I Sources:**

Surprisingly, the initiative is not broadly known about or well remembered. I was at first directed to a New Liberal Arts web site, located at St. Olaf College, maintained (until he died in June 2015 a month before I began my inquiry) by one of the principals in the quantitative literacy field, Lynn Steen. Nothing else is available in electronic form, a reminder of some of the limitations of dissemination in that decade. My sources have been the Wellesley College (print) archives and through the good offices of NLA grant recipients still at Wellesley, Williams, and the Claremont Joint Science Programs, who participated in the initiative. Titles of their courses reflect the range and the ambition of the Sloan Initiative: *Technology Studies 100, Medical Physics, Medical Technology and Critical Decisions* (Wellesley); *Chemistry and Crime, Reproductive Technologies* (Williams), *Discovery, Innovation, and Risk* (Claremont); and from interviews with David Billington, one of the directors of the NLA, and the program’s 200-page final report.

According to a Xeroxed list of grants from the Wellesley archive, the New Liberal Arts generated 219 new courses in the course of the funding initiative, for
which grants were made to instructors and their home institutions, and about a dozen monographs and textbooks to scholars and to the MIT press to publish. Also available are the individual course names and instructors. The reason this matters so much to any new effort to integrate engineering into the liberal arts, is that Sloan’s NLA was a major effort to define and forge programs similar to the ones educators are seeking to inventory and (where they do not yet exist but where there is a potential demand), to encourage.

The consensus, even among its critics is that “Sloan put technological literacy on the liberal arts colleges’ agenda.”

It's so long ago (1980-90) that most of the instructors and textbook authors are retired. Only a few administrators still employed can remember the courses appearing at their own institutions. Yet, some of the courses or variants of the originals may still be on the boards. David. Billington, who deservedly features prominently in this collection, created a course at Princeton which continues under Prof. Michael Littman and has multiple progeny elsewhere. As an initiative, the NLA deserves to be revisited at least for a full complement of subject matter and lessons learned.

III The Courses, What we Know, What we Don’t Know

The titles and scope of the funded courses, the names of the instructors, and their locations are worth knowing about, even if few if any continue to this day. But even more relevant to any effort to re-start such an initiative would be to know their longer-term impact on their institutions and particularly on their enrollees: whether and to what extent students who took these courses changed their majors, changed their lives, or contributed in different ways to the professions to which they were heading anyway.

The list in hand -- from the archivist at Wellesley -- totals 219 courses (some taught by more than one faculty member, some, where the same faculty member taught more than one course) in the following categories provided by Sloan: number of grants in parentheses.

Art and Technology (4)
Biological Sciences (20)
Chemistry (3)
Cognitive Science and Psychology (3)
Computers (8)
Economics (4)
Energy (4)
Engineering (technology) (29)
Engineering (electronics and communication) (14)
Engineering Law (3)
Engineering structures (4)
Environment (14)
History (of science/technology science and technology) (20)
Humanities and Literature (5)
Music (6)
Nuclear Arms Control, Military Engineering (14)
Philosophy (8)
Physics (6) - of sport, of technology, of medical physics etc.
Political Science, Policy (12)
Science Technology and Society (13)
Sociology/Anthropology (7)
System Analysis (Quantitative Inquiry) (18)

Notably, 50 courses have “engineering” in their title but grantees were mainly from institutions that did not house engineering programs.

IV Participating Colleges and Universities

Grants were awarded to 41 individual institutions, some very much favored over the others (e.g. Stanford and Wellesley), the majority not housing engineering departments. Exceptions to the last are: Stanford, Penn, Swarthmore, Duke, Brown, and Princeton. Most went to the smaller private colleges with Wellesley College being favored with 14. Multiple grants also went to Williams, Grinnell, Vassar, Trinity (Hartford), Davidson, Lafayette, and Middlebury. Some few to community colleges (4), and one each to North Carolina, A&T, Reed, Claremont McKenna on the West Coast, and VPI.

Also noteworthy, given current efforts to integrate engineering into the liberal arts, is that although some 50 courses had the word “Engineering” in their title, since most of the grantees did not employ engineering faculty, “technology” and “quantitative literacy” were presumed to be teachable by science and mathematics faculty.
Had “engineering literacy” been an explicit intended outcome, the innovations documented in the Case Studies that follow might have occurred decades earlier.

IV The Analysis as it Bears on Current Initiatives.

Extensive interviews with some of the grant recipients, provide a glimpse both of the extraordinary vision that launched the programs and attracted faculty and students, and of the reasons the NLA funded course initiatives tended not to survive over the long term.

• When funding stopped, university administrators had neither the “slots” nor felt any “pressure” to continue them.

• Few faculty continued to teach them. Exceptions were Newton Copp and Andrew Zanella at Claremont McKenna, Larry Kaplan at Williams, Ted Ducas at Wellesly and David Billington at Princeton, all of whom were interviewed for this retrospective.

• No student “movement” took hold (as with Black Studies, Women’s Studies, Environmental Studies) to fuel demand.

• Despite the coinage (by NSF in the 1980s) of the term STEM, intended to include engineering along with mathematics and science in programmatic funding for education, engineering was considered neither an old nor a new Liberal Art. Rather, “technological literacy” was meant to be a stand in for engineering, this, despite that fact that three of the major advisers to the NLA were engineers, John Truxal, Stony Brook, Marian Visich, Jr., Stony Brook, and David Billington, Princeton.

• As said, with a few exceptions (Stanford, Brown, Princeton, Penn, Swarthmore, Lafayette), the Sloan-funded institutions did not have in-house engineering programs from which faculty and any kind of continuing initiative/support could follow.

• There was a failure to disseminate. The initiative never achieved, as was intended, a national discussion of technology in undergraduate education. There was no “band wagon,” according to Copp and Zanella, just a number
of individual faculty members focusing on their own courses. Of course, there was no email and no Internet in the 1980s.

- “Technological literacy” many remember was most likely code for computer science and computer science was often housed, particularly at the liberal arts institutions, in mathematics. Not that everyone would have to do computer science; but everyone should have sufficient “quantitative literacy” to learn about it. Hence quantitative literacy was explicitly addressed.

- “The Sloan/NLA strategy,” according to Copp and Zanella, (who continued to teach their own course for 25 years until they retired from the Joint Sciences Program at Claremont) “was to promote ‘subversion’ of the curriculum from the grass roots, and hope that sustainability would be guaranteed by student enrollment and that the innovations would spread on its own.” “It all worked,” they remember, “except for the spreading.”

If one were to try again one might want to find ways to engage professional engineers and professional engineering societies. Also to target stakeholders outside of Higher Education (private and government) where graduates in any field familiar with “what engineers do and how they think about what they do” will be prized. Again Newton Copp and Andrew Zanella answering the author’s question: about the specifics of engineering that should be taught:

- The high degree of specification of problems
- Clear recognition of all constraints, physical, economic, political, social, psychological that will determine (or define) acceptable solutions
- Solutions based on quantitative, data-driven arguments.

And further “explicit recognition”

- Of the built world
- That science and engineering are different “animals”
- That, given the nature of constraints on engineering problems, engineering stands at an interface of the humanities, the social and the natural sciences,
- The limitations of single focus engineering approaches to resolving societal problems.
Nannerl Keohane then (1980s) president of Wellesley College and a major participant in the NLA, may have written the final assessment, both actually (as a coda to the NLA’s Final Report) and figuratively. She faults Stephen White for having had too ambitious an agenda, wanting not simply to add technological and mathematical literacy as new modes of thought, but to transform the entire liberal arts curriculum. She quotes White as having said:

The changes that should occur [as a result of the NLA] will be taking place in the college as a whole; they will affect not only the offerings of the liberal arts curriculum, but [its] very conceptual basis…They must make the same claim on the college as a whole as courses in philosophy, or government, or literature or languages. [Sloan Final Report, p. 194]

Keohane’s critique was of White’s expanded agenda. She wrote:

It would be no mean achievement to have “the new mode of thought” take its place alongside literary analysis, aesthetic understanding, scientific enquiry, critical scrutiny of ideas as a recognized component of the liberal arts curriculum. The misleading assumption in White’s program was that any single way of knowing – however fundamental or powerful it might be – could ever be “at the heart of the curriculum.” A curriculum has no single heart, except the commitment to enquiry and knowledge. [p.195]