DOCUMENT RESUME

ED 368 338 IR 016 591

AUTHOR Pietras, Jesse John
TITLE Connecticut Takes a Cautious First Step in Establishing a Statewide, Interactive, Distance Learning Cable Franchise Operator Interconnection.
PUB DATE 1 Feb 94
NOTE 18p.; Paper presented to the Connecticut Higher Education and Technical Association Symposium on Communications (New Britain, CT, March 22, 1994).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Cable Franchising; *Cable Television; Cost Effectiveness; *Distance Education; *Educational Media; *Educational Television; Elementary Secondary Education; Financial Support; Government Role; Interaction; Needs Assessment; Program Development; State Legislation; State Programs; *Telecommunications
IDENTIFIERS *Connecticut; *Fiber Optics

ABSTRACT

Remote education has arrived in Connecticut and is promising to expand, as this discussion of its development, progress, and difficulties demonstrates. In June 1993, state legislation mandated a feasibility study of ways to bring about bidirectional educational programming among Connecticut's 26 cable-franchise operators. Cost allocation for the remote educational architecture remains an undefined area with the question of what franchisers and the state should pay, undecided. Another issue is that of the legal implications of local access. Connecticut has not yet adopted a regulatory stance for these issues but is suggesting a focus on community needs. Equipment provisioning is another area that is not yet defined, although 14 of the 26 operators have begun some distance-education efforts. Of additional interest are the role of national organizations and companies and questions of ensuring the quality of programming. Connecticut franchise operators are poised to fit into developing systems and are beginning to replace unidirectional coaxial cable with bidirectional fiber-optic cable to facilitate development. A map locates the state's cable operators. (SLD)

Connecticut Takes A Cautious First Step in Establishing A Statewide, Interactive, Distance Learning Cable Franchise Operator Interconnection

Paper Presented to the Connecticut Higher Education and
Technical Association Symposium
on Communications
March 22, 1994,
Central Connecticut State University
New Britain, Connecticut

***Jesse John Pietras**
Technical/Policy Analyst
Department of Public Utility Control

Connecticut Department of Public Utility Control
February 1, 1994

On June 10, 1993, Connecticut' s governor signed into law legislation mandating a feasibility study to be conducted to assess to what extent and in what manner bidirectional educational programming may be effectuated among the state's 26 cable franchise operators[1] This legislation coincided with such federal remote educational initiatives as the National Competitiveness Act of 1993 and the Distance Learning Information Act of 1993. On February 1, 1994, Connecticut's Regulatory Utility Agency, the Department of Public Utility Control (DPUC or Department) submitted a comprehensive report to the Connecticut General Assembly adumbrating the feasibility of a statewide interconnection among the state's cable franchise operators for the purposes of facilitating instructional programming.[2] The purpose of the federal legislation is to establish a national clearinghouse for information technologies relating to remote educational programs. The clearinghouse will maintain a database of distance learning protocols, report on the completion of successful projects, periodically publish a compilation of reports, and review remote educational grant applications.[3] The Connecticut approach has identified the following objectives.

1. What obligations should the franchise operator assume regarding educational equipment and what costs concomitant with outside plant should be the cable franchisee's responsibility?
2. What equipment and distribution plant should the schools be responsible for?
3. To what extent and in what manner should inter-franchise instructional programming costs be allocated?
4. To what extent and in what manner may educational communities of interest most efficaciously articulate their instructional programming needs?[4]

Technolcgical innovations by the state's franchise operators have been analyzed by the Department, some of which have been initiated by major cable players. Tele-Communications Inc., (TCI) for example, the world's largest multiple

1 An Act Conceming Educational Community Antenna Television Service. Hartford, CT.: Substitute Senate Bill No. 414, June 10, 1993.

2 DPUC Feasibility Study of Provisioning of BiDirectional Transmission of Educational and Instructional Programming. New Britain, CT.: Dept. of Public Utility Control, Docket No. 93-07-09, January 26, 1994.

3 Telecommunications and Information Infrastructure and Public Assistance Act of 1993. Washington, D.C.: H. R. 2639, July 14, 1993.

4 DPUC Feasibility Study of Bi-Directional Transmission of Educational and Instructional Programming. New Britain, CT.: Department of Public Utility Control, Docket No. 93-07-09, September 30, 1993. p. 2

systems cable franchise operator, has five franchises in Connecticut, and has installed fiber-to-the-trunk cable, increasing channel capacity and improving picture quality. This innovation also facilitates reception of a single signal within the franchise area transmitted to a single town rather than having that signal be received by all other franchise area towns. The advantage is that the distance learning transmissions need not block public, educational, and governmental access channel time in franchise area municipalities. Without a dedicated channel, the interactive educational transmissions are viewable by all franchise area subscribers, unless advanced, soi disant ISDN architecture is available in that particular system.

An undefined area in distance education remains cost allocation for the remote educational architecture. Educational costs are largely supported by the general tax base. However, the costs for each type of remote educational morphology vary with network construction requirements. The nascent federal legislative framework supporting distance education is silent on the question of cost implications for remote educational infrastructures. The legislation states:

> to achieve significant cost savings and improved distance learning services by establishing....an "information clearinghouse" for distance learning activities to gather and distribute information on the effectiveness of distance learning programs and the technologies used in such programs.[5]

As far back as 1988 the Connecticut State Board of Education and the Board of Governors for Higher Education surveyed Connecticut's cable franchise operators on the uses of instructional programming on extant access channels by schools and on schools' perceptions regarding inhibiting factors in the uses of cable. Results indicated that while the use of instructional channels by educational institutions at that time was relatively low, both teachers and administrators were becoming increasingly aware of the need of sharing video resources among schools within educational districts. One recommendation from that survey stated that the Department of Higher Education should: "Offer technical and financial assistance to

5 Distance Learning Information Act of 1993. Washington, D. C.: H. R. 2592, July 1, 1993.

schools for the wiring of school buildings...."[6] A more recent DPUC study on the feasibility of distance learning found that teachers surveyed overwhelmingly stated they would not be averse to teaching via interactive television.[7]

The DPUC has been addressing the issue of remote education for about four years, and has adopted the position that franchise operators need to commit to the provisioning and to the maintaining of technologically advanced equipment and facilities for effectuating educational programming, and should incur some of those expenses that are legitimately needed to transmit such programming.[8] The Valley Shore Telecommunications Cooperative, an educational consortium comprised of six school systems along the state's shoreline, has advocated that cable operators interconnect franchise areas so that educational programming can be shared across cable franchise boundaries. According to Valley Shore, "Not only must our school walls come down and become almost limitless, but so too should the walls of our franchise areas."[9] The Department has also submitted to the General Assembly draft legislation concerning two-way transmission of cable signals. The legislation, scheduled to be acted upon during the 1994 legislative session, seeks to allow cable franchise operators to transmit bidirectionally, as cable franchisees are currently restricted statutorily from 2-way transmission, (1.) "....the one-way transmission to subscribers of video programming or information....to all subscribers generally...."[10] The proposed draft seeks to authorize cable operators to transmit bidirectionally educational programming relative to operators' franchise agreements.

> The two-way transmission of educational and instructional programming or information, in accordance with the community antenna television company's franchise agreement or pursuant to an order of the Department.[11]

6 Richard T. Hetzel, Utilization of Mandated Instructional Access Cable Channels in Connecticut. Syracuse, N. Y., March 4, 1988. p. 9.
7 Communications Policy Group: Cable Television Community Needs Assessment :Final Report to the DPUC. New Britain, CT.: Docket No. 90-10-11, Application of Century Cable Management Corp. for Franchise Renewal, Appendix C. October 5, 1992, p. 5.
8 Application of Storer Communications of Clinton, Inc., for Franchise Renewal. New Britain, CT.: Department of Public Utility Control, November 18, 1992. pp. 6-8.
9 DPUC Feasibility Study of Provisioning of bidirectional Transmission of Educational and Instructional Programming, Docket No. 93-07-09: Comments of the Valley Shore Telecommunications Cooperative. New Britain, CT.: Department of Public Utility Control, September 30, 1993. pp. 1-3.
10 General Statutes of Connecticut, vol. 5 Titles 14-16a. Revised to January 1, 1993. Hartford, CT.: p. 417.
11 DPUC 1994 Legislative Proposal: bidirectional Educational CATV. New Britain, CT.: Department of Public Utility Control, October 1, 1993.

This anticipated change in regulatory policy, first proposed in 1993, is consonant with the issue of interconnectivity of instructional or institutional networks across Connecticut's cable franchise demarcations. One problematic aspect of Connecticut's statewide interconnect initiative concerns cost allocation. Specific Apportionment of distance education costs was not specifically addressed in the Department's 1994 report to the General Assembly, and distance education costs are acknowledged to be unique to the specific system architecture of the operator. Connecticut's regulators have historically taken the position that cable franchisees have a social contract obligation to provide the distribution plant and some of the funding necessary for remote educational programming. Legally, these costs are ostensibly interpreted as rate-based above-the-line pass through costs to subscribers, as stated in the 1992 Cable Act:

> ....the cost of satisfying franchise requirements to support public, educational, or governmental channels....and the costs of any public, educational, or governmental access programming.... are largely beyond the control of the cable operator and should be passed on to subscribers without a cost-of service-showing.[12]

Additionally, the public, educational, and governmental institutions themselves incur costs, some of the recovery of which could theoretically be derived from the general tax base, various embedded subsidies, off-budget funding schemes, private investment, or from incipient competition. The construction of a distance learning architecture may be considered an operating expense by the franchisee, and thus charged to the subscribers, since that function then becomes another operating expense of providing service. Further muddying these cost allocation waters is the burgeoning appearance of new competitive service providers, some of whom assume the access programming functions for the cable operator. Additionally, Distance learning architecture will help expand educational choices and operationally extend the reach of education deeper and more substantively into the individual and temporal lives of learners. In Connecticut's case, preliminary and unofficial rough cost estimates for statewide interconnectivity are approximately

12 DPUC Feasibility Study of bidirectional Transmission of Educational and Instructional Programming:Comments of the New England Cable Television Association, Inc. New Britain, CT.: Department of Public Utility Control, Docket No. 93-07-09, September 30, 1993. p. 10.

$71,168,123, which is about $6.17 per subscriber per month in addition to whatever each customer currently pays. Cable operators estimate they have spent over $23,000,000 dollars on distance education, and further forecast that the costs to interconnect remote educational architecture with other operators would be much greater, due to the prodigious amounts of fiber optic cable that would be needed.[13] When added to the average monthly cost for basic cable service, it becomes apparent that a statewide interconnected cable institutional network may significantly increase the cost of basic cable television service.[14] Additionally, there is the inevitability of local loop competition within the next year, which would facilitate the eventual merging of the telecommunications and the cable industries, further complicating the issue of cost allocation. Lastly, there is the thinking by some regulators that public service commissions should promote distance education systems not only to benefit franchise area schools, but also to benefit other subscribers, since the construction of the remote educational network makes that plant available for other public service uses as well, such as telemedicine, video-on-demand, games, interactive libraries, and infrastructure modernization. If telephone and cable companies do not assume the responsibility for constructing distance education networks, the "critical mass" of money from the communications infrastructure that the operator uses to provision its panoply of services will be minimized.[15] Additionally, some experts predict that while the early stages of the TCI/Bell Atlantic merger, ceteris paribus, may not spawn new communications options, full-fledged interactive pathways and other sophisticated modalities will emerge, particularly as cable television companies evolve into competitors for local exchange companies along with other competitive access providers.[16] The point to note is that instructional programming is not free, and precisely who pays for what equipment is not yet determined.

Regarding the statewide interconnection, there is an important legal issue of local access with which to contend. For example, to what extent and in what manner would a "must carry" type of regulatory designation for instructional

13Ibid., p. 5.
14 DPUC Feasibility Study of bidirectional Transmission of Educational and Instructional Programming:Unpublished Preliminary Cost Estimates. New Britain, CT.: Department of Public Utility Control, Docket No. 93-07-09, November 1, 1993.
15 "Using Distance Learning to Push Telco Deregulation," Distance Education and Cable Television, 1, (2), (December, 1992): p. 5.
16 Paul F. Kirvan, "Divestiture: Its Impact on End Users," Communications News, 31, (1) (January 1994): 11-13.

programming oppose the intent of the federal government that such programming be dedicated specifically for local access purposes? Connecticut. has not yet adopted a regulatory stance on this issue. The Department has only gone so far as to rule that:

> ....it is the responsibility of a cable operator to address the educational needs within its franchise through the provision of facilities and equipment necessary for technologically advanced educational programming, where such needs have been identified as an essential part of the overall cable-related community needs.[17]

The Department's historical philosophy regarding distance education has been delimited to focus on placing the educational needs of the community within the parameters of governmental and public access programming. That view has remained essentially the same in the recent report to the state legislature, with the regulatory emphasis being on ensuring that the franchise operator offers whatever services are considered necessary and appropriate by the franchise community, though not at the expense of serving its subscribers.[18]

As Connecticut's cable operators begin to implement remote educational protocols, equipment provisioning has varied. Typically, distribution equipment has included return lines both upstream and downstream connecting remote education studios, hardware, internal wiring, fiber optic technology and various components of outside plant. Companies have also offered technical expertise concomitant with the hardware. Equipment supplied by schools has typically included whatever plant is necessary to effectuate program origination. Educational programming costs have been included in basic rates; however, due to the treatment of those expenditures, specific rate base impacts have not been isolated and analyzed, particularly under the maze of the new rate reregulation laws.

About 14 of the state's 26 cable operators currently have implemented some type of remote educational protocol or are in the process of constructing one.[19] According to the Joint Committee on Educational Technology, (JCET), a technical group of education professionals charged with reporting on the various uses of educational technology, Connecticut lags far behind many other states technologically with

17 Application of Storer Communications of Clinton, Inc., for Franchise Renewal. New Britain, CT.: Department of Public Utility Control, Docket No. 90-06-23. November 18, 1992, p. 6.
18 DPUC Feasibility Study, Docket No. 93-07-09, January 26, 1994, p. 7.
19 Ibid., p. 4.

respect to distance education.[20] Remote learning, until the relatively recent explosion in information technology, has had the same basic configuration for over 20 years-a talking teacher positioned in front of a camera. New interactive pathways now allow student/teacher dialogue through various electronic interfaces.[21] The JCET thinks that this is partly because Connecticut has not yet adopted a uniform system for provisioning remote instructional programming, but instead has adopted a piecemeal approach, which has stifled innovation. The JCET further believes that educational and information technology can remove many of the inequities now extant in the public school system, and they further suggest that new applications of educational technology such as the proposed statewide interconnection could attract much needed commerce to a state economy ravaged by the depressed insurance and defense industries and by the high cost of doing Connecticut commerce. As the JCET has pointed out, "The use of technology must be integrated into other efforts to improve educational outcomes," particularly with the current emphasis on outcome or product-based education.[22] The JCET further believes that the proposed interconnect is imminent, particularly with the recent designation of Hartford as a "superhub" in the $2 billion dollar nationwide TCI fiber optic wiring project. This work will result in approximately 1,100 miles of fiber in Connecticut alone, costing a projected $68 million dollars, and affecting virtually all of the state's 223,000 cable subscribers.[23] Part of that package will offer interactive educational services. Since costs for running the schools are supported by taxes, the extent and manner in which the DPUC will recommend the shifting of these programming costs from the general tax base to the subscriber base, if at all, remains to be determined in future proceedings.[24]

Another issue regarding the proposed interconnection is the modus operandi used by the Justice Department in allowing the cable and telephone company mega mergers among such communications colossi as TCI, Viacom, Bell Atlantic,

20 Joint Committee on Educational Technology. Presentation to the State Telecommunications Task Force, Hartford, CT., December 6, 1993.
21 Cablelearn Channel 27 Quarterwire, 6, (1), (Spring, 1992):1-3.
22 1992 Annual Report from the Joint Committee on Educational Technology. Hartford, CT.: February 1, 1992. p. 3
23 Susan E. Kinsman, "Hartford to be Hub in $2 Billion Fiber-Optic Project," Hartford Courant, 150, (103), (April 13, 1993): A1.
24 DPUC Feasibility Study of Educational and Instructional Programming:Comments of Nutmeg Public Access Television Inc. New Britain, CT.: Department of Public Utility Control, Docket No. 93-07-09, p. 5.

QVC, and Bell South, on the federal level.[25] Any statewide interconnection that is actually implemented is likely to spawn more policy than technical problems, especially in the crossing of cable franchise boundaries. In Connecticut, both TCI and the Southern New England Telephone Company, (SNET) the state's dominant local exchange carrier, are installing fiber optic cable. SNET's goal is to install fiber to connect every switching station in the state to nodes of 500 or more customers.[26] Coaxial cable would then connect the individual nodes to homes or to businesses. This arrangement will facilitate the offering of not only dial tone but of video and data transmission as well, including remote education. Regulators in Connecticut as in other states are moving away from fixed rates of return toward allowing regulated utilities more leeway in shifting costs and in setting prices within certain limits set by the state commissions. In SNET's case, the Company has recently allowed MFS Telecom to share a portion of its fiber-optic network and local telephone business in an effort to expand its existing 2,500 miles of fiber.[27]

The primary reasons for the nationwide proliferation of remote educational paradigms is that essential educational needs can be fulfilled by the developing technology, and technology is becoming cheaper and less capital-intensive to implement.[28] On the federal level, the Department of Education's "Star Schools" grants program has allocated more than $100 million dollars to fund remote education programs in 47 states over the past several years, as well as establishing programs in Puerto Rico and in the Virgin Islands.[29]

Recent Connecticut legislation that has attempted to foster the development of instructional programming has included educational shows deemed by legislative act to be "technologically advanced" including the programming...."to comply with quality of service standards."[30] Ultimately, the provisioning of two-way cable television service is one important regulatory objective. As suggested by a recent

25 Colin McEnroe, "On the Information Superhighway and Going Nowhere," Hartford, Courant, 155, (312), (November 8, 1993): A6, A10.
26 George Judson, "Data Highway Accelerates in Connecticut," New York Times, 143, (49, 576) (January 14, 1994): B1, B4.
27 Kathleen Gorman, "SNET to Share Fiber-Optic Service," Hartford Courant, 156, (January 18, 1994): D1, D5.
28 Isabelle Bruder, "A Guide to Distance Learning," Electronic Learning, 11, (3), (November-December, 1991): 20-28.
29 Linking for Learning:A New Course for Education. Washington, D.C.: Office of Technology Assessment, November, 1989. p. 15.
30 An Act Concerning Educational Programming. Hartford, CT.: Public Act No. 92-146, May 27, 1992.

technical report on emerging communications technologies: "Cable operators will continue to spend significant amounts of capital on fiber optics, but not on digital compression," since that technology has still not saturated the franchise territories, nor is it technologically feasible until system channel capacity needs to be greatly expanded, usually well beyond the usual 60-70 channel average system size.[31] The recent proliferation of interactive services has resulted in: "....delivery of movies on demand, home shopping, interactive pay-per-view, educational programming, medical diagnostic services, games, data service and electronic libraries."[32]

Despite the copious amount of federal legislation supporting the evolving electronic information superhighway, many schools must still contend with such time-honored problems as unwieldy class sizes and a constrained educational largesse, and not every educational institution will have the funding and the access to support state-of-the-art electronic learning protocols, particularly in a depressed economy. In these cases, the textbook rather than the computer terminal will remain the dominant learning modality as being the cheapest way of getting into a student's hand and head what is needed to be learned. As textbook expert Jeanne Chall states: "We go in and out of different fashions in education. Right now, the fashion is to be opposed to textbooks because it is not considered creative."[33] On the other hand, disciplines such as medicine and science have embraced the new electronic learning paradigms wholeheartedly to cut the rather substantial costs of medicine by transmitting the expertise of expensive specialists to geographically isolated and rural areas of the country.[34] Recently, the information monolith *Encyclopedia Britannica* has begun computerizing its product . The Company has come to realize the limitations of hard-bound volumes and is entering the electronic publishing milieu to determine what are the largest and most lucrative information markets. This represents a significant move toward instant knowledge. *Britannica's* move is significant because it represents the use of what is essentially an electronic learning paradigm to tap such advanced Information Age modalities as "hypertext," which allows each referenced article to be instantly referred to other germane works and illustrations, and also connects the four primary components of the

31 Peter Lambert and Leslie Ellis, "1994 Outlook: Fiber Optics Yes, Digital No," Multichannel News, 14, (48), (November 29, 1993):1, 40.
32 Merwin Sands, Recent Developments in Telecommunications. New Britain: Office of Consumer Counsel, January 1, 1994. p. 22.
33 Lynda Richardson, "More Schools are Trying to Write Textbooks Out of the Curriculum," New York Times, 143, (49,593): January 31, 1994): A1, B2.
34 Andrew Purvis, "Healing by Wire," Time, 139, (20), (May 18, 1992): 68.

encyclopedia: *macropedia*, *micropedia*, *index*, and an outline of world information called a *propedia*. Traditional texts cannot offer such informational capability. Larry Smarr, Director of the National Center for Supercomputer Applications states: "Here is a whole world of people who are using cyberspace as their information stream. They are all potential customers for commerical information providers."[35]

While it remains technologically feasible to proffer interactive instructional learning, the costs to Connecticut's cable franchise operators remains prohibitive. New technologies such as digital signal compression and high-tech system architecture such as ISDN are theorized to drive down instructional programming costs eventually. However, questions regarding usage, operation, and maintenance costs, cost allocation and sources of funding must be thoroughly analyzed as a necessary prerequisite to the establishment of statewide remote educational network in Connecticut.

It is noteworthy to observe the change that technology has wrought in distance education, from its inauspicious beginnings as correspondence courses in the early nineteenth century to a learning modality now considered to be de rigueur in many learning environments across the country. Connecticut's emerging regulatory framework supporting distance education is a cautious first step in moving from its present multifaceted approach toward achieving a more unified paradigm. Philosophically, technology being used to promote remote education may also be viewed as a social contract in that leading edge technology is the means to produce and to disseminate a service to benefit the common good of the whole society. As the Enlightenment philosopher Jean Jacques Rousseau stated:

> "What a man loses by the social contract is his natural liberty and an unlimited right to do everything he tries to get and succeeds in getting; what he gains is civil liberty and the proprietorship of all he possesses."[36]

The Department has concluded that cable franchise operators can and should play a part in the provisioning of a statewide cable distance education interconnection. Cable officials however, quickly admonish against constructing an expensive system without usage assurances in place from local educational

35 John Markoff, "Britannica's 44 Million Words Are Going On Line," New York Times, 143, (49, 601), (February 8, 1994): D1, D2.
36 Jean Jacques Rousseau, On the Origin of Inequality of Political Economy:The Social Contract. G.D.H. Cole, trans., Chicago: Encyclopedia Britannica, Inc., 1952. pp. 393-94.

communities. Cable representatives expressed concern that building interactive architecture without such assurances from potential users may lead to a situation analogous to Iowa, where a costly, $100 million dollar, 2,800 mile fiber optic backbone, statewide remote education interconnect has been established, but has ostensibly suffered from a dearth of educational and instructional programming usage, which has had a deleterious impact on the state's general fund of operating the massive interactive educational network.[37] In Connecticut's case, the question of whether such an investment should be made has already been answered affirmatively. The next question must be asked to determine who should make it. The beginning deregulation of various communications service providers, the emergence of competitive access providers, competition, and private investment are theorized ultimately to fund the new electronic pathways.[38] Government in and of itself, however, be it federal, state, or local, cannot accomplish that task.

As digital and fiber optic technology have evolved, both the local exchange companies and the cable franchise operators have been moving toward a common objective of constructing and of implementing two-way interactive networks offering voice, video, and myriad data communications options.[39] The transformation has been from separate monopolistic conglomerates to head-on competition, which is one mechanism purported to fund the development of the National Information Infrastructure Act. It makes sense to combine cable and telephone technologies, since the former are essentially gigantic one-way pipelines into the home capable of processing enormous capacity, while the latter possesses the switching and linking ability necessary to bring about ease of data transmission. The advent of the Information Age may in fact change the prevailing educational metaphor from the textbook to the computer screen, just as the computer revolution helped change the image of America from the land of the smokestack economy to the land of the cathode ray tube display. The raison d' etre of distance education is that learners of all ages, by they administrators, teachers, students. machinists, or politicians will be provisioned with information and mail from across the nation, state, and district sans costly connect charges, making the equity of informational access more feasible by linking users to the network with only a local telephone call. Education is

37 William Fulton and Morris Newman, "Who Will Wire America?" Governing, 7, (1) (October, 1993): 26.
38 Mitchell W. Pearlman and Colleen M. Murphy, "Will Access to Information Be Universal?" Hartford Courant, (January 30, 1994): E1, E4.
39 Edmund L, Andrews, "From Sibling Rivalry to Civil War," New York Times, (November 28, 1993): 3, 1, 6.

to take advantage of the shared resources of statewide, interconnected communications systems.[40]

Inter and intrastate remote education networks are likely to increase as the National Information Infrastructure Act encourages both telephone and cable companies to build high-speed fiber optic networks.. Trade groups such as the National Cable Television Association want to exclude telephone companies from entering the cable television market for at least a few more years, but the mega mergers such as TCI/Bell Atlantic mean that regional phone companies will be offering video services over telephone lines by the end of 1994.[41] It remains to be seen whether the National Information Infrastructure Act will create an interconnected, interactive nation or will result in the establishment of a vast, electronic wasteland where voice mail, automatic call routing, electronic mailboxes, multiline fax machines and caller ID lead to an environment where rather than connecting, messages get lost more easily than ever.[42] Connecticut recently accomplished an important distance educational objective when the Department adopted distance education and instructional programming regulations. The new regulations state:

> The Department may renew a franchise.... if the franchise holder has committed itself to maintain technologically advanced equipment and facilities, comply with quality of service standards as determined by the Department and make available the facilities and equipment necessary to enhance and promote educational programming.[43]

The regulations, intended to bring the Department into compliance with Public Act 92-146, require the franchising authority to consider the cable operators' commitments to identifying, adumbrating, and for implementing quality criteria for instructional and for educational programming. Cable franchise holders must now specify to the Department in what manner they will address not only the public, educational, and governmental access needs of their subscribers, but to what extent

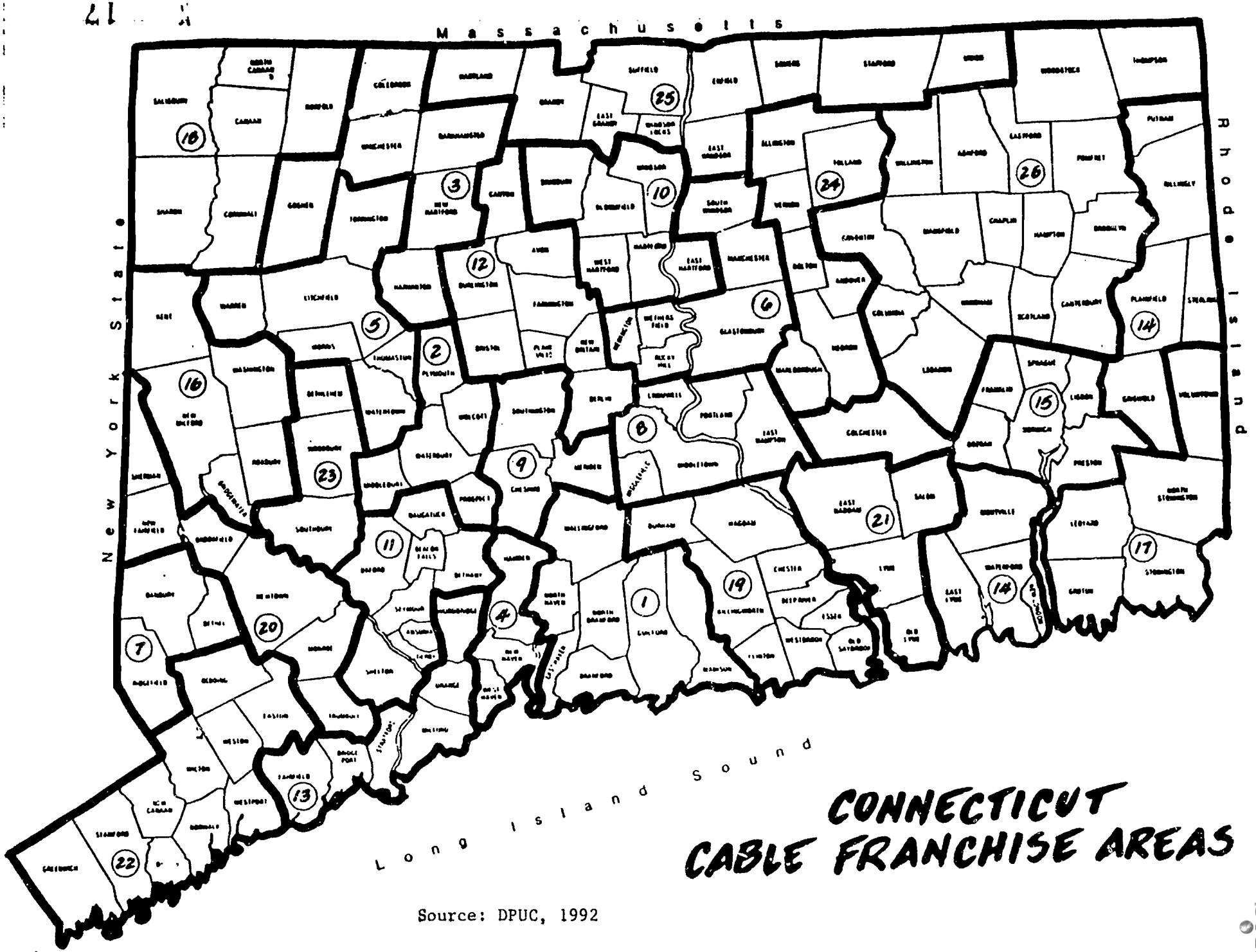
40 Connie Stout, "Telecommunications: A Statewide Approach to Link Educators," Educational Technology, 31, (4). (April, 1991): 44-46.
41 Edmund L. Andrews, "A Free for All in Communications," New York Times, 148, (49,567) (February 4, 1994): D1, D5.
42 Kirk Johnson, "Banishing the Busy Signal," The New York Times, 143, (49,587) (January 25, 1994): B1, B6.
43 "Quality Standards for Instructional and Educational Channels. Connecticut Law Journal, 225, (May 18, 1993): 21B, 22B

and in what manner the operator will address the instructional programming needs of the franchise community. This regulatory framework provides a platform on which the franchise community can construct the foundations for its distance learning and instructional programming needs. Whether these needs are articulated to the operator via cable company advisory councils, by educational communities of interest, or by Boards of Education, the result is what is important-namely, that the franchise community has a mechanism with which to communicate to its franchise holder a "critical mass" of support for its educational and instructional programming and its policy objectives. Connecticut franchise operators already are re-thinking and re-configuring their system architecture to eventually replace uni-directional coaxial cable with bi-directional fiber optic cable to effectuate future interactivity, particularly for educational and for instructional programming.

Connecticut is thus well-positioned to fit into the evolving parameters of the National Information Infrastructure framework that will eventually connect homes, businesses, and various educational communities in a vast multimedia and informational network infrastructure.[44] Remote education, long the province of the large, remote and geographically isolated communities and states, has arrived in tiny, southern New England Connecticut with a flourish and promises to continue to expand in scope and in content.

44 "Vice President Gore Outlines Administration's Telecommunications Policy," Infotrack, 3, (1), (January, 1994): 1.

TABLE A



CONNECTICUT CABLE FRANCHISE AREAS

Source: DPUC, 1992

Legend To Table A

Cable TV Company Name	Company Number
TCI Cablevision of South Central CT	1
Sammons Communications	2
Pegasus Cable Television	3
Storer Communications of Groton	4
Laurel Cablevision	5
Cox Cable of Greater Hartford	6
Comcast Cablevision of Danbury	7
Comcast Cablevision of Middletown	8
Telesystems of CT	9
TCI Cablevision of Hartford	10
Tele-Media of Western (Valley)	11
TCI Cablevision of Central CT	12
Cablevision of Southern Connecticut	13
Eastern Connecticut Cable Television	14
Century Norwich Corporation	15
Crown Cable New Milford	16
Storer Communications of Groton	17
TCI Cablevision of Northwestern CT	18
Storer Communications of Clinton	19
Crown Cable-Housatonic	20
Century Cable Management Corporation	21
Cablevision of Connecticut	22
Crown Cable Mid-CT	23
TCI Cablevision of Eastern Connecticut	24
Continental Cablevision	25
Tele-Media of Northeastern CT	26

Source: DPUC, 1993