

IT FOR THE LIBERAL ARTS COLLEGE: A WINDOW OF OPPORTUNITY



Exploiting information technology applications can increase the competitiveness of liberal arts colleges

The quantity of printer's ink sacrificed daily in the name of information technology and the new economy makes it difficult to separate fact from euphoria. The forceful reassertion of the business cycle and our current national trauma¹ provide an appropriate opportunity for careful reflection about IT and about the future of IT in higher education.

The measurable indicators — such as productivity, employment, and the inflation rate — clearly show that some important structural changes are taking place in the national and the international economies, although the rate of these changes will undoubtedly be slowed temporarily by the business cycle. Further, evidence continues to accumulate that IT is directly responsible for

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these structural changes.² Despite the risk that we may add to the noise, we explore what these structural changes imply for the “crown jewel of undergraduate education,” the liberal arts college.

The impact of IT on competition among new economy firms is a prominent theme in the IT literature. Large firms find themselves increasingly harried by agile and entrepreneurial small competitors. Many large firms struggle to “downsize” in order to respond to this vigorous new competition.

These trends suggest an important relationship between technology and firm size. Among economists, it is well known that technology determines the optimal size, which we identify as the “minimum efficient scale.” Consequently, the impact of IT on size in higher education is an issue that needs vetting. To this end, we consider what IT may have in store for the liberal arts college.

An Uncomfortable History: New Technology and the Liberal Arts College

For the past five decades, technology has been very unkind to liberal arts colleges. As public institutions proliferated and their enrollments grew, the liberal arts colleges’ collective share of enrollment declined steadily. More than 20 colleges have permanently closed their doors in the past decade. It’s troubling that this many institutions could not survive during the most prosperous decade in the past half century.

The Chronicle of Higher Education frequently carries reports detailing the financial distress and the closing of additional institutions. These closings suggest that the share of total enrollment has declined and that the absolute number of students enrolled in liberal arts colleges has been insufficient to keep all of the institutions viable. At least part of this decline can be attributed to the dominant technologies of the post-World War II economy. Nuclear science, aerospace, military applications, medical science,

and the mainframe phase of IT are all examples of “big science.”

Big science technology has at least two adverse impacts on small liberal arts colleges. First, the hardware and the specialized labor required to educate students in these technologies are very expensive. The specialization and the expense require more students to amortize the cost. The direct effect of post-World War II technology is that it selects for larger institutions. It creates economies of scale in higher education that place small liberal arts colleges at a natural disadvantage.

Second, the pedagogical differences between large or research universities and liberal arts colleges reinforce the effect of scale economies. Small liberal arts colleges place considerable emphasis on the horizontal links among disciplines. Integrated studies frequently form the unifying core of a small college. These integrated studies discourage faculty specialization. Alternatively, major universities emphasize intense faculty specialization, and the limited amount of integration that does take place occurs within different colleges in the university. As a result, education takes place within distinct and separate areas of the university, with only limited collaboration among areas.

The faculty specialization and restricted integration found in large universities is the natural format for big science. To work at the frontier of any of these scientific disciplines, a scholar must specialize and must have access to expensive research tools. In the liberal arts college, faculty commit resources to interdisciplinary programs and activities, while faculty in universities prefer to concentrate resources within their disciplines.

While these trends select for faculty with a preference for teaching in liberal arts colleges, they adversely select for faculty willing to stay up to date with their professions. The liberal arts culture values breadth, rather than depth. From this perspective, clearly the educational require-

ments for most post-World War II technology are at odds with the curricular traditions found in small liberal arts colleges.

Modern IT is the first technology wave compatible with both the scale and the pedagogy of liberal arts colleges. It represents an unprecedented opportunity to reverse several decades of decline. There is no discipline within the academy that does not employ IT. It plays a more important role in each discipline every day.³ In contrast, notice how few disciplines were influenced by other technology waves. Beyond public policy considerations, nuclear science and aerospace had little direct impact on the social sciences or the humanities. This illustrates the importance of IT and its broad applicability.

Hardware and networks are common to each discipline. Furthermore, communication lies at the heart of IT, which exists to move large quantities of data quickly over long distances and organizes that data into comprehensible forms. The objective of professional communication is to render complex problems comprehensible, and communication skills are a perceived curricular strength in the liberal arts tradition. The common platform and the communication tradition are the unifying characteristics for interdisciplinary studies. Therefore, such an approach to IT would serve the liberal arts curriculum quite well.

IT Hardware and Applications

It’s very important to draw a distinction between IT hardware and the applications that employ this hardware. Discussions of the issues surrounding IT in higher education rarely distinguish between them. IT hardware is the product of big science. By IT hardware we mean the design, construction, and maintenance of computers, networked systems, and peripheral devices. The industry reliance on research universities for research on hardware technology is now, and will remain, the

prerogative of major research universities. The industries producing such hardware will inevitably be concentrated around these institutions in places like Boston, Palo Alto, and Austin. Given the skills and financial resources the research universities can bring to bear on this technology, liberal arts colleges will never be players in this field.

IT applications are another matter entirely. The term refers to the infinite variety of hardware and software configurations that can be employed to resolve problems in as yet unimagined contexts. This may involve the unique configuration of existing hardware, the development of specific software, the configuration of existing software, or any combination of these. To gain the perspective required to realize these opportunities, you must have one foot firmly planted in IT and the other in the discipline where the opportunity exists.

Liberal arts colleges are well positioned to make significant contributions to this field. Applications require creativity, familiarity with the existing technology, and, most importantly, the ability to integrate concepts from diverse sources. The liberal arts focus should be on how to develop problem-solving skills using IT, rather than on acquiring mechanical technology skills that will be obsolete before the student graduates.

Bill Gates' experience in building Microsoft offers an appropriate example. Gates and his team were neither scientists nor hardware engineers. They were intelligent and creative people who understood the existing technology and had the vision to see how it could be applied — they were innovators.

Historically, there has always been a distinction between inventors and innovators. Inventors are people who create new technology. As technology becomes more complex, they are more likely to be highly specialized scientists and engineers. Innovators are the people who convert new technology into tangible applications.

Clearly, inventors and innovators



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are sometimes the same individuals. However, in numerous examples, such as Microsoft, the inventors and the innovators are separate people. IT innovation lies within the reach of many liberal arts institutions.

The most significant hurdle the liberal arts college has to overcome is cultural. Many colleges are strongly committed to the traditional liberal arts curriculum. In its present incarnation that curriculum precludes any topic that resembles professional training. For many uninformed faculty, IT applications sound like professional training.

These views are ironic, since the sustaining enrollment at liberal arts colleges comes from student demand for pre-professional training. How successful is any liberal arts college without well-regarded pre-medical and pre-law programs? In the future, how successful will any such college be without a strong pre-technology program? If the liberal arts community fails to respond to this demand, they yield this unique opportunity to the state-supported institutions without a contest. We are convinced this failure will have serious consequences for the financial prospects of the entire liberal arts community. Since we are the only sector in higher education with a declining market share, it would be unforgivable not to seize this opportunity.

A Plan of Action

IT applications represent a natural competitive niche for the liberal arts college. The only thing remaining — besides the will to exploit the opportunity — is an action plan. While we focus on the liberal arts college, it's improbable that a single model will suit all of the institutions within this intersecting set. Each institution is likely to be at a different point in its IT development and to have different departmental strengths upon which it might build. In any event, a likely place for each institution to start is with the following question: Given our existing strengths, how can we use IT applications to leverage these existing assets?

More generally, we can identify three different strategies — or models — an institution might follow in pursuit of IT applications. The first is a traditional model of creating a new academic department for IT. Whenever a new discipline emerges, the academy creates a department and hires faculty to staff the new department.

As the traditional approach, this model offers the path of least resistance. However, it's unlikely that it will result in an innovative IT applications program. This model suits

new disciplines that have little or no overlap with other disciplines in the academy. In fact, it may lead to vigorous turf protection and fail to exploit the transcending character of IT applications. Finally, this model may become a burden to the institution as the specialists in the department are forced to expand their course offerings into areas outside of their expertise.

With the second model, an augmented department model, the institution creates and staffs an IT department and then augments existing class offerings in other disciplines with IT. The institution might offer incentives for existing faculty to employ IT in their current classes, for example. Identifying technology friendly faculty in various disciplines and engaging them as organized evangelists to their colleagues also offers a viable strategy.

The augmented department model is clearly a step beyond the traditional department model. However, it may prove more difficult to take full advantage of the IT applications potential, as this approach is limited by the extent to which IT exists in other departments.

The third model is the interdisciplinary department model. Again, the institution creates a department and staffs it with a core set of IT faculty. The new department should be designated as an area of excellence for the college, and it should be anchored with a senior scholar in IT. The college also does all of the missionary work suggested in the augmented department model.

At least two options exist within this model. The first is to cross-list courses from other disciplines as part of the IT major. For example, a computational biology course offered by the biology department or a data-mining course from economics might be cross-listed as an IT elective. The second option is to have faculty in other departments hold joint appointments in the IT department. The core objective with this approach should be to eliminate territorial attitudes with

respect to IT wherever it exists on campus. The interdisciplinary department model offers the greatest opportunity to capitalize on the promise inherent in IT.

Looking Ahead

Despite the advantages liberal arts colleges hold in high-quality undergraduate education, they have steadily lost market share over the past five decades. The loss of market share has led to the collapse of many institutions and placed the survivors under considerable financial stress. Their strong pre-professional training programs in medicine and law have helped keep the survivors going, but pre-professional training in IT gives us an opportunity to add a third leg to that stool, stabilizing these institutions.


For students not interested in either medicine or law, the most frequent question we hear is, How can I earn a living with a liberal arts degree? Students and their parents are acutely aware that job opportunities for humanities majors remain limited, while the real incomes of knowledge workers are rising rapidly. Our response to this question is that the quality of life is very important and that broadly educated people have a higher quality of life. While true, this response effectively sidesteps the pertinent question.

A vigorous interdisciplinary approach to IT allows the liberal arts college to provide graduates with skills that are both marketable and valued by elite graduate programs. The placement of graduates will improve, and improvements in student recruiting will follow in short order.

Very few liberal arts colleges have begun to plan for the interdisciplinary department model. Most are struggling with financing their IT expenditures and seem oblivious to leveraging those new assets through reorganization of their traditional approach to education. We fear they are still thinking about IT as a cost center, not an investment. Most insti-

tutions actively struggling with the issues created by IT and the liberal arts curriculum have adopted the augmented department model.

The universities have cultural problems of their own in this regard. The specialization required for faculty to stay current in their own disciplines tends to prevent much interest in interdisciplinary approaches to IT, and the very scale of universities works against this approach. Their traditions and their scale better position liberal arts colleges to exploit the integrated approach to IT.

The broad interdisciplinary approach we recommend can lead to a more sophisticated understanding of IT and a greater appreciation of the opportunities for application innovations where these opportunities aren't obvious. Coupling the liberal arts graduate's traditional communication skills with IT skills creates a sound foundation for leadership roles in diverse careers. This curriculum will produce future leaders in the field — individuals trained to solve complex problems with information technology. 

Endnotes

1. This article was finished shortly after the events of September 11, 2001.
2. Changes include increased price competition, increased outsourcing and downsizing, increased demand for knowledgeable workers, sequential career tracks, reduced job security, and more independent contracting.
3. A survey of *The Chronicle of Higher Education* reveals the emerging trends in information technology and such diverse disciplines as history, physics, computational biology, classics, languages, and business.

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