

Distance Learning – From Novel Niche to Core Mission

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Abstract

American state universities and land-grant colleges have been charged with “reaffirming their public character and public mission by making lifelong learning part of their core mission,” and to use the new technological means of distance learning to do so. While the quality of the experience must remain on an equal par, both today’s older learner and traditional-age college student are not learning in the same manner now as in the past. Instead, learning, either totally or partially, has become internet-based, interactive and distributable to wherever students reside and work. Over the nearly twenty years since NJIT coined and trademarked the term, “Virtual Classroom®,” and began to use computer-mediated means to offer lifelong learners full degrees and credentials online, a clear picture is emerging of university-wide impact on face-to-face instruction as well as on workforce and economic development. This paper explores these subjects, and shows how the intricate and holistic changes that occurred at NJIT have moved distance learning from a novel niche to the university’s core mission.

1. Introduction

Distance Learning at NJIT lends support to the recommendations contained in *Returning to Our Roots: A Learning Society*, the 1999 report of the Kellogg Commission on the Future of State and Land-Grant Universities and the National Association of State Universities and Land-Grant Colleges[1]. This Report calls for public state universities and land-grant institutions to “**reaffirm their public character and public mission by making lifelong learning part of their core mission,**” and **to use the new technological means of distance learning to do so** at the highest levels of quality attainable. Many factors converge to create the lifelong learning imperative, not the least of which are the needs of professionals to keep up with the accelerated pace of technological change.

While the quality of the experience must remain on an equal par, it is not likely that today’s older students or even the traditional 18-22 year old will or should learn in the same manner now as in the past. The campus-bound traditional and technology-infused learning experiences of today’s youth simply are not possible for adult professionals working 60-70 hours per week and raising families. What is possible is a learning experience that is

internet-based, interactive and distributable to wherever

they reside and work and from as many places as they reside and work over the course of their lifetimes. And, as one definition of quality distance learning, what is also possible is a learning experience that connects students with instructors for mentoring, guidance, and feedback; with communities of other learners; with opportunities for investigation and practice; and with first-rate scholarship [2].

NJIT has been playing a leadership role in this arena since as far back as 1978 with the publication of the seminal book, *The Network Nation: Human Communications via Computer*, by Starr Roxanne Hiltz and Murray Turoff, now both NJIT College of Computing Sciences Distinguished Professors. In 1984, the results of their scholarship led NJIT to coin and trademark the term, “Virtual Classroom®.” By 1989, NJIT had registered the mark with the U.S. government and had begun to lead the first classes based on this model. Since then, as New Jersey’s technological research university, NJIT has been using multiple modes of technology to offer enrollment both to the on-campus student in need of flexible course scheduling alternatives and to the remote student who, for a variety of reasons, is unable to reach the NJIT campus.

Throughout the years, NJIT has used internal resources and has received external support totaling nearly \$9,000,000 to help distance learning reach new plateaus in rapid order. Examples of externally-funded projects include:

- X WebCenter for Learning Networks Effectiveness (01-02), Funded by Alfred P. Sloan Foundation for \$370,000
- X H1-B Visa IT Training Program (01-03), Funded by US Department of Commerce for \$2,770,000
- X NJ Information-Technology Opportunities for the Workforce, Education and Research (00-05), funded by NJ Higher Education Commission for \$2,500,000
- X NJ Center for Multimedia Research (96-01), Funded by NJ Science and Technology Commission for \$1,043,000
- X From Virtual Classroom to Virtual University (97-00), Funded by Alfred P. Sloan Foundation for \$450,000
- X Video + Virtual Classroom (93-96), Funded by Alfred P. Sloan Foundation for \$718,000
- X Tools for Enhancement and Evaluation of Virtual Classroom (85-89), Funded by Annenberg/Corporation for Public Broadcasting, NJ, and IBM for \$815,000

Illustrative of its reputation today in the now burgeoning field of distance learning, NJIT is ranked by

Yahoo! Internet Life (1998, 1999, and 2000) as the “most wired” public university in America, based, in part, on its prowess in this field. Indeed data show that each semester NJIT enrolls some 1,600 students representing 20% of its academic student body in distance learning courses. Another 2,000 students participate annually in distance-based non-credit professional development training programs.

Over the nearly 20 years since NJIT coined and trademarked the term, Virtual Classroom®, a number of approaches have been used as the university capitalizes on its in-house technical expertise, computing prowess, television and multimedia studios and quality assurance orientation to continually enlarge a growing inventory of internally-produced distance deliverable electronic courses. At present, both asynchronous and synchronous approaches are employed, although only the former will be discussed in this paper.

1.1. Distance learning programs

At NJIT, both young students and lifelong learners are using distance learning to obtain full NJIT undergraduate and graduate degrees, hot career track graduate certificates, and non-credit professional credentials in the Information Technologies (IT) and Internet areas. They can also complete college courses required in their campus-based curricula or attend virtual classes as “visiting” students from other colleges and even from high schools. Figure 1 presents a listing of the undergraduate and graduate degrees and certificates and non-credit course available in the Fall 2002 Semester.

- Bachelors Degrees**
- Computer Science (BS)
- Information Systems (BA, BS)
- Masters Degrees**
- Engineering Management (MS)
- Information Systems (MS)
- Professional and Technical Communication (MS)
- Graduate Certificates (12 credits)**
- Computer Networking
- eCommerce
- Information Systems Design and Development
- Internet Applications Development
- Internet Systems Engineering
- Object Oriented Design
- Practice of Technical Communication
- Programming Environment Tools
- Project Management
- Telecommunications Networking
- Non-Credit Courses**
- A+ Certification

- Advanced Sun Java
- Cisco Networking
- Cisco Routers
- Enterprise Java Beans
- Dreamweaver
- Flash
- Help Desk Analyst
- Java
- Photoshop
- SMIL
- Visual Basic
- Web Author
- Web Developer
- Web Manager
- Windows 2000 Server

Figure 1. NJIT Distance Learning Programs

2. Core mission of NJIT – then and now

The first NJIT computer-mediated distance learning course was conducted in 1989. The mission statement of NJIT in effect in that year declared, “New Jersey Institute of Technology is a comprehensive technological university committed both to anticipating and responding to change.” This not only took into account the novelty of distance learning but forebode its becoming a forte of the university. While the passage of time has brought expansion and refinements, the implementation of the current NJIT mission is described in *NJIT Discovery: Report from the President, 2000-2001* as crystallizing around four areas of emphasis as follows:

- enhanced student-centered focus
- computing-intensive environment
- excellence in research
- global perspective

It is the thesis of this paper that the distance learning experience at NJIT has and is playing a significant role in each of these areas; and by so doing, can be said to have moved from a novel niche to the core mission. This does not mean that NJIT has embraced the idea of transforming itself from “bricks and mortar” to a “virtual” university. Instead what it connotes is that NJIT has moved to becoming a “clicks and mortar” enterprise in the following two ways: (1) NJIT offers a “virtual” experience especially for adult lifelong learners; and (2) pervasively applies aspects of the distance learning experience to advance its enterprise-wide mission. Further, the way the latter occurs in everyday operations is through a selective deployment both of distance learning’s underlying “clicks” (i.e.; IT tools) and of a variety of other “non-click” or non-technological-related best practices. As each of the four areas of current NJIT emphasis is discussed below, distinctions will be made between the impacts on NJIT from

distance learning “clicks” versus “non-clicks.”

3. Enhanced student-centered focus

3.1. Online student services—the “clicks”

Observers of higher education trends now agree that a new category of students has emerged, who may appropriately be called the “agile learner.” This category stems from the sizable ranks of adults who populate American colleges. That is, today 45% of college enrollees are over 25 versus only 28% in 1969[3].

Agile learners are likely to be the ones who, in their daily lives, have become familiar with one-stop shopping services that make it possible to purchase consumable goods, cars, houses, vacation packages and the like with minimal inconvenience, a minimal number of interactions with the service purveyor, and through use of the web. Not surprisingly, agile learners, seeking lifelong learning, expect a one-stop shopping service which handles for them all tasks related to the academic support infrastructure; and that arranges for them learning experiences that are convenient and of practical consequence and application.

The agile learner trend manifested itself early at NJIT among the comparatively small cohort of adult students electing to enroll in NJIT distance learning classes. To be responsive to them, and as an example of a “non-click” aspect, NJIT adopted and continuously refines an overarching operating philosophy that centers learning opportunities and services on their perspectives. The learning opportunities or programs available to this audience today are listed in Figure 1 above and described online at www.njit.edu/DL. The special services that this group receives are furnished by a crew of Customer Service Representatives—a job title not commonly found in academe—who provide help online, via the telephone and fax and even in-person to distance learners; who each year design and furnish them with a “Getting Started” orientation Cd-Rom; and who facilitate their interactions with the NJIT infrastructure including Admissions, Registrar, Bursar, Bookstore, Library, Computing Services, and Placement Testing.

As a current example of the broader utilization of both a distance learning best practice and of “clicks,” this overarching operating philosophy is being applied to the full student body through utilization of IT tools. That is, the following initiatives first piloted with distance learners, have evolved to become the norm for face-to-face students, too:

- Online admissions
- Online registration and semester class schedule
- Online grade reports, transcripts and progress towards degree

- Online academic catalogs
- Online account balances, financial aid status and payment
- Online email and internet account applications

In another example of student-centeredness relying on “clicks” first honed with distance learners and now holistically applied to the full student body, the NJIT Library made early strides in acquiring a store of online databases and journals and overcoming obstacles to remote retrieval via internet on a virtual private network. Today, these services are becoming the norm for campus-bound students who, interestingly enough, are flocking in droves to the actual library building so that they can work collaboratively to access, retrieve and utilize new digital library services, and take advantage of a vast array of new online information resources. This has been made possible by NJIT’s leadership role in developing the New Jersey Consortium of academic libraries known as the Virtual Academic Library Environment.

Through activities of this sort, NJIT strives to convey the impression to both face-to-face and distance learning students that the university will do all that is possible to permit them to expend their time and energies exclusively on learning activities.

3.2. Changed definitions—the “non-clicks”

There is another set of “non-click” student-centered initiatives being undertaken, at present, exclusively for distance learners. These include more flexibility in definitions of academic semesters, in testing options, and in eligibility for financial aid; and experimentation with removing distinctions between credit and non-credit learning.

At NJIT, general practice among face-to-face learners shows that there are more enrollments in a fall semester than in the spring. However this pattern does not obtain among distance learners; where for the last 5 years, spring enrollments have exceeded fall counts and where summer enrollments are particularly strong. Thus, as a student-centered university, NJIT has begun to explore new arrangements so that distance learners will be able to experience “just-in-time” learning through rolling enrollment options year round.

At NJIT, both face-to-face and distance learning students undergo proctored examinations as a means of measuring student outcomes. Even though using pencil and paper testing for distance learners may appear to be counterintuitive, it has remained for some time the most reliable way to ensure the integrity of the examination and credit awarding process. However, to accommodate new situations, DL faculty are more frequently utilizing competency and project based assessments of learning for

this population.

At NJIT and elsewhere, the growing number of distance learning students, particularly those who are part-time, find few avenues to receive federal financial assistance to help pay for the cost of their studies. This is because there are burdensome U.S. regulatory and statutory provisions that had been put in place years earlier to address past abuses from diploma mills and some correspondence school's fraudulent operations. For example, a statutory provision inhibiting the growth of distance education is the "50% rule" which states that institutions that offer more than 50 percent of their courses via distance education or enroll more than 50% of their students in distance education programs are not eligible to receive federal financial aid. Authorized in 1998 by the US Congress, a Distance Learning Demonstration Program has begun to help determine the specific statutory and regulatory requirements that should be altered to provide greater access to distance education. However, recommendations are not expected until 2005. In June 2001, a new bill was introduced in the U.S. House of Representatives to soften the 50% rule and one other key restriction, but the earliest that it could become law would be in late 2001.

As another example of the student-centered focus, in 2000, NJIT began steps to be helpful to distance learning students now. In particular, in order to overcome a lack of available sources of financial aid and loans for part-time and/or non-matriculated graduate and undergraduate students and non-credit students studying in online programs, NJIT is participating in a pilot program, underwritten by CitiBank, which, in an uniquely progressive manner, is advising this population on a privately-funded loan programs designed just for them.

Finally, in response to the agile learner's need for lifelong learning in rapid order that is practical and specific, NJIT has begun to experiment with "atomizing" standard 3-credit online academic courses by refashioning their content into a number of smaller blocks of online non-credit course(s). The adult would then have the choice to exit after completing the exact number of modules needed for his/her purpose or to take the requisite number of modules to permit NJIT to reconstitute the online experience back into its original form as an academic course. Success with this initiative will move NJIT from a "clicks and mortar" university to a "bits, clicks and mortar" enterprise.

If past experience holds true, these initiatives will come to have impact on face-to-face learners sometime in the offing, which, in turn will help to hone NJIT's student-centered emphasis.

4. Computing-intensive environment

4.1. Impact on the learning experience—the clicks

Another widely recognized trend shaping higher education today is the application of the "clicks" of the distance learning experience to campus-bound teaching and learning. The use of IT – computers, networks, and multimedia – in conjunction with classroom teaching is acknowledged to be spreading faster than any other form of curricular change and to be moving irreversibly beyond the pioneers and well into the mainstream of faculty including at elite school[4]. Beliefs propelling this momentum include:

- IT – as an enabler/conduit/vehicle – can help fulfill an university's desire to implement certain principles of good practice in undergraduate education (e.g.; collaborative learning, active learning, increasing student's time-on-task).
- College graduates in their professional lives will need to work and think with IT, so undergraduates need to learn some of these skills by using quite similar technologies in their campus-bound programs.
- Institutions that integrate IT into their programs will more successfully recruit students than those that do not.

In short, IT is viewed as making it possible, at minimum, to maintain; and, at best, to enhance educational standards and values for campus-bound instruction. In fact, most universities, even those with no strong distance learning tradition, are seeing this phenomenon occur on their campuses. NJIT is no exception, although, because of its ongoing distance learning experience, these evolutions may have occurred earlier here and been implemented more smoothly.

Thus it is not surprising to find that in another example of the application of distance learning "clicks," NJIT faculty who teach face-to-face classes in NJIT classrooms are evolving their teaching practices to include IT-mediated techniques. To assist them in this process, they are taking advantage of a non-faculty team of instructional designers adept in IT-related pedagogy, specialists in design/graphic/web publishing, and professionals in student services provision; and they are enrolling in face-to-face and online training classes in the techniques of effective online instruction and in various IT and internet tools and online conferencing software. The final product is a face-to-face course in which IT is used to create a classroom environment where faculty and students are in physical reach of each other **as well as** in electronic reach of substantial other bodies of resources including other educators, learners and learning tools.

4.2. The learning outcomes challenge

As this process unfolds, what remains to be determined

are questions concerning the comparability of the learning outcomes from such face-to-face classes versus those offered via distance learning. Complicating this matter is the fact that what is becoming the norm in face-to-face classes cannot be said to be identical to what occurs in the distance learning experience. In particular, what faculty have derived from the distance learning experience and are now using in their face-to-face applications concerns using the unique capabilities of the web to make learning environments more engaging (e.g.; relevant websites and graphic/video materials), and to involve students in threaded, asynchronous electronic discussions that in fact typically occur outside the class meeting time. These discussions involve the faculty and students each joining in at different times of the day and night with some software package making it possible for coherent dialog, discussions and exercises to ensue. However, in face-to-face applications, this coherent dialog is an augmentation to whatever else the professor is providing as he/she teaches students in the classroom; whereas in the distance learning application, this coherent dialog is the sine qua non of the teaching and mentoring by the faculty member.

The unmet challenge in this situation is to determine whether the unique capabilities of the web make learning more effective; and whether significant differences in learning outcomes exist among traditional face-to-face classes, technology-infused face-to-face classes and technology-dependent distance learning offerings. Future research, based on new assessment tools, will uncover answers.

4.3. Impact on faculty intellectual property rights—the non-clicks

NJIT's computing-intensive focus also impacts another aspect of the teaching/learning equation: intellectual property. Early on faculty feared disintermediation; that is, learning occurring directly between online content and students without benefit of their mentoring and assistance. This fear has all but ceased. Today, it is not so much about the "clicks" causing faculty to lose their jobs and livelihood, but rather about a "non-click" concern for protection of their reputations and ability to generate additional revenue from the fruits of their intellectual property. It would appear that these fears are being allayed at NJIT in a less contentious manner than many places elsewhere. One reason for this may be that the NJIT faculty – with as full a slate of skeptics as anywhere -- has been able to witness first-hand over the years just how the cadre of distance learning pioneers have fared. What they have seen is that, on the one hand, no distance learning professor – even the most distinguished at NJ -- has personally struck it rich from his/her online course; and, on the other hand, that the university has neither sought to nor reaped profits by taking

advantage of its professors who excel at online creation.

These two realities have helped both sides in labor/management relations to realize that whatever differences exist between face-to-face and distance learning course delivery, the existing set of contractual terms, rules and policies that work in face-to-face settings can suffice to determine such issues as appropriate distance learning class size and compensation levels for content preparation and teaching, as long as copyright ownership is unbundled in a way which leaves room for the professor to gain benefits from derivations of the creation of an online course. For example, at NJIT, discussions are underway to acknowledge at once that the online course is the intellectual property of the professor and that the faculty can assign aspects of copyright ownership to NJIT to ensure the use of the material for its students. However, as part of this equation, faculty reserve the right to make derivative works, such as books, translations, videotaped versions, film scripts; and the right of portability; that is, to use the content of the online course with a new employer.

5. Excellence in research

NJIT has built its research program around multi-disciplinary centers that encourage partnerships among various disciplines, as well as with other educational institutions, private enterprise and government agencies. One of these multi-disciplinary centers is focused on IT and Telecommunications and encompasses multimedia research, signal processing, wireless communications, simulation and modeling, data mining and software development. Here again, there is a clear association between the work done in support of the novel distance learning niche to today's research agenda.

Actually NJIT's first foray into distance learning was a research endeavor to develop a computer conferencing platform to facilitate human communications and learning. Known originally as the Electronic Information Exchange System (EIES) and then as the Virtual Classroom®, this platform underwent three generations of development and use. Its groundbreaking features are the hallmark of today's commercial conferencing platforms, several of which are now employed at NJIT.

Befitting an university which has invested so strongly in an extensive IT infrastructure, NJIT research has been moving forward to take the lead in bringing technology-infused learning to the next level with a vision of the role which technology can play in improving, if not, revolutionizing secondary education. In particular, research projects at NJIT are emphasizing the fact that learning is a highly personalized experience that depends on the student's life experience, cognitive style, and personal and professional aspirations, and therefore that technology's role can be focused on scaling the customization and

personalization of instruction. On the horizon of mission-enhancing NJIT research is the possibility of coupling leading edge work in cognitive science with advances in “click” technologies that, for example, can scan an individual’s web surfing habits to determine which emphases and concepts to “push” to that person so that he/she can more deeply grasp and comprehend an educational construct. All “information has to be arranged in some sort of sequence, tiny touches of humor or pathos added, unnecessary details subtracted, hidden patterns emphasized [5].” So as another twist on the “bits, clicks and mortar” phenomena mentioned in 3.2, researchers at NJIT are probing how to use technology to atomize knowledge, so that each learner can learn differently, deeper, and with more unique resonance.

6. Global perspective

In an economy which has transitioned from the industrial age to the information age, the most valued commodity which individuals can possess are the right skills and knowledge at the right time in order to fully participate in the workforce. In fact, since the 1980's, there have been 3 million layoffs per year from the “old industries” whereas one of the “new industries,” IT, has spent trillions on new equipment over the years and cannot find enough qualified employees. Once the new and needed skills and knowledge appropriate to this and other high technology fields have been grasped, not only are individuals able to compete for jobs, but companies are able to build things or provide services that are faster, better or cheaper than their competitors, thus gaining a competitive edge in the global economy.

The imperatives of such an atmosphere have led to a rethinking among businesses, primary and secondary schools, colleges and universities, government agencies, and community-based organizations about the ways in which a 21st century workforce is to be educated; and have helped all stakeholders realize that they must collaborate for this rethinking to achieve results. This rethinking and the engendered partnerships have embraced distance learning. In the industries of today’s fast changing global economy, where a company might miss a complete product cycle if its employees cannot access education and skills training precisely when they need it and from their very locations, there may be no better way for speedy access and customization of content than through distance learning.

From the start, NJIT not only realized the relationship between distance learning and workforce and economic development but also the need to find new ways to leverage its investments and experience to build economies of scale which could have global impact. One of the ways NJIT has been doing this is through partnerships. Today NJIT’s distance learning programs are reaching professionals and

students worldwide through participation with 53 other prominent engineering schools in the National Technology University/PBS–The Business and Technology Network (www.ntu.edu); through the New Jersey Virtual University (www.njvu.org), which is one of 35 such state organizations to deliver or promote distance education and which NJIT helped to create, through contributions to the World-Bank-inspired African Virtual University; and through partnerships with various education/learning/knowledge portals which are internet sites which provide one-stop-shopping services typically to lifelong learners looking for online education.

7. Conclusion

Distance Learning at NJIT operates with a vision and understanding both of the needs of the lifelong learner and of the future of the Internet, and it strives to use these to respond to the Kellogg Commission’s clarion call to return to the roots of a learning society. Done well, distance learning is no longer either separate from the academic enterprise or a novel niche within; it expands student-centered orientation, computing intensity and value on campus, excellence in research, and a global perspective by improving learning, creating productive networks and fostering the flow of information and knowledge.

8. References

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