

# **HOW DOES TECHNOLOGY AFFECT ACCESS IN POSTSECONDARY EDUCATION? WHAT DO WE REALLY KNOW?**

## **AN ANNOTATED BIBLIOGRAPHY**

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NATIONAL POSTSECONDRY EDUCATION COOPERATIVE  
(NPEC)**

**Updated March 15, 2002**

Since 1990, when the coding for the World Wide Web was developed, the opportunities for students to participate in postsecondary education have increased considerably. Thousands of online courses are now available and more and more on-campus courses possess a technology component. Many colleges and universities are finding the Internet to be an effective tool for use with their admissions programs. In addition, education and training through the Internet is becoming big business worldwide.

These developments raise an important policy question. Does technology expand or serve as a barrier to access to postsecondary education, particularly to underrepresented groups? Put another way, has the advent of technology in our colleges and universities and other emerging postsecondary providers helped or hindered the ability of certain classes of people—such as racial/ethnic and low income groups—from enjoying the benefits of education beyond high school? This public policy issue engenders other corollary questions. To what extent do higher education students have access to technology-based learning, including access to faculty, information, and other learning experiences? Does availability of computing resources or technology in secondary school affect access to postsecondary education? How effective is technology in the learning process?

The following annotated bibliography was developed to serve as a resource document to address these questions. Based upon a review of the literature regarding an examination of how technology affects access to postsecondary education and how technology is used in postsecondary education, the bibliography is grouped into the following categories: (1) access to postsecondary education in general; (2) effectiveness of technology; (3) access to technology-based learning; (4) preparation for using technology; and (5) academic programs.

The literature review primarily targeted those sources published since 1990. Materials reviewed included journal articles, reports published by independent research organizations, testimony before government committees, books and book chapters,

higher education association reports, federal government studies and reports, dissertations, papers presented at association meetings, and monographs. The review resulted in a bibliography of over 120 sources.

For the purpose of this bibliography, “access” is viewed as having three components: (1) access to postsecondary education in general, (2) access to technology-mediated distance learning, and (3) access to technology-enriched campus instruction. Also, for the purpose of this bibliography, “technology-based learning” is viewed as having two components: (1) technology-mediated distance education, and (2) technology-enriched campus instruction.

The reader should be aware that only those references that focused upon the relationship of technology and access to postsecondary are included. Sources were selected based upon their ability to address this issue and helped to answer the questions noted above. Thus, to that extent, the bibliography is selective, rather than all inclusive.

It is also important to note that the literature on these topics is expanding at a rapid rate. Although efforts were made to ensure that this bibliography as up-to-date as possible (the latest reference is dated February, 2002), it is unavoidable that as soon as the bibliography is released, additional materials will be published that could have been included and contribute to the ongoing dialogue. Indeed, this fact is a poignant testimony to the intense interest regarding how technology is affecting access to postsecondary education.

## Access to Postsecondary Education in General

Burnett, Frank (2001, February). The Internet as an Admission Tool – 2000. Education Now

A survey was sent to 966 members of the National Association for College Admission Counseling to measure how higher education institutions are using the Internet to carry out functions of the admission office. Among the several findings, the report finds that a significant number of institutions (75% of survey respondents) provide applicants with the option of completing the admission application online and submitting it electronically. Author's note: A word of caution—only 13 percent of the members responded.

Card, Karen A. (2000). Providing Access to Graduate Education Using Computer-Mediated Communication, International Journal of Instructional Media, 27(3).

This study examines the effectiveness of the computer-mediated communication (CMC) method in delivering graduate educational administration courses in the United States. Factors analyzed include achievement of course learning objectives by students taking courses through CMC, differences in the student level of satisfaction, and significance of CMC for individuals working full-time.

Carnevale, Dan (2001, October). House Votes to Ease Regulations on Distance Education, The Chronicle of Higher Education, October 26, 2001.

The House of Representatives overwhelmingly passed a bill to curtail regulations that many critics say inhibit distance education. The bill, H.R. 1992, would, for some institutions, effectively eliminate the 50-percent rule, which forbids an institution to provide federal financial aid if it teaches more than half of its students at a distance, or if more than half of its courses are distance courses. The bill would also change the 12-hour rule, which requires a student to spend at least 12 hours a week in a physical classroom to be eligible for financial aid. If the bill were to pass the Senate and be signed into law by President Bush, any institution that is currently providing federal financial aid could ignore the 50-percent rule, provided that its loan default rate had been below 10 percent during the previous three years.

Gladieux, Larry, and Watson Scott Swail (1999, April). The Virtual University & Educational Opportunity: Issues of Equity and Access for the Next Generation. The College Board, see <http://www.collegeboard.org>.

This report concludes that the result of the new technologies may be to deepen the divide between educational haves and have-nots, and that the market-place alone will not fix the problem. Public policy must intervene to narrow the digital divide between whites and minorities, the wealthy and the less advantaged. Access and inclusion should be the principle values inspiring the use of new

technologies to deliver and enhance instruction. Among the policy recommendations are (1) that the government must intervene to ensure a level playing field, and (2) the government must continue to generate research and indicators on the social impact of the Internet.

Green, Kenneth (2000). 2000 Campus Computing Report. Campus Computing, Encino, California.

This annual survey of information technology in U.S. higher education shows that more institutions now offer more services on their Web sites. Three-fourths (76.1 percent) of the 469 institutions participating in the 2000 survey provide online undergraduate applications, up from 69.5 percent in 1999 and 55.4 percent in 1998. Over four-fifths (83.1 percent) make the course catalog available online, compared to 77.3 percent in last year and 65.2 percent in 1998.

Heeger, Gerald A. (2000, July 19). Testimony before the Web-based Education Commission. President, University of Maryland University College.

One policy recommendation in his testimony targeted the need to focus on enabling students to take advantage of the Internet rather than creating obstacles to that access. Presently, Heeger observes that it is virtually impossible for a student to enroll in more than one higher education institution at the same time. In particular, the current financial aid regulations constitute a barrier to students fully utilizing Internet education opportunities.

Heller, Donald E. (ed) (2001) The States and Public Higher Education Policy. Baltimore: The Johns Hopkins University Press.

Among several issues, this book addresses financial aid policy and distance education. A summary of a roundtable discussion of key issues on financial aid for distance education students outlines six principles for future policy development. (1) Student aid should be available without regard to mode of instructional delivery. (2) Delivery of student aid should be learner-centered, with aid following the student through the academic program. (3) Aid should be awarded only to those in accredited programs of study that confer a recognized credential, such as a degree or certificate. (4) The awarding of student aid should be tied primarily to standards of academic progress and not arbitrary measures of time. (5) Regulations should give institutions flexibility in determining how to calculate eligibility for aid to pay for direct (tuition) and indirect (living expenses) costs of attendance. (6) Aid amounts and limits should be focused more on lifetime standards than on annual or institutional maximums.

Jewett, Frank (1997). The Human Computer Interaction Certificate Program at Rensselaer Polytechnic Institute: A Case Study in the Benefits and Costs of a Joint Industry/University Designed Program Featuring Integrated Delivery Systems. Seal Beach, California: The Chancellor's Office, California State University.

This study addressed a graduate level certificate program in Human Computer Interaction designed for individuals who work in computer industry occupations. Rensselaer expects 200-300 more new working professional students at remote sites over the next five years as a result of this program. Seventy-five percent of the respondents indicated that they would not have been able to take the course if it had not been delivered to their workplace.

\_\_\_\_\_. (1997). TELETECHNET—Old Dominion University and “Two-Plus-Two” Programs at Community Colleges in Virginia: A Case Study in the Benefits and Costs of an Intercampus Instructional Television Network. Seal Beach, California: The Chancellor’s Office, California State University.

This case study describes a collaborative distance education effort between Old Dominion University and community colleges in Virginia. Among the conclusions, the program in 1996 is estimated to have increased the participation of Virginia residents in four-year public higher education by over 4,000 individuals (a 3.3 percent increase in the participation rate).

\_\_\_\_\_. (1997). The WESTNET Program—SUNY Brockport and the SUNY Campuses in Western New York State: A Case Study in the Benefits and Costs of an Interactive Television Network. Seal Beach, California: The Chancellor’s Office, California State University.

This case study describes a collaborative effort among ten campuses of the State University of New York (SUNY) to establish a shared distance learning network in western New York state. A major conclusion was that course sharing among campuses is one way to maintain degree programs and provide adequate course offerings even where campus departments are relatively small.

Lewis, Laurie, Debbie Alexander, and Elizabeth Farris (1997, October). Distance Education in Higher Education Institutions. U.S. Department of Education, National Center for Education Statistics, Statistical Analysis Report, NCES 98-062.

This survey was to provide the first nationally representative data about distance education course offerings in higher education institutions. Among other analyses or data, the study obtained information about the percentage of institutions that currently offer and that plan to offer distance education courses in the next 3 years; distance education course offerings; and characteristics of distance education courses and programs. Among the key findings was that increasing access was an important goal for most distance education programs, with making courses available at convenient locations rated as very important by 82 percent of the institutions. A third of higher education institutions offered distance education courses in fall 1995, and another quarter planned to offer such courses in the next three years. Also, an estimated 753,640 students formally enrolled in distance education courses in academic year 1994-95.

Lewis, Laurie, Kyle Snow, and Elizabeth Farris (1999, December). Distance Education at Postsecondary Education Institutions: 1997-98. U.S. Department of Education, National Center for Education Statistics, Statistical Analysis Report, NCES 2000-013.

This report presents findings from the second nationally representative survey of distance education undertaken by the National Center for Education Statistics. The survey was conducted in winter 1998-99, and collected information about the 12-month 1997-98 year. Some of the key findings were (1) that about one-third of the nations colleges and universities offered any distance education courses during the 1997-98 academic year; (2) distance education was more likely to be conducted by public institutions; and (3) there were an estimated 1,661,100 enrollments in all distance education courses and 1,363,670 in college-level, credit-granting distance education courses.

Oblinger, Diana G., Carole A. Barone, and Brian L. Hawkins (2001). Distributed Education and its Challenges: An Overview. American Council on Education and Educause.

This overview paper identifies several significant issues associated with distributed education. They include market size and growth of distance education, governance and organization to provide distance learning, partnerships, quality, and barriers to distance education. The overview also includes the following sample set of learner segments. *Corporate learners* who work for corporations and are seeking education to maintain or upgrade their skills. *Professional enhancement learners* who are seeking to advance their careers or shift careers. *Degree-completion adult learners* who are working to complete a degree at an older age. *College experience learners*, a.k.a. the traditional student. *Pre-college(K-12) learners* who are interested in doing baccalaureate-level work prior to the completion of high school. *Remediation and test preparation learners* who are focused on learning as prerequisite to an examination or enrollment in another program. And, *recreational learners* who are interested in learning for its own sake.

Phipps, Ronald A. and Jane V. Wellman (2001, April). Funding the “Infostructure:” A Guide to Financing Technology Infrastructure in Higher Education. Lumina Foundation for Education, New Agenda Series, Volume 3, Number 2.

This report provides an overview and recommendations to help states and campus officials know how to plan, pay for and maintain the infrastructure that is necessary to maintain technology. Based on a survey of state finance officers and interviews with experts and institutional representatives on technology financing, the report offers several key findings. A major issue identified in the report is that an institutional digital divide seems to be emerging; larger, wealthier institutions find it easier to stay technologically “current” than do smaller, less well-funded higher education institutions.

Rodrigues, Charles G., Rene A. Gonzalez, and Narciso Cano (1996, April). Improving Utilization of the Information Highway by Hispanic-Serving Institutions. Hispanic Association of Colleges and Universities.

A survey of Hispanic-Serving Institutions (HSIs) indicates that fewer than one-half of students at HSIs would have access to the Internet during the 1995-1996 school year. Indications are that fewer than one-quarter of students with Internet access will access it through Graphical User Interface (GUI) access. The report notes that HSIs should implement strategic planning and consider placing greater emphasis on student ownership of computers, greater reliance on commercial outsourcing of Internet services, and instituting rewards that encourage faculty to use and adapt technology to enrich the educational experiences of their students.

Spencer, Bruce (1995, Fall). Removing Barriers and Enhancing Openness: Distance Education as Social Adult Education, Journal of Distance Education, X(2).

The author argues that, given the internal institutional constraints of delivery-centered distance education institutions and systems, distance education on its own cannot remove all barriers and become truly “open” and “accessible.” Open accessible, social purpose adult education can only be rebuilt in collaboration with other educational and community groups.

Stokes, Fay Elizabeth (1998). An Evaluative Case Study of Distance Learning and its Impact on Students’ Needs and Development, Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, Walden University.

This case study evaluated distance learning at the community college level and focused on four aspects of technology based instruction: (1) performance, (2) social interaction, (3) college mission, and (4) replacement capacity. The research demonstrated that technology-assisted learning did not jeopardize the mission of the college and was accepted as an alternative to the traditional classroom by students, faculty, and administrators. Overall, it was also determined that student performance increased or remained the same in the distance learning curriculum, and students’ psychological needs for social interaction were maintained despite decreased physical meetings. Other factors such as easy access, convenience, and self-paced workloads were reported as being highly successful components of distance learning environments.

## Effectiveness of Technology

Archer, Jeff (1998). The Link to Higher Scores, Education Week. Retrieved October 3, 2001 from the World Wide Web: <http://www.edweek.org/sreports/tc98/ets/ets-n.htm>.

New research on technology's effectiveness in teaching math appears to confirm what many educators have optimistically suspected. Computers can raise students' achievement and even improve a school's climate. This paper reports on a study based on the performance data of 4<sup>th</sup> and 8<sup>th</sup> graders who took the math section of the 1996 National Assessment of Education Progress (NAEP). After factoring out the influence of several other variables that affect achievement, such as students' socioeconomic status, class size, and teacher qualifications, strong links were found between certain kinds of technology use, higher scores on NAEP, and an improved school climate. In every case, the gains were greater at the middle school level than in the elementary school.

Bland, Kay, Gary Morrison, and Stephen Ross (1992, November). Student Attitudes Toward Learninglink: A Distance Education Project. Paper presented at the Annual Meeting of the Midsouth Educational Research Association, Knoxville, Tennessee.

The purpose of this study was to investigate the first offering of two interactive distance education courses at Memphis State University. Of particular interest was how the students responded to the delivery mode and the methods of instruction. A survey revealed that most of the students in both courses indicated that they would study about the same amount of time, rely on classmates about the same, and take the same amount of notes in the distance education course as they would in a course with the instructor physically present in the classroom.

Cheng, Hui-Chuan, James Lehman, and Penny Armstrong (1991). Comparison of Performance and Attitude in Traditional and Computer Conference Classes, The American Journal of Distance Education, 5(3).

This study tested the effectiveness of computer-mediated communication by delivering a graduate-level instructional computing course to remote sites, compared to traditional face-to-face instruction. The overall findings of the study were that computer conferencing can be an effective educational tool, but further research is needed to clarify time-on-task issues, investigate cooperative learning arrangements, and determine if this type of instruction can be applied to other fields.

Cronin, Michael (1993, January). A Review of Experimental Studies of Interactive Video Instruction in Oral Communication. Paper presented at the Convention of the Association for Educational Communications and Technology, New Orleans, Louisiana.

This paper reviews experimental research on the pedagogical effects of three interactive video instruction programs in oral communication. Formative

evaluations indicated that students enjoyed the programs. Among several measures, it was found that students in the interactive video instruction compared favorably with students in the control group.

Galusha, Jill M. ((1998). Barriers to Learning in Distance Education. Hattiesburg, Mississippi: University of Southern Mississippi.

This literature review recognizes that distance education is not without its problems. They include loss of student motivation due to the lack of face-to-face contact with teachers and peers, potentially prohibitive startup costs, and lack of faculty support.

Gee, Donna (1990). The Impact of Students' Preferred Learning Style Variables in a Distance Education Course: A Case Study. Portales, New Mexico: Eastern New Mexico University.

This study examined the effect of students' preferred learning style on attitude, course completion rates, and perceived academic achievement in a distance education classroom. The data indicated learning style preferences may affect academic achievement and attitude of students involved in distance education.

Goodwin, Bonny N., Beverly A. Miklich, and J.U. Overall (1993, November). Perceptions and Attitudes of Faculty and Students in Two Distance Learning Modes of Delivery: Online Computer and Telecourse. Paper presented at the Symposium for the Marketing of Higher Education, Orlando, Florida.

This study was conducted to discover the perceptions and attitudes of students and faculty regarding their experiences with two distance learning programs, an online computer program and a telecourse program. From surveys of faculty and students, the authors observed that online students were more serious, accomplished, and articulate. In addition, faculty also commented on the stronger analytical and written communication skills of the online students. When students were asked why they chose distance education, over four out of five reported that the schedule was important. Nearly half reported that the instructional method also influenced their decision.

Hammond, Ron J. (1997, August). A Comparison of the Learning Experience of Telecourse Students in Community and Day Sections. Presentation given at the Distance Learning Symposium, Utah Valley State College.

The study compared and assessed the quality of the learning experience of students who take telecourses which are broadcast into the classroom during prime time hours. Community telecourse students were compared to day section students. In general, the community students out performed the day section students.

Hogan, Robert (1997, July). Analysis of Student Success in Distance Learning Courses Compared to Traditional Courses. Paper presented at the Sixth Annual Conference on Multimedia in Education and Industry, Chattanooga, Tennessee.

This paper outlined the results of an experimental study comparing distance learning courses and traditional on-campus courses. Students in distance learning courses received, on average, higher grades and had higher completion rates than students in traditional courses. Withdrawal rates were, however, higher in distance learning courses .

Jewett, Frank (1998). The Master's Degree in Social Work at Cleveland State University and the University of Akron: A Case Study of the Benefits and Costs of a Joint Degree Program Offered via Videoconferencing. Seal Beach, California: The Chancellor's Office, California State University.

The University of Akron and Cleveland State University have developed a joint graduate program leading to the Master of Social Work degree using interactive videoconferencing as a means to deliver courses between the two campuses. Comparisons were made of grade averages for students at sending and receive sites. The "t" statistic was not significant in any of the comparisons made.

Kruger, Thomas J. (2001, May). A Virtual Revolution: Trends in the Expansion of Distance Education. American Federation of Teachers.

Recognizing the expansion of distance education is leading a virtual revolution in American higher education, this report questions whether or not that revolution will improve the quality of education students receive. Based on a review of the latest trends in organizing distance education, this report argues that distance education can be a great asset as long as academic decision-making is placed in the hands of teaching professionals. The report further notes that serious problems arise if distance education is organized primarily around corporate models of marketing and command-and-control management.

Larson, Ollie M. (1994, April). A Study of On-Campus and Off-Campus Graduate Nursing Students, In Ann Yakimovicz, ed. Distance Learning Research Conference Proceedings. San Antonio, Texas.

A questionnaire was sent to 151 graduate nursing students enrolled in an interactive classroom using the Interactive Television Network of the North Dakota University System. In addition to the students in the campus classroom, students could be in another eleven sites. The study found that the majority of the respondents were very positive about their distance education experience.

MacAdkins, Roger (1998, August). The Differences in Students' Perceptions of Learning Between Extended Learning Program Students and On-Campus Students at

Southern Christian University. A dissertation submitted to the Graduate Faculty of Auburn University.

This study, conducted at Southern Christian University during the 1998 Winter Quarter, was designed to identify significant communication factors which impacted students' perceptions of their learning experience and to know if significant differences in perceptions existed between distance and on-campus students. Results of the analysis of variance procedure indicated that there were significant differences between on-campus and Extended Learning Program students on the factors of social presence and audio and video transmission. There were no significant differences for the factors of information transfer, nonverbal immediacy, verbal immediacy, and perceived student learning.

Martin, Elaine D. and Larry Rainey (1993). Student Achievement and Attitude in a Satellite-Delivered High School Science Course, The American Journal of Distance Education, 7(1).

This study investigated the effect of satellite-delivered instruction on student achievement and attitude in a high school anatomy and physiology course. The experimental group included students from seven high schools enrolled in the satellite-delivered course. The control group consisted of students from seven high schools in which classroom teachers provided instruction. There was no significant difference between the groups in attitude toward anatomy and physiology, however, students in the experimental group had a higher post-test score in an achievement test.

McClelland, Jerry (1986, March). Adult and Vocational Education: Implications on Research for Distance Delivery. St. Paul, Minnesota: Minnesota Research and Development Center for Vocational Education, University of Minnesota.

This paper presents a review of aspects of adult education, vocational education, and distance delivery. Although the paper is 15 years old, several questions are offered that are still important today. How do learning tasks, learners, and technologies interact to affect learning outcomes? What teaching behaviors enhance student learning when technology is used either to deliver the teacher's voice and visual image (such as interactive instructional television) or when a device (such as a computer) delivers part of the instruction? Which barriers faced by adult learners can be overcome by the use of distance learning?

Merisotis, Jamie P. and Ronald A. Phipps (1999, May/June). What's the Difference? Outcomes of Distance vs. Traditional Classroom-Based Learning, Change, 13-17.

This study suggests that the vast majority of what is written about distance learning are opinion pieces, how-to articles, and second-hand reports that don't include original research such as experimental or correlational research or case studies. In reviewing the research that was conducted, the authors concluded

that it may not be prudent to accept the findings at face value because the quality of the research is questionable.

Moore, Michael G., Melody M. Thompson, B. Allan Quigley, G. Christopher Clark, and Gerald G. Goff (1990). The Effects of Distance Learning: A Summary of Literature. University Park, Pennsylvania: American Center for the Study of Distance Education.

This paper reviews the research of the 1980s on the main issues in teaching, learning, educational planning, organization and policy-making with regard to use of communications technology in education. The weight of evidence suggests that interactive electronic telecommunications is effective when effectiveness is measured by the achievement of learning, by the attitudes of students and teachers, and cost effectiveness. However, the sheer weight of opinion in the literature should not be taken as conclusive of itself, since most of it is based on anecdotal evidence offered by persons and institutions with vested interests. Furthermore, in those studies where some attempt has been made to gather empirical data, the research has been undertaken by school teachers or university faculty with extremely limited resources. As a result, the methodology of many of the research designs is weak.

Omoregie, Mike (1997). Distance Learning: An Effective Educational Delivery System. Jackson, Mississippi: School of Education, Jackson State University.

This paper describes the researchers' findings and the role of faculty, learners, administrators, and technology in the effectiveness of distance learning. New technology and learners' characteristics contribute to the effectiveness of distance education. Also, researchers found improved modern technology tools and software application packages to play a significant role in effectiveness. Finally, variables such as student demographics, motivation, cognitive style, gender, and previous achievement are causal factors. There were no significant differences between distance and traditionally delivered instruction.

Phelps, Ruth, Rosalie A. Wells, Robert L. Ashworth, Jr., and Heidi A. Hahn (1991). Effectiveness and Cost of Distance Education Using Computer-Mediated Communication, The American Journal of Distance Education, 5(3).

This paper summarized an investigation exploring the cost and effectiveness of using computer-mediated communication (CMC) as a means for meeting the educational requirements of the U.S. Army's Reserve Component. CMC and resident instruction were compared for two different courses. Both cost and effectiveness may vary as a function of class size, student drop-out, and type of implementation. The authors note that caution should be exercised in extrapolating these findings to other uses of CMC.

Phipps, Ronald A. and Jamie Merisotis (1999). What's the Difference? A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education. The Institute for Higher Education Policy.

In an attempt to understand the status of current research on distance education, the report (1) reviews the findings of original research and assesses the overall quality of the analysis; (2) identifies gaps or omissions in the body of original research; and (3) discusses the implications of the research. The major findings of the report is that there is a relative paucity of true, original research dedicated to explaining or predicting phenomena related to distance learning, and there are several key shortcomings of the original research on the effectiveness of distance learning.

\_\_\_\_\_ (2000). Quality on the Line: Benchmarks for Success in Internet-Based Distance Education. The Institute for Higher Education Policy.

Several different organizations in the higher education community have developed principles, guidelines, or benchmarks designed to enhance the quality of distance education. The benchmarks are designed to apply to a wide variety of institutional contexts and consist of fairly broad statements. This case study sought to validate these principles with specific attention to Internet-based distance education. By visiting six higher education institutions which are recognized among the leaders in distance education, the study tested some 45 benchmarks that have been published. This resulted in the identification of 24 benchmarks that were deemed *essential* to ensure quality in distance education. They are listed under the following categories: institutional support, course development, teaching/learning, course structure, student support, faculty support, and evaluation and assessment.

Powell, Richard, Christopher Conway and Lynda Ross (1990). Effects of Student Predisposing Characteristics on Student Success, Journal of Distance Education, 5(1).

The question of why some students successfully study through distance education and others do not is important as distance education moves into the mainstream of higher education. This paper first advances a multivariate framework for examining the issue. It then explores the predictive capability of students' "predisposing characteristics" in regard to their chances of successfully completing their first Athabasca University distance education course. Using discriminant analysis, nine predisposing characteristics were found to be significantly related to success. Some of these characteristics included married students, respondents who rated themselves well organized, female students, and student literacy.

Riddle, Joy (1990). Measuring Affective Change: Students in a Distance Education Class. Greeley, Colorado: Western Institute of Distance Education, University of Northern Colorado.

This paper describes an ongoing distance education project at the University of Northern Colorado. Students in a distance education class were assessed both before and after the course to address their affective concerns about distance education.

Rupinski, T. and P. Stoloff (1990). An Evaluation of Navy Video Training (VTT). CRM 90-36. Alexandria, Virginia: Center for Naval Analysis.

This research evaluated the use of Video Teletraining (VTT) to deliver Navy F-school instruction to students at remote sights. Using data collected from a four-site, fully interactive audio-video network, the analysis focused on system utilization, training effectiveness, downtime, and savings to the Navy. Course grades of students at the remote sites were compared to those of students at the originating site. Controlling for a student's mental aptitude and experience in the Navy, regression analysis found that grades at remote sites were, on average, 2.4 points lower than grades at the originating site. In a survey, 64.2 percent of those at remote sites preferred traditional methods of instruction.

Russell, Thomas L. (2002). The "No Significant Difference Phenomenon," Retrieved March 15, 2002 from the World Wide Web:  
<http://teleducation.nb.ca/nosignificantdifference>.

This Web site provides access to studies published or discovered after the release of the book, *The No Significant Difference Phenomenon*, by Thomas Russell. His book compiled 355 research reports, summaries, and papers on technology on distance education, and demonstrated that there is no significant difference distance education courses and traditional classroom instruction. Studies are constantly being solicited by encouraging submissions to [tjrussell@mindspring.com](mailto:tjrussell@mindspring.com). A companion site is being constructed which features comparative studies that DO demonstrate significant differences between distance education courses and traditional classroom instruction.

Smith, Patricia, Connie L. Dillon, and Mary Boyce (1994, April). A Critical Analysis of Comparative Research on Distance Learning Technologies. In Ann Yakimovicz, ed. Distance Learning Research Conference Proceedings. San Antonio, Texas: Texas A&M University.

This analysis asserts that studies comparing distance education and traditional classroom instruction are inconclusive because of research methodology issues. In short, differences other than the delivery system could not be ruled out as key causal agents. Important factors include: (1) instructional task, (2) learners' motivation and knowledge, (3) the design of instruction, and (4) the teaching effort unrelated to the medium of instruction. The paper concludes by describing the ideal criteria for conducting comparative studies.

Souder, William E. (1993). The Effectiveness of Traditional vs. Satellite Delivery in Three Management of Technology Master's Degree Programs, The American Journal of Distance Education, 7(1).

This paper presents the results of a “natural experiment” that directly compared traditional classroom and distance learning settings. The distance learners performed better than the traditional learners on several dimensions. It appears that the distance learners’ higher levels of maturity, experience, “kindred spirit,” enthusiasm, and sense of responsibility contributed to their performance, and that these conditions might be vital to successful distance learning.

Stone, Harvey R. (1990). Does Interactivity Matter in Video-Based Off-Campus Graduate Engineering Education? Newark, Delaware: University of Delaware.

This paper addresses questions concerning the necessity and degree of direct real-time interaction between on-campus faculty and video-based students working in industry. A survey was designed to seek evidence of variation of student performance—with grades used as an outcome measure—when observed against the following independent variables: age, gender, graduate major, and instructional modality (traditional on-campus instruction, non-interactive videotape delivery, and interactive delivery systems complemented with real-time audio feedback). The analyses support the contention that off-campus graduate engineering students do not suffer from the inability to “talk back” to faculty in real time.

Threkeld, Robert and Karen Brzoska (1994). Research in Distance Education. In Barry Willis, ed. Distance Education: Strategies and Tools. Englewood Cliffs, New Jersey: Educational Technology Publications.

This chapter examined general media comparison research as well as research related to specific media. Results from a multitude of studies suggest that the media itself is not as important to instruction as other variables, such as learner characteristics, motivation, and instructional alternatives. Of significant importance is support for the distance learner. Students want and need rapid feedback from instructors as well as access to library resources and other supporting materials.

Troy State University (2001, June). Technology Integration Report. College of Education.

Data were provided from the Spring 2001 Technology Integration survey conducted by the Troy State University College of Education. The survey was designed to measure the amounts and frequencies of technology integration among College of Education faculty and students. The instrument, coupled with student satisfaction surveys and supervisor observations, gave the College of

Education authentic data to indicate the effect technology is having on the teaching and learning process.

Whitworth, Joan (1998, April). Looking at Distance Learning Through Both Ends of the Camera. Paper presented at the annual meeting of the National Association for Research in Science Teaching, San Diego, California.

The goal of this investigation was to chronicle the experiences of an instructor and her students as they first experience a course delivered at a distance utilizing various technologies. Both the instructor and the students had no experience with e-mail, use of the Internet, and the supporting software. A major conclusion was that distance learning is not easy and involves hard work and commitment on the part of both the instructor and the students.

Wilson, Brenda (1990, November). Students' Assessment of Distance Learning. Paper presented at the annual meeting of the Midsouth Educational Researcher Convention, New Orleans, Louisiana.

The focus of this paper was the assessment of students' initial perception of distance learning. The 75 distance learning participants, sponsored by the University of Alabama at Birmingham, were administered a survey to determine: (1) the basis for enrolling in the course and their willingness to recommend the course to others; (2) comparison to college level work; (3) presentation of the course material; (4) the helpfulness of the teacher assigned to the actual classroom; and (5) self-concept as related to actual performance. The major conclusion was that the students' initial perception of the use of the distance learning model appear to be generally positive, indicating that increased usage might be encouraged.

Zsiray, Stephen, Marina Parsegova, and Margaret O Bray (1995, July). Teaching Russian Via Distance Learning, the EdNet Experience. Paper presented at the Utah Rural Schools 17<sup>th</sup> Annual Conference, Cedar City, Utah.

This paper described issues related to teaching a foreign language through distance learning. They include: designing meaningful interactive instruction, engaging students in dialogue with fellow students who are located in remote sites, and evaluating the effectiveness of the instruction.

## Access to Technology-based Learning

Angulo, Martha and Sandra Feldman (2001, March). Leveraging Learning for Generation 1 and the Haves and Have-Nots of the Digital Divide, School Administrator, 58(3).

Noting that the Internet's effects are spreading, this article discusses how schools are purchasing computer programs, assisted by state, federal, and corporate grants. K-12 schools spent nearly \$7 billion on instructional technology in 2000. The authors conclude that the digital divide is narrowing; the current generation of kids have greater computer access at home and at school.

Bishop, Ann P., Tonyia J. Tidline, Susan Shoemaker, and Pamela Salela (1999). Public Libraries and Networked Information Services in Low-Income Communities, Library & Information Science Research, 21(3).

Findings are presented from an empirical study of community information exchange, computer access and use among low-income, predominantly African American residents in one locale. Results indicate that, while computer use is minimal, many low-income community members are poised to participate in the local development of networked information services. Roles for public libraries in community-wide efforts to bridge the digital divide are emphasized.

Blum, Kimberly Dawn (1999). Gender Differences in Asynchronous Learning in Higher Education: Learning Styles, Participation Barriers, and Communication Patterns, Journal of Asynchronous Environments, 3(1). Retrieved October 4, 2001 from the World Wide Web: [http://www.aln.org/alnweb/journal/Vol3\\_issue1/blum.htm](http://www.aln.org/alnweb/journal/Vol3_issue1/blum.htm).

This study was an interpretative qualitative case study of higher education students learning through asynchronous computer-mediated communication based distance education. Subjects consisted of adult professionals studying for bachelors and masters degrees. Male and female preferred learning styles, communication patterns, and participation barriers were compared for differences in gender. Differences were then contrasted with traditional gender differences in face-to-face (FTF) higher education learning environments. Results suggest there are gender differences between male and female distance education students that contribute towards inequitable gender differences which are both similar and different from the traditional learning environment.

Bohman, Paul (2001, May). Section 508 Now in Effect, Legal/Standard News. Retrieved September 28, 2001 from the World Wide Web: [http://webaim.org/news/show\\_item.php?nid=11](http://webaim.org/news/show_item.php?nid=11)

The official start date of compliance for Section 508 of the Rehabilitation Act—June 21, 2001—marked the beginning of a new, more accessible era for the United States government. From that date on, Federal agencies are required to

take into account the disability access features of products and services that the agencies procure. The accessibility requirements extend to Web sites as well as hardware, software, and other electronic information technologies. The question of the applicability of Section 508 to colleges and universities is difficult to answer. Some claim that universities must comply with Section 508 by virtue of the Assistive Technology Act of 1998. This Act supplies monies to states on condition of compliance with Section 508 rules and regulations. If this interpretation is accepted, however, Section 508 is still a procurement law, and might not apply to Web content developed at the university itself. In addition, a state could, in theory, refuse the monies from the Assistive Technology Act, and thus exempt itself from compliance to Section 508 regulations.

Bradburn, Ellen M. (2001, September). Distance Education Instruction by Postsecondary Faculty and Staff at Degree-Granting Institutions. U.S. Department of Education, National Center for Education Statistics, Statistical Analysis Report, NCES 2001-162.

Using the 1999 National Study of Postsecondary Faculty (NSOPF:99), instructional staff from higher education institutions were surveyed regarding their involvement in distance education. The results serve as a baseline for studies of trends in faculty participation in distance learning using future data collections. Some key findings are that about 6 percent of instructional faculty and staff with some for-credit instructional duties indicated that they taught at least one distance education class in fall 1998. Moreover, few demographic characteristics, conditions of employment, or aspects of education and experience were associated with participation in distance education. Only institutional type was associated. For example, faculty at public 2-year institutions were more likely than their counterparts at private doctoral institutions to teach at least one distance education class (12 versus 6 percent).

Bruckman, Amy S. (1993, August). Gender Swapping on the Internet. Paper presented at INET '93 in San Francisco, CA.: The Internet Society. Retrieved October 8, 2001 from the World Wide Web: <http://ftp.game.org/pub/mud/text/research/gender-swapping.txt>.

In text-based virtual reality environments on the Internet called MUDS, it is possible to pretend to be the opposite gender. In these virtual worlds, the way gender structures basic human interaction is often noticed and reflected upon. This paper introduces MUDS, and then presents a community discussion about gender issues that MUDS inspired. Gender swapping is one example of ways in which network technology can impact not just work practice but also culture and values. A major conclusion is that the Internet is in the process of changing not just how we work, but how we think of ourselves—and ultimately, who we are.

Carvin, Andy (2000, January-February). Mind the Gap: The Digital Divide as the Civil Rights Issue of the New Millennium, MultiMedia Schools, 7(1).

This discussion revolves around the growing gap between people and communities who have access to information technology and those who do not—known as the digital divide. Issues include access in schools and in homes, content, literacy, pedagogy, and teachers' professional development.

Census Bureau (2001, September). Home Computers and Internet Use in the United States: August 2000. U.S. Department of Commerce, Economics and Statistics Administration.

Using data obtained in August 2000, this report found that 54 million households, or 51 percent had one or more computers, and 44 million households, or 42 percent, had at least one member who used the Internet at home. High-income households and married-couple households were more likely to have computers or Internet access. White non-Hispanic children were more likely to have home computer access or use the Internet than were black or Hispanic children. Schools appear to level the playing field by giving computer access to children who have none at home. Finally, more affluent and more highly educated adults are more likely to have computers or use the Internet.

Cohen, Libby G. (2000, July). Focus on the Digital Divide, Journal of Education for Teaching, 26(2).

This research addresses the Individuals with Disabilities Act (IDEA) Amendments of 1997, which require that students with disabilities be provided with assistive technology. Assistive technology is defined as “any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.” Some examples of assistive technology include alternative keyboard, auditory trainer or other amplification system, head stick or pointer, scanner, touch screen, and mouth stick.

Compaine, Benjamin M., ed. (2001). The Digital Divide: Facing a Crisis or Creating a Myth? Cambridge, Massachusetts: The MIT Press.

The editor of this book confesses his skepticism regarding the concept of the digital divide and presents documents and materials that discuss this public policy debate. The readings have been selected to describe the issues and then see it in a multi-layered context. The volume addresses four basic questions: (1) What are the underpinnings of the digital divide: the data that substantiated the concept? (2) What is its historical context? (3) What do some advocates say about the consequences or the remedies for the divide? (4) What research or analysis provides other perspectives on this issue?

Crandall, Robert W. (2000, December). Universal Service, Equal Access, and the Digital Divide. Retrieved October 11, 2001 from the World Wide Web: <http://www.ccst.ucr.edu/cpa/bdd/Crandall.pdf>.

This paper notes that the digital divide is, in reality, simply an observation that higher-income households are early adopters of the newest technology, whether it is a fad or not. Ironically, given the incredible rate of technical progress in all things digital, once we understand that a new service or device is very valuable to all households, it is likely that virtually all will be able to afford it and will have it. The author suggests that it is hardly clear that there is a “digital divide” that needs immediate bridging through a deliberate public policy. As incomes grow and the cost of anything digital falls at a dizzying rate, even the newest digital technology begins spreading across demographic groups. Two of several recommendations are: (1) rely on competition to reduce the market prices of the new services as rapidly as possible; and (2) target any support or subsidies to truly needy households, not to the general population.

Damarin, Suzanne K. (2000, July/August). The “Digital Divide” versus Digital Differences: Principles for Equitable Use of Technology in Education, Educational Technology, 40(4).

This report suggests that “digital differences” is a more appropriate view of the situation facing educators than the concept of “digital divide.” Five principles are introduced that provide direction for the design and development of technology-enhanced educational activities appropriate to the diversity of students with computer access: parsimony, accessibility, multiplicity, separability, and full utility.

Dorr, Jessica and Richard Akeroyd (2001, October). New Mexico Tribal Libraries: Bridging the Digital Divide, Computers in Libraries, 21(9).

Focusing on a visit to Native American libraries in New Mexico, the authors discuss their experience meeting with tribal librarians, leaders, and community members. Barriers to technology and Internet access are described, in addition to efforts to preserve tribal culture and language. Also, details of the Native American Access to Technology Program (NAATP) are explained.

Educause (2000, November). Avoiding the Digital Divide for Smaller Institutions of Higher Education: Recommendations to the President’s Information Technology Advisory Committee. Educause.

At the request of the President’s Technology Advisory Committee, the National Science Foundation and Educause convened a meeting on June 5-6, 2000 to explore the potential “digital divide” for advanced networks in smaller 4-year institutions—defined as those that do not fall within the Research or Doctoral Carnegie Classification. These smaller institutions, which educate the great

majority of college students in the United States, face severe challenges in meeting the ever-increasing advanced networking requirements necessary to educate a 21<sup>st</sup> century workforce. Also, smaller institutions must provide equal research requirements for their faculty. Obstacles to advanced networking for smaller institutions include lack of campus infrastructure, a difficult economic environment for information technology and networking, and lack of high level support from campus decision-makers. Several recommendations are offered. The report also recognizes that many minority serving colleges and universities in the United States are “smaller institutions.”

Fattah, Hassan (2000, September). Politics or a Real Problem? MC: Technology Marketing Intelligence, 20(9).

This article examines how the issue of the digital divide has been framed. The author notes that in the beginning, many saw this as a race issue, but it is becoming clearer that the digital divide is an economic issue. The digital divide is as significant for poor whites in Appalachia as it is for inner-city blacks in Detroit and Native Americans on Arizona reservations. More important, access to computers alone is an incomplete measure of the digital divide. A growing chorus of community activists and educators are warning that the real digital divide isn't about access, but about relevance. To truly bridge the divide, they argue, you need to send a different message about technology and its usefulness in people's daily lives. In short, a dearth of pertinent information, literacy barriers, and limited diversity of content are the biggest barriers to getting lower income users online.

Ferrell, Elizabeth (1998, May). Poverty and Race: Traffic Lights at the Information Superhighway On-ramp. Washington State University at Vancouver. Retrieved October 8, 2001 from the World Wide Web:  
[http://helium.vancouver.wsu.edu/~ferrell/ses\\_site/index.htm](http://helium.vancouver.wsu.edu/~ferrell/ses_site/index.htm).

This Web site discusses the disparity of access between classes of people. Citing a variety of sources, the report addresses several issues including poverty, education, employment, and equity. Some of the solutions offered to minimize this disparity include endorsing former President Clinton's Educational Technology Initiative, whose goal is to connect all classrooms to the Internet by the year 2000, and partnering schools with a variety of sponsors.

Garcia, Kimberly (2000, September). Crossing the Digital Divide, Hispanic, 13(9).

Two recent surveys by private research firms suggest that the digital divide may be closing for Latinos. Results of a third, more comprehensive but dated, Census Bureau survey, are less optimistic.

Griffith, Ross (1999, April). Connecting Students and Faculty through Technology, Collaboration, and Globalization at Wake Forest University. The Technology Source. Retrieved October 4, 2001 from the World Wide Web: (<http://horizon.unc.edu/TS/>).

This case study highlights Wake Forest University's strategic plan to provide all faculty and entering freshman with computers. The most distinctive outcome of the plan is that, as of fall 1996, all faculty and entering freshmen received IBM laptop computers, and they receive an upgrade every two years. Seniors keep the computers upon graduation. Also, the entire campus has been completely wired for computing.

Hamilton, Kendra (2001, March). Historically Black Colleges Strive to Bring Campus Communities Up to Technological Speed: But Are They Catching Up? Black Issues in Higher Education, 18(2).

This article explores the digital divide at historically Black colleges and universities. It also describes efforts to remedy the problem at various institutions, controversy over the existence of such a divide, and mobilization of regional and national organizations to address it.

Higher Education and National Affairs (2001, January). National Survey Shows Female Freshmen Lack Computer Confidence. American Council on Education, 50(2).

The fall 2000 survey of freshmen students conducted by the Higher Education Research Institute at UCLA's Graduate School of Education and Information Studies, found that a record breaking 78.5 percent of freshmen use computers regularly during the year before attending college. Yet, although women have almost pulled even with men in computer use—77.5 percent of women and 79.5 percent of men report frequent computer use in 2000—a new survey question regarding computer skill levels reveals a much lower confidence level in female freshmen.

Hoffman, Donna L. and Thomas P. Novak (1998, April). Bridging the Digital Divide: The Impact of Race on Computer Access and Internet Use, Science.

This article addresses the question of whether observed race differences in access and use of computers can be accounted for by differences in education and income. Increased levels of household income correspond to increased likelihood of owning a home computer, regardless of race. Increasing levels of education correspond to an increased likelihood of work computer access, regardless of race. When students are considered, race almost always makes a difference. White students lacking a home computer, but not African American students, appear to find an alternative means of accessing the Internet.

Hu Shouping and George D. Kuh (2001, November). Computing Experience and Good Practices in Undergraduate Education: Does the Degree of Campus “Wiredness” Matter? Education Policy Analysis Archives, 9(49).

Responses to the *College Student Experience Questionnaire* 4<sup>th</sup> Edition from 18,844 students at 71 colleges and universities were analyzed to determine if the presence of computing and information technology influenced the frequency of use of various forms of technology and other educational resources and the exposure to good educational practices. Undergraduates attending “more wired” campuses as determined by the 1998 and 1999 *Yahoo! Most Wired Campus* survey more frequently used computing and information technology and reported higher levels of engagement in good educational practices than their counterparts at less wired institutions. Non-traditional students benefited less than traditional students, but both women and men students benefited comparably from campus “wiredness.”

Johnson, Dan (2001, September/October). The Cyber Children Have Arrived, Futurist, 35(5).

This article focuses on the impact of computers in the United States. It discusses the benefits of computers to children as well as the effects of excessive computer activity. Recommendations to ease the digital divide include significant initiatives from government and the private sector to boost low-income families’ access to computers and the Internet—at home, at school, and in libraries and community centers.

Kominski, Robert and Eric Newberger (1999, August). Access Denied: Changes in Computer Ownership and Use, 1984-1997. Presented at the Annual Meeting of the American Sociological Association, Chicago, Illinois.

This paper reports research and analysis undertaken by Census Bureau staff. Using data from a series of questionnaire supplements conducted as part of the Current Population Survey, questions addressed home ownership and use of computers, in addition to use at school and work. Dramatic growth of computer ownership and use is revealed; in 1984, 7.9 percent of U.S. households reported that they owned a home computer, in contrast to 36.6 percent in 1997. Affordability is a serious hurdle for many households. In 1997, fewer than 1 in 4 households with family incomes below \$35,000 owned a computer. People of white and “other” races had much higher levels of ownership than Blacks or Hispanics. With respect to Internet use, most of the differentials that exist in computer use are also present regarding the Internet.

Kramarae, Cheris (2001). The Third Shift: Women Learning Online. American Association of University Women Educational Foundation.

This report examines the convergence of two major trends: the growth of technology and distance education in the college and university setting, and the demographic shift toward a predominantly female population of non-traditional-age college students. It focuses on understanding why women pursue online education, what constraints they may face in doing so, and how they perceive online culture, social identity, and communications. Several recommendations are provided for future research. They include: What access do students have to computers? What kind of equipment is available at home and at work, and when can it be used for online courses? And, how are computer time and work space allocated within households?

Lach, Jennifer (2000, June). Crossing the Digital Divide, American Demographics, 22(6).

This paper discusses the study conducted by Cheskin Research on computer and Internet usage among Hispanic Americans in the United States. Issues include growth of household computer penetration among Hispanics, demographics of Hispanics using the Internet, top Web sites used by Hispanics, and uses of the Internet for Hispanic Americans.

Lenhart, Amanda (2000, September). Who's Not Online? Pew Internet & American Life Project. Retrieved October 8, 2001 from the World Wide Web: <http://www.pewinternet.org/>

This report is based on the findings of a tracking survey of Internet activities. Half the adults in America do not have Internet access and 57 percent of those non-users are not interested in getting online. The “gray gap”—aging Baby Boomers and senior citizens are the most resistant to the Internet; and the young are the most likely to go online eventually. Significant numbers of non-users cite issues besides the cost of computers and Internet access as problems when they think about the online world. There is gender parity in the Internet population, however, women still lag behind men in their relative participation in the online world. Whites are notably more likely to have Internet access than blacks or Hispanics. Also, there is notably less Internet penetration in rural areas than in other types of communities. A major factor in rural areas is that a relatively large number of residents don't use computers. Finally, more than a tenth of those without Internet access once were online. Younger Americans are the most likely to have dropped or lost Internet access.

Little, Jason (2000, December). A Literature Review of the Digital Divide: Characteristics of People Least Likely to be Online. A course paper presented in partial fulfillment of the requirements for the degree of Doctor of Education, Nova Southeastern University.

This literature review focuses on a digital divide that appears to have emerged during the last decade. The literature suggests that while worldwide online usage

is rapidly growing, many people are left behind. Income, education, and geographic location seem to be the most apparent factors affecting online connectivity. Race, age, and disability factors seem to be closely linked to income, education, and location. In short, the less income and education one has the less likely he or she will use the Internet, regardless of race and age. This is also the case with geographic location. People who live in poorer countries with less education are more likely to be offline.

May, Susan (1994, Spring). Women's Experiences as Distance Learners: Access and Technology, Journal of Distance Education, IX (1).

Utilizing qualitative research, woman's distance learning experiences were examined. Nine woman from a variety of educational backgrounds and circumstances who studied a woman's studies course by home study or teleconferencing from Athabasca University during 1990 and 1991 were interviewed. The women unanimously agreed that distance study "isn't for everyone" and that it is a significantly different experience for female learners than it is for male learners. The author concluded that further research is warranted.

National Association of State Boards of Education (2001). Any Time, Any Place, Any Path, Any Pace: Taking the Lead on e-Learning Policy, NASBE.

This report of the NASBE Study Group on e-Learning: The Future of Education concludes that e-learning will improve American education in valuable ways and should be universally implemented as soon as possible. Among the reports several policy recommendations, the following address the assurance of equity. (1) Ensure that every student has access at school to the equipment, software, fast Internet connections, and other resources necessary to take full advantage of e-learning opportunities. (2) Provide after school access by working with other agencies to ensure that every student has convenient and affordable access to e-learning opportunities when school is out. (3) Supply technologies to assist students with special needs.

National Telecommunications and Information Administration (1995, July). Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America, U.S. Department of Commerce.

This survey addressed trends in telephone subscribership, as well as ownership and usage of personal computers (PC) and modems, using 1994 data. By contracting with the U.S. Census Bureau to add questions on PC/modem ownership and usage in its November 1994 "Current Population Survey," these data constituted the first census survey of its kind regarding PC/modem ownership. The "have nots" in this study included the poor in central cities and rural areas, rural and central city minorities, young and old, the less-educated in central cities, and people in the northeast central cities and the South.

National Telecommunications and Information Administration (1998, August). Falling Through the Net II: New Data on the Digital Divide, U.S. Department of Commerce.

This survey updated the results of the 1995 report by NTIA using similar data compiled by U.S. Census Bureau in October, 1997. The data demonstrate that, as a nation, Americans have increasingly embraced the Information Age through electronic access in their homes. However, despite this significant growth in computer ownership and usage overall, the growth has occurred to a greater extent within some income levels, demographic groups, and geographic area, than in others. In fact, the digital divide between certain groups of Americans has *increased* between 1994 and 1997 so that there is now an even greater disparity in penetration levels among some groups. There is a widening gap, for example, between those at upper and lower income levels. Also, even though all racial groups own more computers than they did in 1994, Blacks and Hispanics lag *even further behind* Whites in their levels of PC-ownership and on-line access.

National Telecommunications and Information Administration (1999). Falling Through the Net: Defining the Digital Divide. A Report on the Telecommunications and Information Technology Gap in America. Revised. U.S. Department of Commerce Research/Technical Report.

This report provides comprehensive data on the level of access by Americans to telephones, computers, and the Internet. It also provides information about where Americans are gaining access and what they are doing with their online connections. While access to the Internet has soared for people in all demographic groups, the digital divide persists between the information rich and the information poor, who include younger people, those with lower incomes and education levels, certain minorities, and those in rural areas and central cities. Whites are more likely to have access to the Internet from home than Blacks or Hispanics are from any location.

National Telecommunications and Information Administration (2000, October). Falling Through the Net: Toward Digital Inclusion: A Report on Americans' Access to Technology Tools. U.S. Department of Commerce.

This report, a fourth in a series, measures the extent of digital inclusion by looking at households and individuals that have a computer and an Internet connection. Even while Internet access and computer ownership are rising rapidly for all groups, a digital divide remains or has expanded slightly in some cases. People with a disability are only half as likely to have access to the Internet as those without a disability. Large gaps also remain regarding Internet penetration rates among households of different races and ethnic origins. Asian Americans and Pacific Islanders have maintained the highest level of home Internet access while blacks and Hispanics are at the other end of the spectrum.

The report finds that individuals 50 years of age and older are among the least likely to be Internet users. Finally, rural areas are now lagging behind central cities and urban areas in broadband penetration.

National Telecommunications and Information Administration (2002, February). A Nation Online: How Americans are Expanding Their Use of the Internet. U.S. Department of Commerce. Retrieved February 15, 2002 from the World Wide Web: <http://www.ntia.doc.gov/ntiahome/dn/anationonline2.pdf>.

This report is based upon findings on the September 2001 U.S. Census Bureau's Current Population Survey—a survey of approximately 57,000 households and more than 137,000 individuals across the United States. As such, the data are among the most broad-based and reliable datasets that have been gathered on Internet, broadband, and computer connectivity. This very recent report provides a comprehensive picture and wealth of information regarding the growth of American's use of the Internet and computers. For instance, a major finding is that the rate of Internet use in the United States is currently two million new Internet users per month. In addition, more than half of the nation is now online and Internet use is increasing for people regardless of income, education, age, race, ethnicity, or gender.

Newburger, Eric C. (1997, October). Computer Use in the United States: Population Characteristics. U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Census.

Using the Current Population Survey, this 1997 survey found that 37.4 million American households, or 36.6 percent, had computers. Computer presence was most likely (75.9 percent) with yearly family incomes of \$75,000 or more. Also, households with school age children were far more likely than those without to have a computer. Other findings were that far more children used a computer at school than at home and school was the most common place for children to access the Internet.

Novak, Thomas P. and Donna L. Hoffman (1998, February). Bridging the Digital Divide: The Impact of Race on Computer Access and Internet Use. Project 2000, Vanderbilt University. Retrieved October 25, 2001 from the World Wide Web: <http://www2000.ogsm.vanderbilt.edu/papers/race/science.html>.

According to this working paper, while whites are more likely to currently have PC access, African-Americans are more likely to state they would like to *acquire* access. Using data from the Spring 1997 CommerceNet/Nielson Internet Demographic Study (IDS), the analysis included several findings. Income explains home computer ownership, while education explains access to a work computer. On the other hand, education does not explain race differences in home computer ownership and income does not explain race differences in access to a work computer.

Oder, Norman, and Michael Rogers (1999, August). Feds Focus on “Digital Divide” Between Whites and Minorities, Library Journal, 124(13).

This paper focuses on the report published by the U.S. Department of Commerce’s National Telecommunications and Information Administration (NTIA) regarding the digital divide between Internet access and use among whites and minorities. Discussion includes how Internet access through libraries is an important factor.

Olsen, Florence (2001, October). Survey of Colleges’ Spending on IT Finds Overall Increase, Hints of a “Digital Divide,” The Chronicle of Higher Education, October 30, 2001. Retrieved November 2, 2001 from the World Wide Web: <http://chronicle.com/free/2001/10/200110300t.htm>.

Data presented at the annual conference of Educause from the Cost of Supporting Technologies Services (COSTS) showed that, for 2000-1, median spending on information technology was \$1,299 for each student and employee at the most selective and wealthiest liberal-arts colleges taking part in the study. At the less selective and less endowed undergraduate colleges, the median spending was only \$459 per student and employee. The disparity between the two groups in median spending per user increased from \$747 in the 2000 fiscal year to \$840 in the 2001 fiscal year.

Resmer, Mark, Diane Oblinger, and James R. Mingle (1995, November). Computers for All Students: A Strategy for Universal Access to Information Resources. State Higher Education Executive Officers.

This report addressed the policy and implementation issues involved in providing universal student access to technology, which means ensuring each student has 24-hour access to a laptop computer and the Internet. The rationale for universal access arises because, among other things, the increasing amount and dynamic nature of knowledge that students must absorb, changes in educational paradigms, and the rapid pace of technology change. Several recommendations are presented to achieve implementation of universal access.

Revenaugh, Mickey (2000, May). Beyond the Digital Divide: Pathways to Equity, Technology and Learning, 20(10).

This article focuses upon equity in access to Internet technology. Highlights include equity at school, the Internet factor, including the e-rate, access in the community—including computer camps, home access to the Internet, and the importance on technological literacy—for education or for work.

Roach, Ronald (2000, March). Capitolizing on the Digital Divide, Black Issues in Higher Education, 16(27).

There are many opportunities for minorities in information technology (IT), especially in the Washington, DC area according to the author. The region's exploding IT growth is noted along with opportunities for public and private postsecondary institutions. Other topics include outreach initiatives to attract underrepresented minorities to the IT field, the government's role, and the role of black companies.

Rodino, Michelle (1997, December). Breaking Out of Binaries: Reconceptualizing Gender and its Relationship to Language in Computer-Mediated Communication, Journal of Computer-Mediated Communication, 3(3). Retrieved October 4, 2001 from the World Wide Web: <http://www.ascusc.org/jcmc/vol3/issue3/rodino.html>.

Using virtual environments, this paper analyzes interactions in Internet Relay Chat to look at the extent to which research on face-to-face talk and computer-mediated communication can describe gender and its relationship to language. Neither the function of utterances nor the construction of gender adheres to dualistic descriptions, as past research has implied.

Ross, John A., Carole A. Crane, and Don Robertson (1995, Fall). Equity of Access to Computer-mediated Distance Education, Journal of Distance Education, X(2).

A survey of graduate students (N=62) enrolled in computer-mediated conferencing (CMC) courses and a follow-up analysis of help seekers (N=49) who used a dedicated hotline found that many students had encountered computer communications difficulties. Students varied in their ability to solve these problems and in their attitudes toward them. The students in greatest need were concentrated in courses that addressed topics unrelated to computer applications. Support from the hotline enabled most high-need students to continue in their courses, which made possible equal admission, a minimum standard of equity of access.

Ross, Sid (2000, September). Lower Income Users Get Online as Gap in Digital Divide Closes, Adweek Midwest Edition, 41(38).

This article describes the results of a survey conducted by Media Metrix on Internet usage among households in the U.S. As the diversity of Internet users continues, its households with an average income of \$25K or less that represent the highest percentage of Internet "newbies." Although these households comprise less than 10 percent of the total Internet population, the survey showed that their numbers have risen nearly 50 percent over the past year.

Singleton, Solveig, and Lucas Mast (2000, November/December). How Does the Empty Glass Fill? A Modern Philosophy of the Digital Divide, Educause Review, 35(6).

The authors argue that the digital divide is not a serious problem. Even without government help, entrepreneurs are offering myriad services and products geared towards people in the lower economic brackets. More of a problem, according to the authors, is the lack of basic skills in areas such as math and reading among younger people.

Thierer, Adam D. (2000, July). Is the “Digital Divide” a Virtual Reality? Consumers’ Research Magazine, 83(7).

This optimistic article discusses the public policy debate over the digital divide in the United States and argues that the history of the computer industry and the Internet in the U.S. is one of the most exciting stories of free market opportunity and entrepreneurial success. The report further asserts that there is no digital divide crisis in America because people can obtain personal computers and access to the Internet at very little cost. Moreover, the author states that federal entitlement programs will not facilitate the process; in fact, they might actually make things worse by putting pressure on computer prices to hold steady or increase.

Treviranus, Jutta and Norman Coombs (2000, October). Bridging the Digital Divide in Higher Education, In: EDUCAUSE 2000: Thinking IT Through. Proceedings and Post-Conference Materials, Nashville, Tennessee.

The emergence of the digital campus, and the rapid convergence of previously disparate methods of communicating information, presents both a risk and an opportunity for people with disabilities. The imminent risk is that non-inclusive design of the digital campus will irreparably widen the digital divide within higher education, to the detriment of learners and educators with disabilities as well as to society as a whole. The opportunity is to use emerging tools and technologies to create more learner-directed, flexible multi-modal learning environments, thereby reducing barriers and advancing education of all learners.

Warburton, Edward C. and Xianglei Chen (2001, October). Teaching with Technology: Use of Telecommunications Technology by Postsecondary Instructional Faculty and Staff. U.S. Department of Education, National Center for Education Statistics, Statistical Analysis Report, NCES xxx. \*(This report is scheduled to be available in February, 2002).

This report examines postsecondary instructional faculty and staff’s access to and use of electronic mail (e-mail) and the Internet. Using the 1999 National Study of Postsecondary Faculty (NSOPF:99), the report attempts to answer the following questions. Who has access to telecommunications technology, such as e-mail and the Internet? Who uses it for teaching purposes and how much do they use it?

WebAim (2001). Introduction to Web Accessibility. Retrieved October 16, 2001 from the World Wide Web: <http://webaim.org/info>

This report focuses on access to the Internet for people with disabilities. An estimated 20 percent of the population in the United States (40.8 million individuals) as some kind of disability, and 10 percent (27.3 million individuals) as a *severe* disability. In general, there are five types of disabilities that affect Internet usage. These are: (1) visual impairments, (2) hearing impairments, (3) mobility impairments, (4) cognitive impairments, and (5) seizure disorders. This overview addresses each one of these disabilities as they relate to Internet access.

## Preparation for Using Technology

Commission on Technology, Gender, and Teacher Education (2000). Tech-Savvy: Educating Girls in the New Computer Age. American Association of University Women Educational Foundation.

Several themes focusing on girls in schools are found in this report. They include: (1) girls and teachers in grades K-12 have reservations about the computer culture; (2) statistics on girl's participation in the culture of computing are of increasing concern, and (3) girls current ways of participating in the computer culture are a cause of concern. Several recommendations include compute across the curriculum, redefine computer literacy, prepare tech-savvy teachers, and support efforts that give girls and women a boost into the pipeline.

Cuban, Larry (2001). Oversold & Underused: Computers in the Classroom. Cambridge, Massachusetts: Harvard University Press.

The author of this provocative book argues that teachers are not trained to use new technology or given a chance to develop creative uses for it in school. Consequently, computers end up being merely souped-up typewriters. He concludes that the abundant availability of infrastructure in the nation's schools has not led, as expected, to frequent or extensive teacher use of technologies for tradition-altering classroom instruction.

Education Week on the Web (2001, May). The New Divides: Looking Beneath the Numbers to Reveal Digital Inequities, Education Week on the Web.

The rapid infusion of computers into the nation's schools is closing the digital divide, but inequities still persist and questions remain to be answered. How often are students using the Internet and other computer resources to learn, and for what purposes? Are youngsters using school computers that can handle large amounts of data and employ sophisticated communication tools? Or are they working with obsolete machines inappropriate for the 21<sup>st</sup> century classroom? Moreover, do some schools have the technical support necessary to keep machines running while others do not? Are teachers in one district getting better trained to understand how to use technology to enhance learning, while teachers in another district are left to themselves to figure it out? Lastly, do all kinds of students—low achievers and high achievers, minority and white children, girls and boys, well-to-do and poor youngsters—benefit equally from the technology available in schools?

Gould, Larry, and John Ross (1999, November/December). Something Old, Something New: The Virtual High School, On the Horizon. 7(6).

This article discusses the emerging movement of virtual high schools, which offer primarily high school-level coursework in a twenty-four hours a day, seven

days a week format made possible by information technology. Virtual high schools enable students to jump-start their college careers in addition to enhancing access and adding value to traditional high school curricula. Moreover, this movement could add new impetus to the home schooling initiative.

Heaviside, Sheila, Toija Riggins, and Elizabeth Farris (1997, February). Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996. U.S. Department of Education, National Center for Education Statistics, NCES 97-944.

This survey requested information regarding the availability and use of advanced telecommunications in regular public schools and, in particular, access to the Internet, plans to obtain Internet access, use of advanced telecommunications by schools and teachers, and sources of support for advanced telecommunications in schools. Among the key findings, 65 percent of U.S. public schools had access to the Internet in fall 1996. While 61 percent of all public elementary schools had Internet access, about three-fourths (77 percent) of secondary schools had Internet access. Moreover, large schools are more likely to have Internet capabilities than their smaller counterparts. Finally, public schools with high levels of students in poverty were less likely to be connected to the Internet.

Kennedy, Mike and Joe Agron (1999). Bridging the Digital Divide, American School and University, 72(2).

This article examines the difficulties schools face in providing equal educational opportunities for all students, particularly in implementing technology in the classrooms of poor school districts. Obstacles in getting schools wired for the Internet are discussed, particularly in the areas of funding. Examples of how some economically disadvantaged schools are getting connected and their funding efforts are highlighted.

Kentucky Long-Term Policy Research Center (2001). Are Technology Investments Yielding Dividends for Kentucky Students? Policy Notes on Issues of Importance to Kentucky's Future. Retrieved October 25, 2001 from the World Wide Web: [http://www.kltprc.net/policynotes/Chpt\\_7.htm](http://www.kltprc.net/policynotes/Chpt_7.htm).

A survey of Kentucky high school students offers several insights into where young people acquire computer skills. The vast majority of principally college-bound youth have access to a computer at home, but they acquire key skills—word processing and spread sheets—at school. Thus, computers in schools appear to have leveled the playing field. Also, some studies have linked the use of spreadsheet analysis to higher math scores.

National Center for Education Statistics Issue Brief (1998, March). Internet Access in Public Schools. U.S. Department of Education, Office of Educational Research and Improvement.

Using surveys of a nationally representative sample of public schools from 1994 to 1997, NCES sought to measure Internet access in schools. In three years, the percentage of U.S. public schools with Internet access increased from 35 percent in fall 1994 to 78 percent in fall 1997. Despite this progress, certain gaps persist. In 1997, schools with 50 percent or more minority students enrolled lagged behind schools with 20 percent or fewer minority students, as did smaller schools. Also lagging in Internet capabilities were schools with 71 percent or more poor students, with 63 percent having access. However, schools with 31 to 70 percent poor students have made considerable gains in Internet access, moving from 58 percent in 1996 to 78 percent in 1997.

National Center for Education Statistics (2000, April). Teacher Use of Computers and the Internet in Public Schools. U.S. Department of Education, Office of Educational Research and Improvement, NCES 2000-090.

This Statistics in Brief discusses public school teachers' use of computers and the Internet and their feelings of preparedness to do so. Using the Fast Response Survey System that was conducted in the spring of 1999, the survey found that 99 percent of full-time regular public school teachers reported they had access to computers on the Internet somewhere in their schools. Thirty-nine percent of public school teachers with access to computers or the Internet in their classroom or elsewhere indicated they used computers or the Internet "a lot." Sixty-six percent of public school teachers reported using computers or the Internet for instruction during class time. Also, 23 percent of public school teachers reported feeling well prepared and an additional 10 percent reported feeling very well prepared to use computers and the Internet in their teaching.

National Center for Education Statistics (2001, May). Internet Access in U.s. Public Schools and Classrooms: 1994—2000. U.S. Department of Education, Office of Educational Research and Improvement, NCES 2001-071.

Since 1994, NCES has surveyed public schools to measure what proportion of them are connected to the Internet. In the fall of each academic year, a new nationally representative sample of approximately 1,000 public schools has been surveyed about Internet access and, since 1996, about the type of Internet connections used. In this survey, questions were also asked about access to the Internet at times outside of regular school hours and on "acceptable use policies." The survey found that there were virtually no differences in public school access to the Internet by school characteristics. There was, however, a difference in the ratio of students to instructional computers between schools with the highest concentration of poverty (9 to 1) and the lowest concentration of poverty (6 to 1).

National Education Association (2000). Technology and Gender Inequity. Retrieved October 8, 2001 from the World Wide Web:  
<http://www.nea.org/cet/BRIEFS/brief5.html>.

This brief notes that the disparities in both the use and proficiency with technology continue to persist between male and female students. Several recommendations are presented. Get comfortable with computers and other technologies and incorporate them into your work. Integrate technology into all subject areas and utilize the Internet as a research tool. Make computers a required part of the curriculum. Use the computer in collaborative projects. Finally, guard against the tendency to “do for” girls, while encouraging boys to “do for themselves.”

Noll, Roger G., Dina Older-Aguilar, Richard R. Ross, and Gregory L. Rosston (2000, December). Bridging the Digital Divide: Definitions, Measurement, and Policy Issues. California Public Affairs Forum held at Stanford University, Stanford, CA. Retrieved October 14, 2001 from the World Wide Web:  
<http://www.ccst.ucr.edu/cpa/bdd/bddhome.html>.

The digital divide refers to many aspects of information technology and a few generalizations stand at the core of the concept, and have shaped the public debate. In part the digital divide is about differential access to hardware—computers. Another aspect of the digital divide refers to software and the uses of information technology. For Internet services, consumers are offered several types of network access, from a relatively slow ordinary telephone line to technologies that can transmit much greater amounts of information. Still another aspect of the digital divide refers to access to the full range of services through the consumer’s network connection. Probably the greatest attention has been given to educational uses of information technology, especially the use of computers and the Internet in elementary and secondary education. Indeed, the Telecommunications Act of 1996 specifically mentions ubiquitous Internet access for schools.

Pea, Roy D. (2000, December). Bridging the Digital Divide: Technology, Equity, and K-12 Learning. California Public Affairs Forum held at Stanford University, Stanford, CA. Retrieved October 4, 2001 from the World Wide Web:  
<http://www.ccst.ucr.edu/cpa/bdd/BDDreport/BDD09.html>.

This paper notes that the United States Commerce Department defines digital divide as “differences in the shares of each group that is digitally connected.” Income and education are key predictors with regard to digital divide. Differential access for U.S. households by race and ethnic origin from 2000 data show that Asian-American and Pacific Islanders lead, with Whites close behind, and Hispanic and Black households much less connected to the Internet. There are profound differences with respect to age, with the percent of Internet users at its peak at 14 years of age. Disabilities provide yet another major demographic

area for a look at digital divide issues. Also, there is a significant digital divide in schools serving lower-income communities. A key finding is that “digital inclusion” for social mobility requires skills and knowledge ranging from basic literacy to new technical fluencies.

Sax, Linda J., Alexander W. Astin, William S. Korn, and Kathryn M Mahoney (2001). The American Freshman: National Norms for Fall 2000. Cooperative Institutional Research Program, American Council on Education, University of California, Los Angeles.

This survey of Fall 2000 freshmen shows that student use of personal computers has escalated in recent years and the gender gap in use has nearly closed. However, women lag far behind their male counterparts when asked about their computing self-confidence. Other gender differences in computing are found in questions related to Internet use. Women are less likely than men are to participate frequently in Internet chat rooms and less likely to report frequent Internet use for “other” reasons or activities.

Smerdon, Becky, Stephanie Cronen, Lawrence Lanahan, Jennifer Anderson, Nicholas Iannotti, and January Angeles (2000). Teachers’ Tools for the 21<sup>st</sup> Century: A Report on Teachers’ Use of Technology. U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics, NCES 2000-102.

Among several findings, this report reported barriers reported by teachers that prevented them from optimal use of technology. In 1999, those barriers most frequently reported to be “great” barriers to their use of computers or the Internet for instruction were not enough computers and lack of release time to learn how to use computers or the Internet. Secondary teachers, teachers in large schools, and teachers in city schools were more likely than elementary teachers, teachers in small schools, and teachers in rural schools to report that not enough computers was as great barrier. Additionally, teachers in schools with more than 50 percent minority enrollments were more likely to cite outdated, incompatible, or unreliable computers as a great barrier than teachers in schools with less than 6 percent minority students.

The Children’s Partnership (2001). Online Content for Low-Income and Underserved Americans: The Digital Divide’s New Frontier, A Strategic Audit of Activities and Opportunities. Retrieved October 14, 2001 from the World Wide Web: [http://www.childrenpartnership.org/pub/low\\_income/index.html](http://www.childrenpartnership.org/pub/low_income/index.html).

This audit focused on four significant “content” barriers that affect large numbers of Americans. They are (1) lack of local information about their community; (2) literacy barriers—the vast majority of information on the Internet is written for an audience that reads at an average or advanced literacy level; (3) language barriers—while 87 percent of documents on the Internet are in English, at least 32 million Americans speak a language other than English as

their primary language; and (4) lack of cultural diversity. Several strategies are offered to address these barriers.

U.S. Department of Education (1996, June). Getting America's Students Ready for the 21<sup>st</sup> Century, Meeting the Technology Literacy Challenge: A Report to the Nation on Technology and Education. Retrieved October 11, 2001 from the World Wide Web: <http://www.ed.gov/Technology/Plan/NatTechPlan/>

Four concrete goals are outlined. (1) All teachers in the nation will have the training and support they need to help students learn using computers and the information superhighway. (2) All teachers and students will have modern multimedia computers in their classrooms. (3) Every classroom will be connected to the information superhighway. (4) Effective software and on-line learning resources will be an integral part of every school's curriculum. The report outlines strategies and identifies the roles of the federal government, state and local communities, and higher education and the private and nonprofit sector.

Warburton, Edward C., Rosio Bugarin, and Anne-Marie Nunez (2001, May) Bridging the Gap: Academic Preparation and Postsecondary Success of First-Generation Students. U.S. Department of Education, National Center for Education Statistics, Statistical Analysis Report, NCES 2001-153.

A meaningful conclusion of this report is that, after holding all other variables constant, students who took rigorous coursework in high school significantly increased their chances of staying on the persistence track to a bachelor's degree. Taken together, these results suggest that, while first-generation status is an important predictor of success in postsecondary education, rigorous preparation in high school substantially narrows the gap in postsecondary outcomes between first-generation students and their peers whose parents graduated from college. Computer literacy or use is not part of this survey, which may have been informative given the importance of computers.

## Academic Programs

Note: There are hundreds of programs and thousands of courses available on line. A variety of sources are open to a student interested in pursuing postsecondary education at a distance. The following are representative venues for accessing information regarding distance education programs and courses.

Motorola (2002) About Motorola – Products and Services. Motorola, Inc. Retrieved January 14, 2002 from the World Wide Web: <http://www.mot.com/home/>

This web site provides a listing of 792 courses offered by Motorola University, primarily to upgrade the skills of Motorola employees. The majority of courses are very technical, relatively short duration, and available at the employee work place.

Oracle Learning Network (2002). E-learning Without Limits. Oracle Corporation. Retrieved January 15, 2002 from the World Wide Web: <http://www.oracle.com/education/oln/subscribe.pool.html>.

This web site offers a subscription for access to many instructor-led Oracle eclasses. Examples of the courses include “Internet, Networking, and Distributed Systems,” Oracle Applications DBA,” and “Database Applications Development.”

PBS Adult Learning Service (2002). Learning for a Lifetime. PBS. Retrieved January 15, 2002 from the World Wide Web: <http://www.pbs.org/als/courses/courselistings/index.html>.

This web site provides a listing of courses produced by PBS and offered by many colleges across the country. The courses are available as telecourses, teleWEBcourses, or Webcourses. Some are also available by cassette. Over 100 courses are listed and range from titles such as “American in Perspective,” to “For the Love of Wisdom.” to “Growing Old in a New Age,” to “The World of Abnormal.”

Peterson’s (1998). Distance Learning Programs, Second Edition. Peterson’s.

This guide provides a list of instructional programs available electronically from individual colleges, universities, and consortia of higher education institutions. This second edition includes programs of some 700 accredited North American institutions, in contrast to the first edition—published in 1994—where there were less than 100 institutional listings. The Web site, which provides more updated information, is <http://www.lifelonglearning.com>.

SREB Electronic Campus (2002). Electronic Campus of the Southern Regional Education Board. Southern Regional Education Board. Retrieved January 16, 2002 from the World Wide Web: <http://www.electroniccampus.org/>

This Electronic Campus of the Southern Regional Education Board is an “electronic marketplace” for courses, programs and services. All of the courses and programs are offered by accredited colleges and universities in the 16 SREB states. Twenty-one total degree programs are offered ranging from a Bachelor of Independent Studies to a Master of Arts in Rehabilitation Counseling to a Master of Science in Fire and Emergency Management Administration. These courses and programs are offered by over 300 individual higher education institutions.

Thorson, Marcie Kisner (1998). Campus-Free College Degrees, 8<sup>th</sup> Edition. Thorson Guides.

In addition to providing a list of accredited college degrees through distance learning, this guide includes information on accreditation, equivalency examinations, experiential learning, the Regents College Credit Bank, and high school diplomas.